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AT THE BOTTOM OF THE PHONE CHARGING VALUE CHAIN…

Analysis of the solar phone charging value chain in Tanzania and recommendations to foster phone charging entrepreneurship in remote areas.

SEPTEMBER 2013

GVEP International

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1 Introduction

1.1 Context and main objectives

GVEP International (Global Village Energy Partnership) is a non-profit organisation with the mission of reducing poverty through broader access to energy. The organisation supports entrepreneurship related to energy services. This commitment is focused in developing countries (Africa, Caribbean and Latin America region) and has led to the development of several programs which empower BoP entrepreneurs. (Entrepreneurs at the Base of the Pyramid[1]): *Kenya Climate Innovation Centre*, *Developing Energy Enterprises Project* (DEEP), *Capital Access for Renewable Energy Enterprises* (CARE2), etc.

CARE2 PROGRAMME – CAPITAL ACCESS FOR RENEWABLE ENERGY ENTERPRISES

"In low-income countries, access to finance and lack of capital are a major constraint to the growth of micro, small and medium sized enterprises. The CARE2 programme aims to improve capital access in the renewable energy markets of four East African countries: Kenya, Tanzania, Uganda and Rwanda. This $7 million facility is supported by the Swedish International Development Cooperation Agency (SIDA).

Starting in September 2012, this 3-year programme consists of a combination of interventions designed to increase both the supply of capital to businesses, and their capacity to deploy that capital effectively. CARE2 comprises of a Business Support Team providing advice to businesses seeking capital, as well as an extension of our Loan Guarantee activities and several sector-focused enterprise development projects. This programme will focus heavily on women as one of its priorities is to address gender issues."

Source: *GVEP International, 2012*

In Tanzania (Mwanza region), CARE2 will concentrate its resources on supporting BoP entrepreneurs for the development of phone charging services powered by solar energy. GVEP International has already been involved in field trials of phone charging kits in Kenya and has evaluated other alternatives in the phone charging market. GVEP International is aware of the sustainable impacts that phone charging businesses have on BoP entrepreneurs as well as of its ripple effects in terms of development.

To contribute to the expansion of micro phone charging businesses while maximizing the positive impacts of such activity on BoP entrepreneurs, GVEP International is seeking to establish the value chain required to support such a market with affordable and efficient phone charging products. GVEP commissioned ENEA Consulting to examine the opportunities and risks for each business in the chain in order to better position and focus the NGO's resources and support.

Taking a value chain approach, GVEP International formulated several problem statements it wanted to be investigated in order to make its value chain involvement effective:

- **Manufacturers**: What do potential mobile phone charging technology suppliers view as the key barriers and risks? How are their business models facilitating entry into the market (or creating barriers)? What costs will they incur in establishing distribution in Mwanza versus the possible revenue?
- **Distribution channels**: How do local dealers view the opportunity and what do they view as the barriers to market entry? What costs and risks are involved? Do the different technology offerings and different business models, particularly new or unfamiliar models such as pay-as-you-go, offer different opportunities or challenges? What financing issues do they face? What benefits are they expecting for solar phone charging promotion to BoP entrepreneurs? Outside of Mwanza town, what are the available distribution channels? Are there distribution channels that are different from the channels that are currently used for delivering solar systems?

[1] Base of the Pyramid (BoP) entrepreneurs: referring to entrepreneurs with very limited means and revenue (See CK Prahalad, 2005).

- **BoP entrepreneurs**: What do potential BoP entrepreneurs view as the key barriers to the uptake of mobile phone charging equipment? What sort of technical support do they expect/need from product providers? Will this be different for pay as you go? Do they have sufficient capital, or access to finance to pay in cash?
- **GVEP positioning**: What interventions should GVEP International focus on in attempting to establish a distribution chain for these products?

Through its intervention and field investigations, ENEA Consulting intended to answer as many of these questions as possible. Even though every GVEP International problem statement has been considered, not every questioned could be answered:

- Most of the finance related answers were either confidential or the questions were not appropriate to the context. Manufacturers' costs, margins, or any profit and loss related information which was complicated to gather. Even though the investigation team could capture some material, information on several finance related topics were too limited to be considered as fully relevant. Such data should be treated with caution.
- Alternative distribution channels couldn't be reached and interviewed during the field investigations. As mentioned later in the subsection *Manufacturer of plug-and-play kits*, Fenix International is distributing its product through the Vodacom network of M-Pesa agents. This channel just established few weeks ago (summer 2013) around Mwanza but couldn't be properly covered by the analysis since it was not possible to meet with Vodacom. Other than this, no major alternative channel outside the value chain described in this report, was identified by the investigation team (beside an informal second hand market on solar panel). However, this doesn't mean any alternative distribution channels can't be developed. In Uganda several solar kit manufacturers have developed innovative routes to market (for instance by working with agricultural cooperatives to distribute products to their farmers).
- The respondents interviewed were not familiar with the concept of plug-and-play solar kits and could not provide informed opinions. Such products are very new to the market (only a few hundred units are currently distributed by manufacturers as part of pilot projects) and are not broadly available in the Mwanza region. Any analysed (potential) impact of the product integration to the value chain relies upon the investigative team's analysis of the market and is not based on respondents' perceptions.

Acknowledging the previous limitations, the final analysis, based on GVEP's problem statements, led to the characterisation of the value chain respondents and their challenges, as well as the elaboration of recommendations for the GVEP International CARE2 Programme. For reasons of confidentiality some of the information shared by the companies interviewed for this study have not been included in this report.

1.2 Means

Through its Access to Energy Programme, ENEA Consulting offered 1 month (22 man-days) of pro-bono consulting to GVEP International in order to assist in better understanding the Photovoltaic phone charging value chain in Tanzania.

To do so, the consulting mission has been organised as followed:

- Phase1: Integration of GVEP needs and preparation of the business owner interviews – From April 18th to May 6th 2013.
- Phase 2: Phone call interviews with phone charging kit manufacturers – From May 7th to May 22nd 2013.
- Phase 3: 22 field interviews with the remaining members of the value chain – From May 26th to May 31st of 2013.
- Phase 4: Post interview analysis and deliverable production – From June 18th to August 28th of 2013.

Phase 1, 2 and 4 were realised at ENEA Consulting Head Quarter (Paris, France) while Phase 3 was completed in the Mwanza region (Tanzania) with the direct support and supervision of the GVEP International local branch (interview schedule and related logistics). Field interviews proceeded as followed:

- Respondents based in Mwanza town were met with the in the company of a GVEP Regional business coordinator (Interviewed respondents: Wholesaler, Retailer, Bank, Micro finance Institution);
- Respondents outside of Mwanza town were met with in the company of a GVEP Regional technical mentor (interviewed: Retailer, BoP entrepreneur).

GVEP staff provided translation where this was required.

2 Methodology

2.1 Approach

2.1.1 Data collection

To collect all the needed information from the main five business types of the value chain, ENEA Consulting organized the interviews following a semi-directive approach[2]:

- Interviewees are asked to express their opinions on specific topics. The interviewers responsibility is therefore to keep the interviewees inside the topic boundaries.
- The questionnaire does not contain a set of pre-determined answers with which the respondent is asked to agree or disagree. This is to encourage the interviewee to express their views as freely as possible on the given topic.

The main advantage of such an approach is that it limits the respondent being swayed by the interviewer's opinions. Since "no" and "yes" cannot be possible answers, the interviewee is required to express a statement or a concern without having an expectation of what is a "right" response.

The main disadvantages of such an approach is:

- The length of the answers may vary from topic to topic. In some cases the interviewee may have little to say leaving the interviewer with limited input for the study;
- The limited possibilities of statistical analysis, though statistically valid, quantitative data was never the purpose of the mission.

2.1.2 Data analysis

In this report, every business typology has been analysed following the *Business Model Generation* Framework. The methodology developed by A. Osterwalder & Y. Pigneur (and supported by 470 business model practitioners through a co-creation process) it has been chosen for its efficient representations of interactions along the value chain.

According to the authors, a business model is a composition of 9 key blocks that represent the systemic environment of an organisation. These 9 blocks are the following:

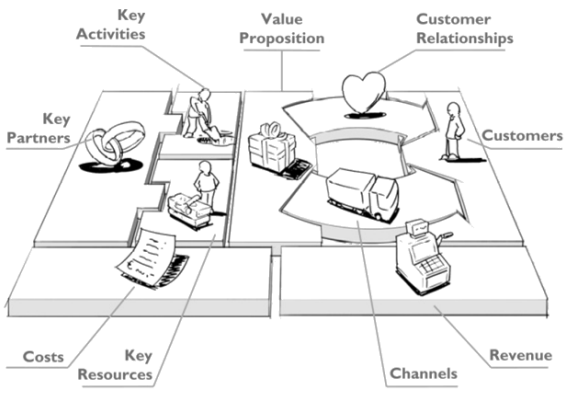

Figure 1 -- Presentation of the Business Model framework (Source: *A. Osterwalder & Y. Pigneur, 2010*)

To facilitate understanding of the methodology, a summary of the key questions which relate to the analysis of each block is available in the Appendix (Business Model Framework methodology).

[2] An illustration of the approach applied to a questionnaire template is available in the Annexes section.

The following illustration (Figure 2) explains the presentation of the business model interpretations which are provided in the section 3 of the report.

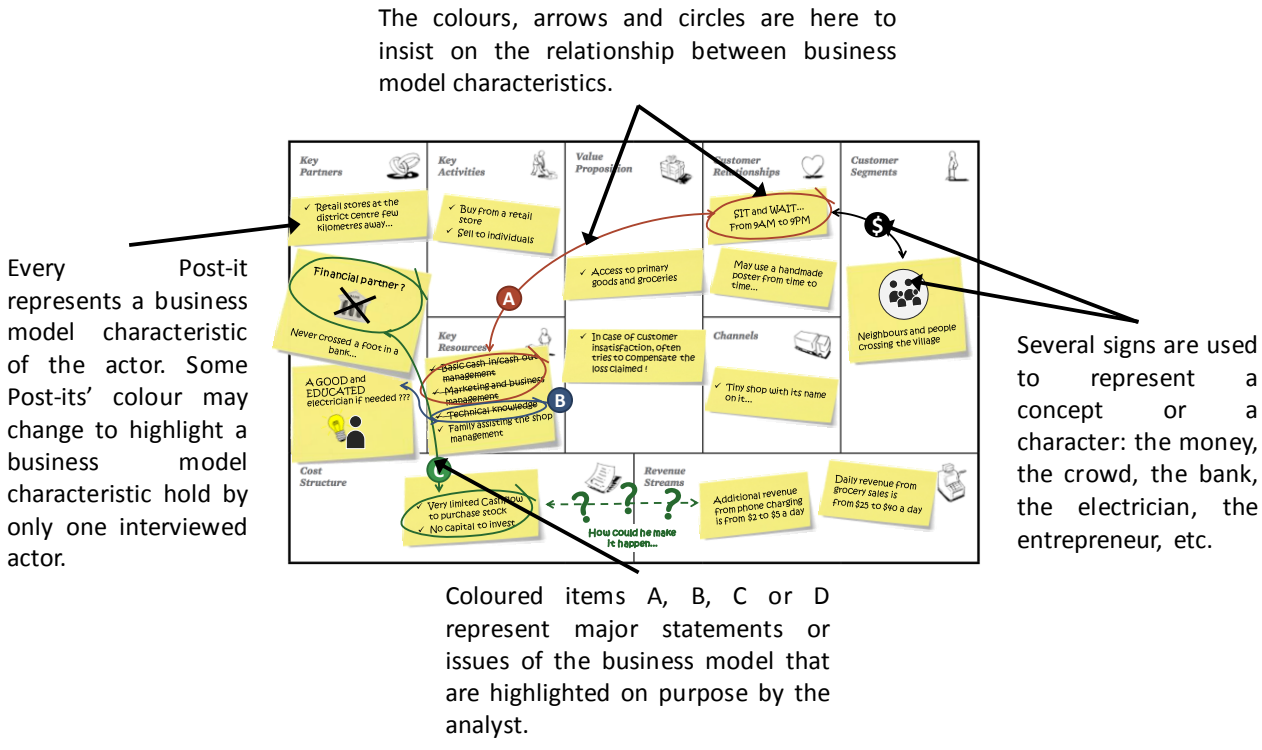

Figure 2 -- Illustration of the business model framework used in the report (*Source: ENEA Consulting / BMG, 2013*)

2.2 Scope of the study

Interviews were organised by the GVEP International local branch with the intention of filling all typologies of the phone charging value chain.

Thus, the interviewee selection process respected the analysis boundaries illustrated in the Figure 3. The 5 business types represented along this value chain correspond to the scope of the study. Each typology is further detailed in the section called *Businesses and their challenges along the value chain*.

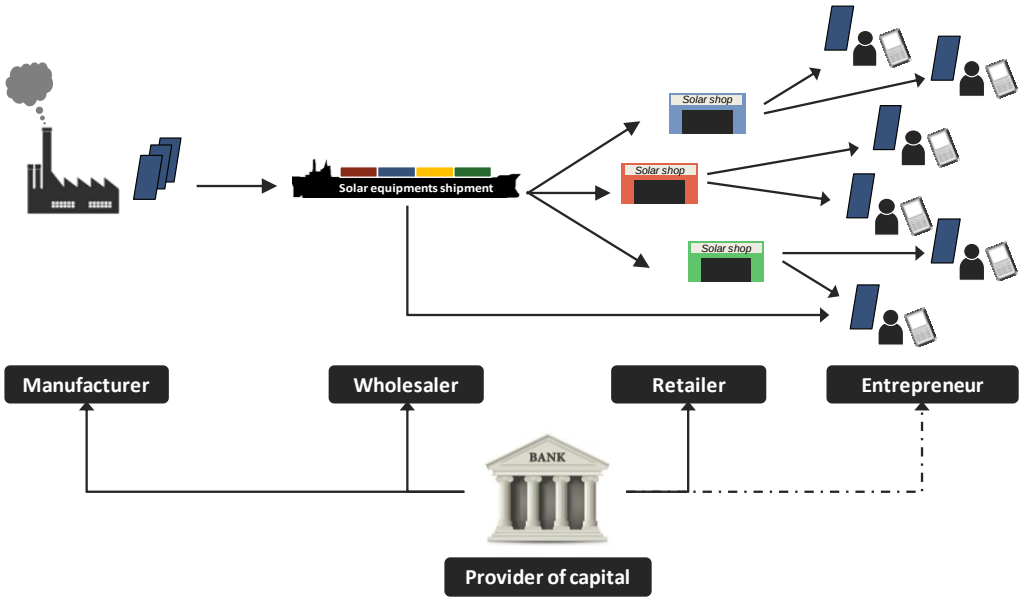

Figure 3 -- Illustration of the PV phone charging value chain (Source: *ENEA Consulting analysis, 2013*)

Twenty-six members of the value chain were met at their registered location (except for manufacturers who do not have facilities in Tanzania). In addition to the main members of the value chain, an association (TAREA) regrouping retailers and the local wholesaler in the renewable energy related markets were interviewed. Beside the valuable information the organization brought to the team regarding solar markets, TAREA is not considered further in this report as it is not properly part of in the value chain.

Based on the initial value chain chart and the filed investigations, value chain member's denomination is understood according to the following:

- **Manufacturers** (4 interviewed): they are solar kit designers.
- **Producers**: are contracted by the manufacturer to manufacture (from Asia essentially) the solar kits which then would be shipped to Africa.
- **Distributors**: refers to the full distribution channel firms, including both wholesalers and retailers.
- **Wholesaler** (1 interviewed): firms purchasing electronic products from abroad (from bigger wholesalers or manufacturers) to distribute it within its region. Wholesalers are able to conduct international transactions, source products from abroad and pay upfront for large amounts of stock
- **Retailers** (8 interviewed): able to conduct domestic transactions with wholesalers. Except from Nairobi (Kenya), retailers are not normally able to import goods from abroad. Retailers have limited cash flow limiting their ability to acquire stock.
- **BoP entrepreneurs** (8 interviewed): are understood as BoP entrepreneurs, purchasing solar kits from retailers/distributors in order to commercialize a service from the acquired kit.
- **Providers of capital**: refers to both banks and Micro Finance Institutions.
- **Banks** (2 interviewed): a business that safely stores and lends capital and generates income by charging interest on loans.
- **Micro Financed Institutions - MFI** (2 Interviewed): similar to banks, MFIs earn money by managing others' money. Except the MFI is a business supplying small loans to individuals and organisations.

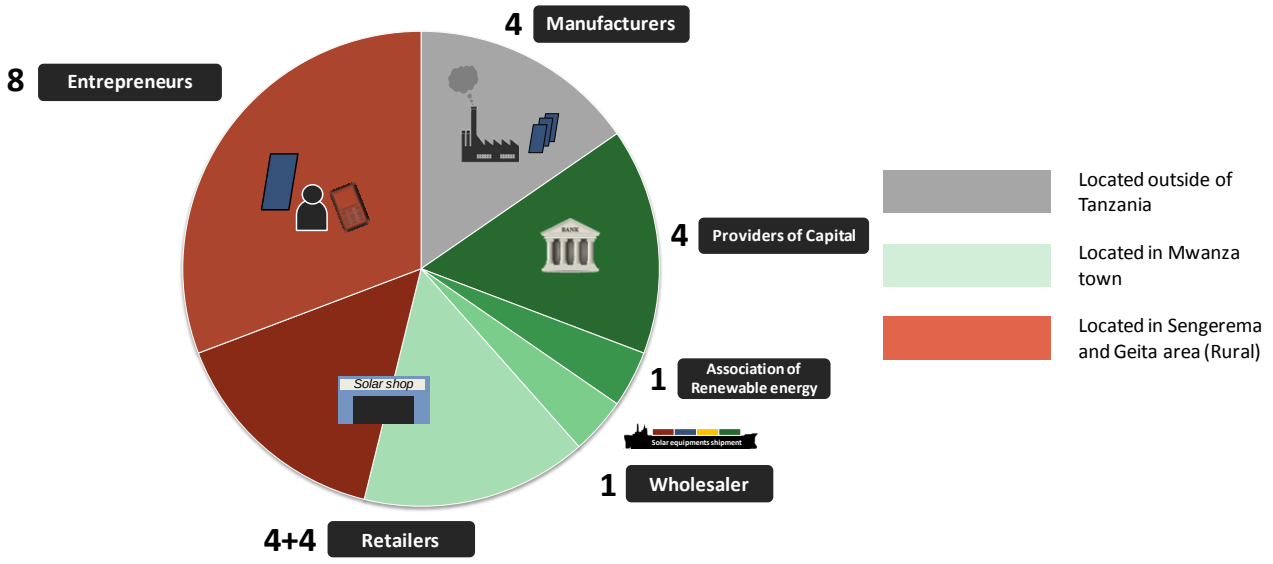

Figure 4 -- Distribution of interviewed actors according to their typology and registered location

The manufacturers interviews were run through conference calls. The remaining 21 (+1) businesses of the value chain were visited during the field investigations:

- 2 Banks, 2 Micro Finance institution, 4 retailers and 1 wholesaler (and the Tanzania Renewable Energy Association - TAREA) were met in Mwanza town 27, 28 and 31 May.
- 4 BoP entrepreneurs and 2 retailers were met in Sengerema area on 29 May.
- 4 BoP entrepreneurs and 2 retailers were met in Geita area on 30 May.

Out of the 8 BoP entrepreneurs met, the team interviewed 5 BoP entrepreneurs who are registered among the businesses participating in CARE2 and 3 others met in the villages. (1 in Sengerema rural suburbs and 2 in the Geita rural suburbs). Geographical locations of the field investigation are available in Figure 5.

Region capital hosting every type of the value chain actors except the entrepreneurs the study focused on.

District center connected to the grid. Among the value chain, It only hosts small retailers and few banks.

Rural suburbs of the district center: area mainly off grid which only hosts the entrepreneurs.

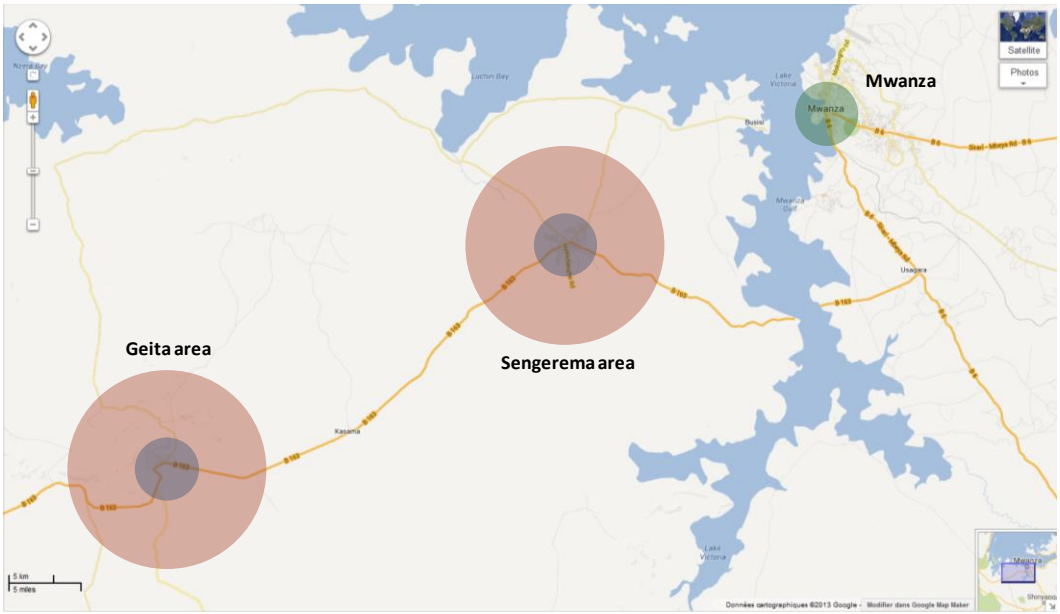

Figure 5 -- Areas covered by the field analysis (Source: *Google maps, 2013*)

3 Businesses and their challenges along the value chain

3.1 Manufacturer of plug-and-play kits

3.1.1 Business Model analysis

Out of the 4 interviewed manufacturers, 3 presented themselves as start-ups (Eternum Energy, Azuri Technologies, Fenix International) with a head quarters in western countries while the remaining manufacturers are a mature solar company with head quarters in China (Trony). All the interviewed organisations chose to reduce their costs by outsourcing distribution activities. The majority also outsource production activities. By doing so, the manufacturers lower their structural costs, but at a loss of control.

NOTE: WHAT IS A PHOTOVOLTAIC PLUG-AND-PLAY SOLAR KIT?

Source (picture): *Eternum energy, 2013*

Currently an entrepreneur wanting to set up a phone charging business would buy a solar panel, inverter, phone charging adapters, etc. as separate component. They rely on the solar dealer to help then select the right sized system according to their needs. They may also need an electrician to install the system.

Several start-ups and manufacturers now offer modular solar kits that support the expansion of phone charging businesses in remote areas. Unlike the existing options, the plug-and-play kits work with direct current (DC) which allows a much higher efficiency[3] (systems based on direct current already exist but based on the team observations, they are not broadly offered by distributors). Therefore the interviewed manufacturers provide systems from 10W to 80W photovoltaic panels with possibilities to charge 6 to 25 phones at once (according to the panel size) or to plug any other device: LED, TV, Radio, or even an i-Pad or fridge.

Such plug-and-play solar kits usually come with a warranty period and are priced below the current available options (some systems claim to be sold for less than 50% of the common market price in Tanzania[4]). Manufacturers also hope to deliver higher battery performance, that requires less maintenance and provide systems which might even be monitored remotely. Some plug-and-play kit manufacturers even include leasing services to bypass the problem of the upfront costs.

All the manufacturer interviews showed that plug-and-play systems are not yet established in the country. Interviewed manufacturers are at the launching stage of the product life cycle, which was confirmed by the field investigation. Indeed, very few products have been sent to Tanzania so far. Considering this current lack of presence in Tanzania, most manufacturers do not have firm sales projections for the oncoming year.

Based on their testimonies the following business model analysis (statements A, B, C and D) can be provided.

A. Outsource the distribution activities

Office space, business developers, administrative staff, and any expenses related to the physical implementation of a business can jeopardize its ability to breakeven quickly and lower its market penetration flexibility. To reduce such costs, all interviewed manufacturers decided to look for wholesalers able to take responsibility for the market penetration of their solar kits.

However, such tactics present a few downsides that must be highlighted:

[3] Plug-and-play solar kit manufacturers claim a 15W Photovoltaic panel with its plug-and-play kit can charge up to 20 phones a day while it is currently necessary to use a 50W.PV panel to deliver equivalent performance (through an inverter).

[4] According to the interviews, final market prices are assumed to be the following: $300 for a Trony product, $150 for an Eternum Energy product, $206 for a Fenix/Vodacom product, $20/month for Azuri Technologies which relies on a pay-as-you go system,

- Market penetration is often under the wholesaler responsibility. It means the manufacturer's ability to increase its turnover (and its profitability) over time is entrusted to an external party.
- Since the wholesaler will often sell to retailers who would be the ones in direct touch with the ultimate customers, the value chain downstream can become complex and therefore the product distribution and customer care become more difficult to control.
- Wholesaler identification and selection emerges as a key issue since the wholesaler has to be:
  - Economically powerful (with significant cash flow) to fill as many containers as needed;
  - Technically skilled to take over any after sales issues;
  - With a sales and marketing expertise to distribute high volumes of solar kits and collect customer feedback.
  - With wide experience of the regional solar market and the actors already present in the local value chain.

On this last point, manufacturers conceded finding reliable distributors able to fulfill these 4 characteristics was not easy (Fenix which is already committed to Vodacom do not share this concern). Indeed, as a bridge between the plug-and-play producers (manufacturers' partners) and the market, **the interviewed manufacturers' first task is to find reliable distribution channels**. Economically powerful wholesalers with the ability to deliver the expected performance to penetrate a market are potentially few and not easy to identify (for instance, at the moment only one business in Mwanza with such characteristics is active in the market).

The other downside of this approach is the difficulty for manufacturers of maintaining a high level of control along the the value chain. Indeed, even though manufacturers try to find an agreement on the theoretical prices which would be charged along the value chain, they do not pretend to have a strong control over prices set.

To minimize this business models negative ripple effects (i.e. the manufacturers' outsourcing strategy), all manufacturers enhance their value proposition to **offer free marketing advice** to their local partners in order to improve the penetration rate and to secure customer feedback and market experience from the wholesalers[5].

B. Outsource the production activities

Following the previous tactic, most manufacturers decided to unbundle the upstream activities of the solar kit business: the manufacturing activities. Except for Trony[6], the other "manufacturers" should be considered as solar kit designers rather than solar kit manufacturers technically speaking. The solar kit production is outsourced to Asia in order to prevent the business from assuming high costs of manufacturing items.

Even though such tactics prove to be more flexible and economic, they also generate some business weaknesses, or at least raise some concerns from the "manufacturers". Due to the combination of outsourcing both production and distribution, the manufacturer reduces its activities to a "middle-man" role. Once the plug-and-play kit design has been provided to the Asian producer, the main manufacturer's added value becomes concentrated into connecting the manufactured kit to an identified distributor which understands the local market.

Once the solar kit design is provided to the Asian manufacturer (who will ship the manufactured product to the wholesaler in Tanzania), **what more than a contractual agreement prevents the Asian partner from cutting the business bridge between offer (production) and the demand (distribution)?**

[5] In order to minimize the described ripple effects of the distribution outsourcing, few manufacturers also developed marketing strategies around branding (point C.) or supported the market development by a payment model (point D.).
[6] A solar energy manufacturer based in China that integrated the production activities and owns its own production plants.

Figure 6 -- Barefoot Power solar kit versus the product of its former manufacturing partner Solarland (Source: *ENEA Consulting field investigations, 2013*)

As shown in Figure 6, the associated risk of outsourcing production and distribution can be significant for the "manufacturers", considering most of them are following a short term strategy[7] and therefore rely exclusively on the success of their sole flagship product.

C. Securing the market penetration through a branding strategy relying on the TelCo channel

In order to lower its "middle-man" exposure, the manufacturer can concentrate part of its efforts on strengthening the intangible assets of its business model. In this case: the brand awareness. The tactic consists of securing its future position in the market through strong branding and a distribution chain that is already accessible to potential customers: **a national operator**. Doing so, the manufacturer limits the logistics loop to one official downstream chain it can manage while gaining market penetration. Fenix International has adopted this approach partnering with Vodacom, the number one mobile phone operator in Tanzania. Vodacom manages the successful M-Pesa system which consists of small cash transfers from phone to phone.

Even though such a strategy may prevent the Asian partner from excluding the "manufacturer" from its value chain, it may suffer from fake devices taking advantage of the brand to gain some illicit profits. The more the brand is able to sell thanks to the generated awareness, the more potential competitors will try to "pirate" the brand and imitate its design. This "scavenger strategy" consists of using the leaders' efforts to grab some "market share remains" by using "chameleon tactics". Besides damaging the brand, such illegal marketing activity could result in the ultimate customer not receiving poor quality product while spending a large amount of cash.

D. Securing the market penetration through an included payment model

A second identified option for lowering the "middle man" exposure is to lock in the business transaction to a specific payment model managed by the retailer. This strategy results in a "pay-as-you-go" system (PAYG) where the wholesalers and retailers distributes plug-and-play kits to the ultimate customers who subscribe to a planned series of regular small instalments. The payment is made either through a scratch card system or mobile payment. At the end of the payment period, the customer can usually either upgrade or acquire the system by paying a one off 'unlocking' fee.[8]

Beside the "value chain comfort" it provides for the manufacturer (control over the value chain), this strategy offers an interesting alternative to a BoP entrepreneur interested in launching a phone charging business: it brings down the upfront costs and allows the entrepreneur to spread the payment of the system over time.

[7] Short tail strategy : to focus on a limited number of offers/products with expectation of a high sales volume per item. In opposition of a long tail strategy where the business model focuses in developing plenty of niche addressed products and expects to sell a limited volume of each of them (wholesaler configuration).

[8] At the moment, the provider of PAYG system tends to focus on covering its business development effort toward the household segment (answering the energy needs of a family) rather than providing BoP entrepreneurs with a phone charging dedicated system. Thus, this option is not expected to be available to entrepreneurs of the region any time soon.

3.1.2 Business Model characterisation

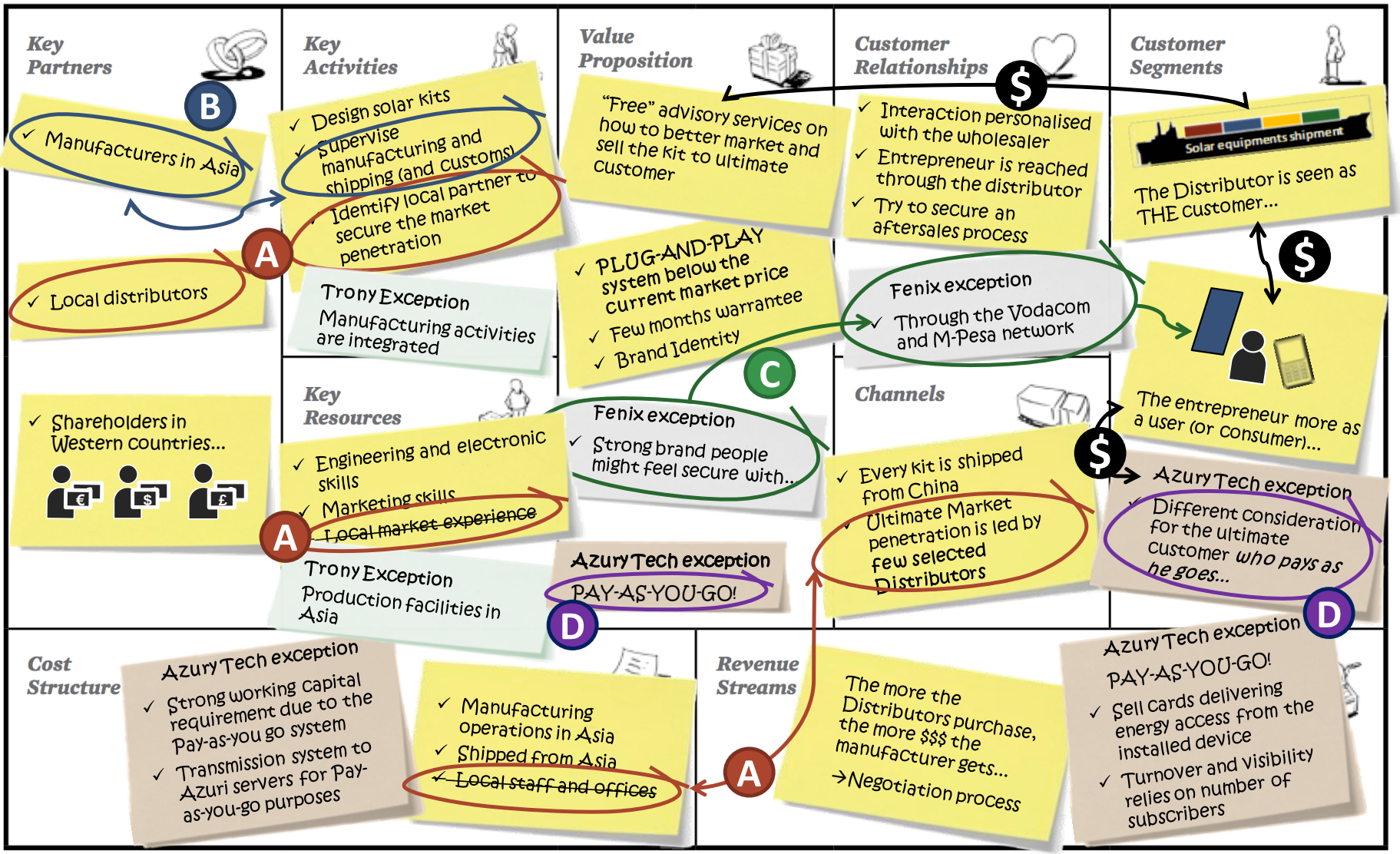

Figure 7 -- Business Model characterisation of the Manufacturer typology (Source: *ENEA Consulting analysis, 2013*)

3.2 Wholesaler

3.2.1 Business Model analysis

As highlighted previously in the report, only one firm in the GVEP network in Mwanza can claim to be a wholesaler (according to manufacturers' wholesaler characteristics[9]). Even though only one firm can be considered to be a wholesaler, it is important to mention that 1 out of the 8 interviewed retailers' show some promising wholesaler-to-be capacities. Further details are discussed in the Retailer section.

A. Key marketing lever: Word of Mouth

According to the sole distributor showing some wholesaler characteristics, the most effective marketing campaigns rely on the distributor's reputation, conveyed through word of mouth. This view was confirmed by BoP entrepreneurs' interviews. The reputation of the product distributor appears to be more important than individual product brands[10].

Thus the most efficient and sustainable way to grow a distribution business is through a combination of customer attention and quality products. The interviewed wholesaler appeared to benefit from a good reputation in the region and claims most of its "unfaithful customers" come back to him after experiencing cheap and poor quality products. Beside the quality of the offered products, the reputation of the business relies on the large diversity of its offers (long term strategy) and its knowledge of products.

B. Risk of addressing the upfront cost issue

Wholesalers distinguish themselves from a retailer due to **their available cash flow which offers the opportunity to order** (with upfront payment) large quantities of electronic products. Without this cash flow the business cannot purchase the variety and quality of products which built its reputation. In addition to the opportunity cost of mobilizing its available capital, the wholesaler was deeply sceptical about the idea of providing credit to his customers because of the high risk of default. The wholesaler prefers instead to help its customer save towards acquiring a product[11]. The wholesaler is comfortable being at the centre of a deal which facilitates lending by capital providers/financial institutions to his customers, provided he is not exposed to risk himself.

C. International business capacities

The last main characteristic which distinguishes a wholesaler business model is the necessary skills to master in order to properly manage such a business:

- International negotiation: being strong enough to negotiate with companies in English
- Legal knowledge: managing logistic and certification requirements

Based on these skills the wholesaler needs to be able to extend its network internationally (with manufacturers and international import/export distributors based in Morocco or Dubai for instance) and to qualify its providers' innovations[12].

However extended its current network, the wholesaler interviewed for this study did not appear to be familiar with the plug-and-play system. This is a reflection of the fact that such systems are very new and not widely available. The fact that this wholesaler, who is a major player in the solar PV market in the region, was unaware of the products is significant and suggests that manufacturers need to do more to raise awareness of their products.

Lack of awareness from the key solar importer of the region means **the businesses further down the value chain are also unlikely to know of such technology**.

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[9] One exception can be found in this statement, the sole identified wholesaler (Zara Solar Limited) do not provide technical maintenance services yet even though it can redirect customers and retailers to freelance professionals if necessary. This aspect could be an exclusion criteria for several manufacturers…

[10] Contrary to solar kits (which are not yet available on the market), most available products do not show high branding materials. Since there is nothing more than solar to be as alike as another solar panel, none professionals cannot easily distinguish the difference between offered products.

[11] This practice appeared to be commonly used by distributors: it is usual that the customer ask the distributor to help him save the necessary amount since he doesn't feel confident to do the savings on his own. The distributor plays the role of a bank, receiving weekly/monthly payment from the customer and holding its money until he reaches the price of the equipment he desires to acquire.

[12] Zara Solar Limited claims to have visited several R&D centrescenters of its providers.

3.2.2 Business Model characterisation

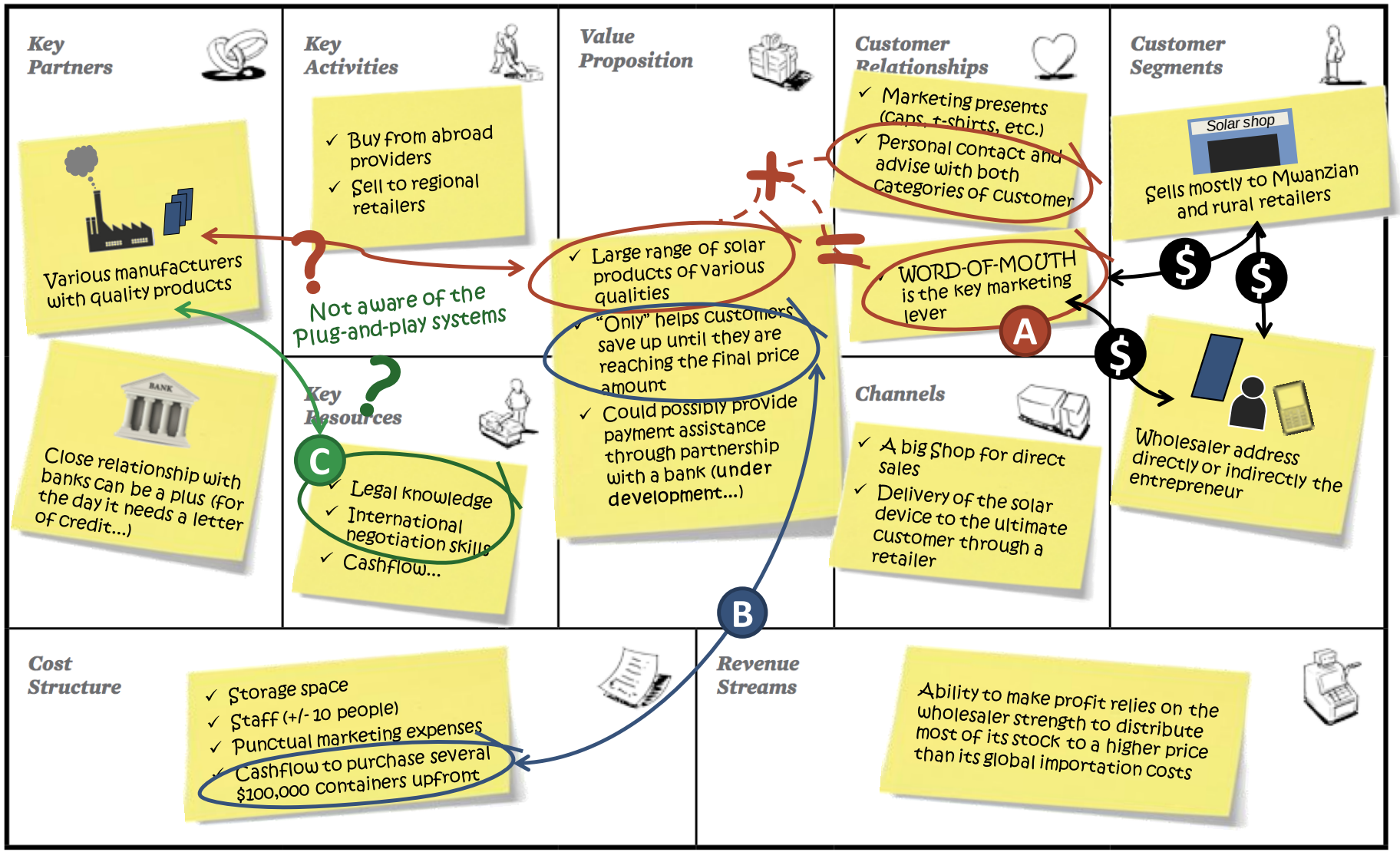

Figure 8 -- Business Model characterisation of the Wholesaler typology (Source: *ENEA Consulting analysis, 2013*)

3.3 Retailer

3.3.1 Business Model analysis

In contrast to the wholesaler, the retailer is a distributor without the capacities of being in direct business with a manufacturer:

- It has a limited cash flow which lowers its capacities of importing,
- Most retailers do not have English, international business negotiation, nor customs management skills.

Obviously some disparities (in terms of economic capacity or business skills) can be found between the 8 retailers which have been interviewed. Therefore, we can distinguish between:

- "Small" retailers: able to purchase solar equipment from a local provider, which is very likely to be poor quality.
- "Intermediate" retailers: with higher cash flow but still likely to have poor international business skills and not able to speak English (able to source from Dar es Salaam, Nairobi or a distributor in Dubai).
- "Big" retailers: able to purchase up to $40/50,000 of stock at once, with business skills and English speaking skills.

Among interviewed retailers, 5 disclosed turnover information without showing any proof of the figures they claimed to be achieving:

- "Small" retailers announced an annual turnover between $10,000 and $40,000 ;
- "Intermediate" retailers claimed to turnover $100,000 annually ;
- "Big" retailers (i.e. Intra Profession East Africa LTD) claimed to turnover $200,000 annually.

A. Key marketing lever: Word of Mouth

Following the same marketing stream as the wholesaler typology, the 8 interviewed retailers do not develop any major marketing campaigns (beside small promotions/product demonstrations on local markets in one case). Considering the retailer's customers do not know any brands of solar equipment[13], most retailers are aware of the importance of building a good local reputation that will provide them with a sustainable flow of potential customers. Even though they would not refuse marketing support from a business further up the value chain, technical support might be more useful for helping them better manage their business and particularly their customer relationships.

Figure 9 -- BoP entrepreneur showing the business card of a retailer when asked of any solar brand he could name (Source : *ENEA Consulting field investigations, 2013*)

Contrary to the wholesaler, the **retailer cannot afford to build a large range of products and instead has to pick products that are likely to sell**. The retailer must be in touch with its customers' needs in order to better identify the most successful products.

[13] During the mission field investigation, none any of the 8 interviewed BoP entrepreneurs were able to name a solar brand (even the solar equipped BoP entrepreneurs), but they almost all new someone who could advise them or provide them regarding their solar needs.

Combined with low access to new electronic products (Statement D. International business skills), the limited knowledge on products' technical aspects (Statement C. Ripple effects of the lack of technical knowledge) from the retailer encourages them to follow a "pull marketing attitude"[14] in terms of product range offered.

B. Limitation in addressing the upfront cost issue

Unlike the wholesaler, the retailer cannot purchase high quantities of product at once (up to a $40/50,000 shipments for the biggest interviewed retailers[15]). It therefore sources its product from a domestic provider which sells them fewer items.

The ways in which retailers purchase products are as follows:

- From another retailer based in a nearby district ;
- Or from a distributor based in Mwanza (mainly bigger retailers or the only identified wholesaler) ;
- Or from a distributor in Nairobi or Dar es Salaam) ;
- Or sometimes from an import/export distributor based in Middle-East like Dubai[16].

Due to cash flow limitation and risk aversion to providing credit to customers who appear unreliable, the majority of retailers do not sell on credit. Instead they suggest to the customer that they hold savings until the time they have the necessary amount to purchase the product (this is a common practice detailed previously).

A minority of interviewed retailers provide payment support but to a limited pool of known and close customers. Along with this minority, one retailer used to provide credit to its customers after they after they had made an initial deposit (mostly around 30% of the total purchase cost). Except for this one case the retailers do not provide financial support for customers.

C. Ripple effects of the lack of technical knowledge

Most of the interviewed retailers showed interesting business skills but suffered from a lack of technical knowledge:

- Some of them were occasionally assisted by freelance electricians for solar purchases or sale operations
- Others could redirect customers to freelance electricians
- Others were without any technical support for either purchase/sales operation or for after sales operations
- A minority had the technical skills among the managing team

Such lack of skills impacts both the ability to source good quality products, the ability to help customers (such as system sizing) and the ability to contract good freelance electricians to assist the customers in basic maintenance. Eventually these issues damage the BoP entrepreneurs' ability to break even while using solar phone charging systems (due to the equipment inefficiency and its results in terms of phone charging performance).

D. Lack of international business skills

Beside a lack of technical skills, most retailers are not able to source solar products from abroad:

- Most of them do not speak English
- Most of them do not have international trade knowledge (even the largest retailer, which had some wholesaler characteristics, needs to be assisted): several retailers claimed to pay customs fees from a domestic intermediary whereas Tanzania does not institute any customs or duty on solar products.

Those weaknesses eventually limit the retailer's business abilities to extend its range of product with innovative solar equipment. Therefore, the retailers often stick to small wholesalers due to their capacity to identify and assess new business opportunities.

Since a major player such as the large local wholesaler is not aware of the plug-and-play innovation, it is even more difficult for retailers to access such systems without any support from external parties.

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[14] Pull marketing consists in answering an expressed need from a customer segment in opposition to a Push marketing attitude which is commonly known to be an "offer driven" attitude with the intention of suggesting needs to a customer segment to better serve it afterwards.
[15] This figure appear to be too small to conclude a sustainable deals with a manufacturer, without considering the ability of the retailers to conclude such deal…
[16] Only "intermediate or big" retailers able to order up to a $50,000 load do source their product from abroad distributors (not manufacturers).

3.3.2 Business Model characterisation

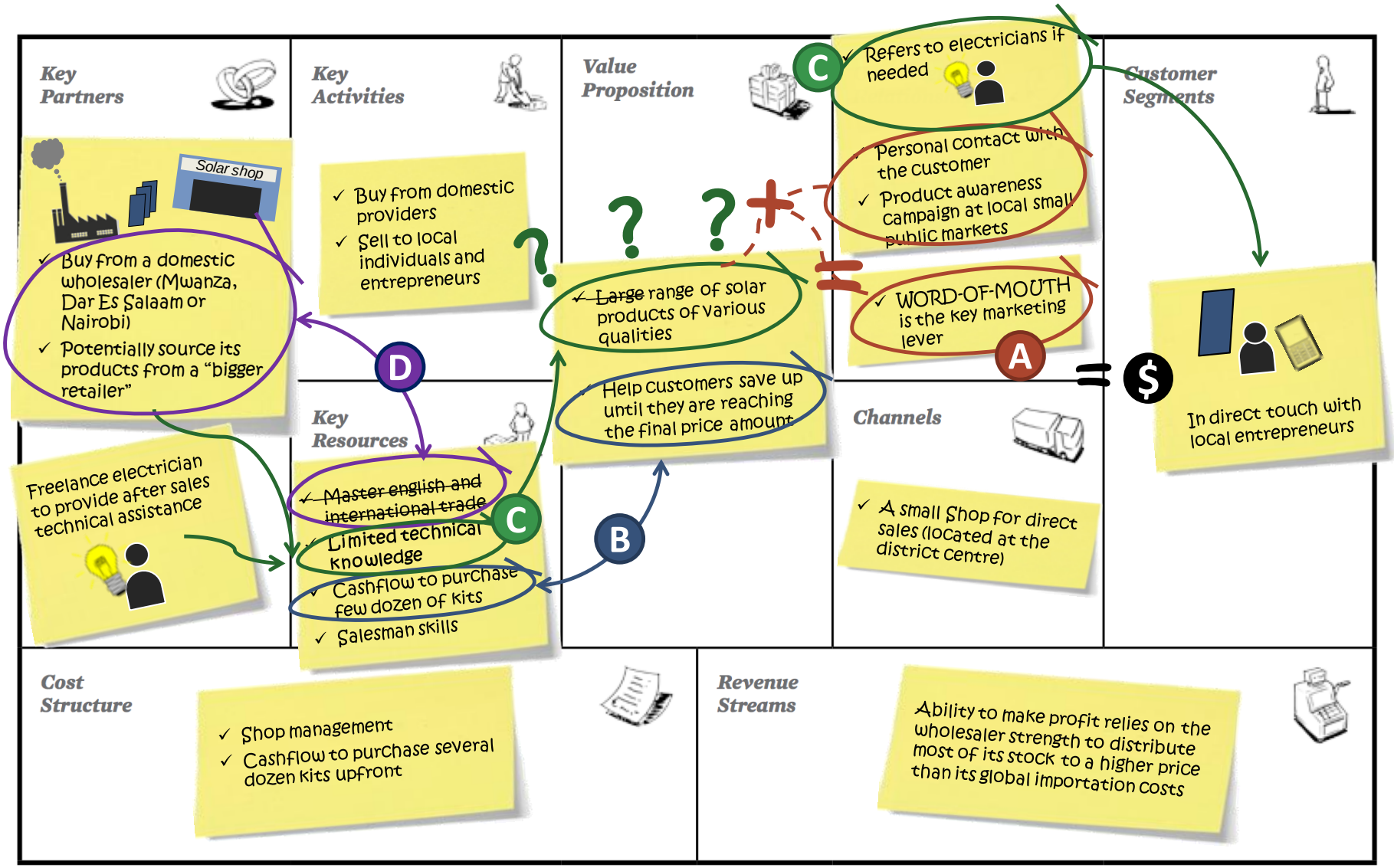

Figure 10 -- Business Model characterisation of the Retailer typology (Source: *ENEA Consulting analysis, 2013*)

3.4 BoP entrepreneur

3.4.1 Business Model analysis

BoP entrepreneurs were met in the rural suburbs' of Geita and Sengerema districts. They were approximately located 2 to 8 kilometres from the grid. The businesses the entrepreneurs owned were as follows:

- 4 interviewees were grocery store owners located next to the main road of the village (frequented by travellers) ;
- 3 interviewees were cell phone dedicated shop owners (either phone repairs and charging stations or only charging stations) ;
- 1 interviewee was a freelance nut dealer managing a small phone charging station whenever he was not busy with nut collection.

Along with hundreds of other entrepreneurs, half of the interviewed entrepreneurs are known to GVEP and have been selected to be part of the CARE2 programme. The other half were entrepreneurs met during the field investigation who are not fully aware of the phone charging business opportunity.

A. Manage and market the business development

The majority of the 8 interviewed BoP entrepreneurs did not have access to a proper elementary education and have never been trained in business management. Besides their perseverance and will to succeed and maintain their business, they cannot rely on basic business skills that would contribute to getting them out of poverty.

Thus, the ignorance of "cash in / cash out" registration methods (book keeping) or basic customer relationship principles slows down their development and ability to expand.

CONSUMERS OF PHONE CHARGING SERVICES – KEY FIGURES

- The rural electrification rate for the Lake Zone regions is 6%.
- The penetration rate of using mobile phones in rural areas of Lake Zone region is 18.5%.
- Only **4.1% of rural phone owners charge their phones at home**: 61.9% charge it at small businesses, 29.7% at kiosks, and 4.4% at their neighbours.
- More than **70% of phone owners have to travel more than 2 Km from their home to charge their phone** (almost 45% travel between 4 Km and 18 Km).
- 54% of the rural users need to switch off their phone frequently to conserve power.
- 53% of mobile phone owners in rural areas spend less than $1.2 per week on calls and SMS's.
- **37.7% of rural mobile phone owners say long distances to phone charging places is a common issue** (14.8% mention the phone charging cost).
- Mobile phones main uses are: **93.1% for communication with customers and money transfers**; 6.9% for social matters only.
- Phone charging consumers have already suffered from problems related to the delivered services :
  - Security issues (33.5%): Airtime theft, phone loss and loss of accessories
  - Reliability issues (31.5%): Undercharged battery and service not available
  - Bad experience (21.6%): customer services
  - None (13.4%)

Source: *Survey report from ASEDETA to GVEP International administered to 320 respondents, 2012*.

B. Managing the solar equipment

Some of the interviewed BoP entrepreneurs were already powered by solar energy and offered phone charging services. **None of these BoP entrepreneurs could properly manage their equipment on their own** and the majority of them were either assisted by electricians lacking the necessary skills or not assisted at all.

This **lack of maintenance knowledge** has been assessed by the GVEP technician mentors (during the interviews) and through observation the following problems were deduced:

- Large quantities of dust were on the panels ;
- Panels were exposed to trees' shadows all day long ;
- Systems did not have the proper capacity ;
- There were improper electronic connections.

All the listed mistakes led to inefficient phone charge yields: the worst observed case being a BoP entrepreneur **only able to charge 5 phones per day with 95 W photovoltaic panels while its expected performance would be almost 40 phones per day if its panels were properly connected.** The panel was **covered with dust and shaded by a tree.**

Without getting into deep technical considerations at this point, the main statements were that every interviewed entrepreneur was not aware of the very elementary information concerning:

- the functioning of solar power equipment ;
- the procedure for basic maintenance.

Based on this statement, it can be declared that **without any knowledge of these two points, no entrepreneur would be able to manage a plug-and-play system** even though it is said to be easy to manage in terms of maintenance. Indeed **plug-and-play or not, the solar panel will always need to be cleaned and installed in areas without shadows.**

C. Finance its investments

1 out of the 8 interviewed BoP entrepreneurs had only been to the bank once. Based on the investigation, it can be assumed that **BoP entrepreneurs are not able to properly design and create a business plan, nor do they have experienced pitching their project in front of providers of capital**.

Besides any support from non-profit organisations, their only opportunity would be to get support from a relative or friend.

3.4.2 Business Model characterisation

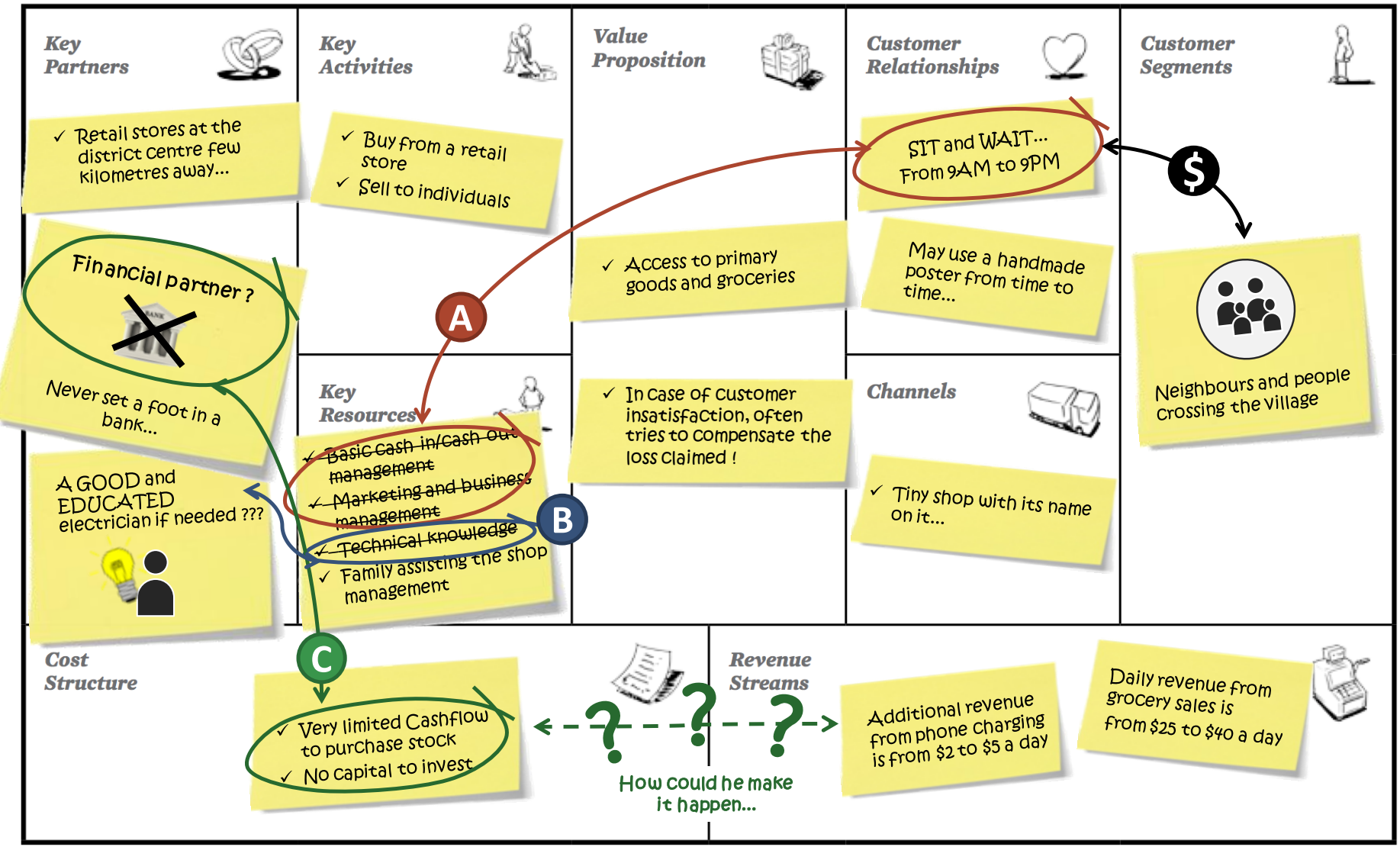

Figure 11 -- Business Model characterisation of the BoP entrepreneur typology (Source: *ENEA Consulting analysis, 2013*)

3.5 Providers of capital

3.5.1 Business Model analysis

A. Economic viability of addressing micro entrepreneurship finance issues

Considering BoP entrepreneurs generate limited resources through their business activities, and considering banks have important structural costs to face, the economic relationship between the two parties is difficult to engage.

Generally, a bank cannot meet its costs for credits under $1,900[17] which actually represents 5 times the required capital for an available solar kit[18] sized for servicing 20 phone holders per day. Beside the inappropriate minimum amount, the bank must charge for several processes that the BoP entrepreneurs might not be able to afford:

- Application costs ;
- Administrative fees ;
- Legal documentation edition ;
- Interest rate.

Based on the field investigations, credit access costs (additional money paid back to the bank along with the lent amount) would be between 17% and 20% (from $312 and $375[19]) with a required payback period of one year. On the other hand, Micro Finance Institutions who address such customer profiles (with loan amounts usually up to $950[20]) offer even more expensive services with credit access costs reaching 36% of the loan amount, or 27 business days of a small BoP entrepreneur's current revenue[21].

B. The cultural gap

Beyond the expensive credit access costs, another element that prevents a bank from working with small BoP entrepreneurs from remote areas is the cultural gap between the credit manager and the small business owner.

On the one hand, most BoP entrepreneurs have never set foot in such institutions and do not have any idea of how to behave in front of bank managers, neither do they know how to "sell" their idea. The common mistake is to pitch the classic "give me the money and you will see how much I bring..."[22] which does not convince the credit manager.

On the other hand, the bank branch has no flexibility with regard to procedures. The regional entity does not have any authority to secure partnerships or deals which are outside of the common customer profile. In other terms, a potential collaboration with access to energy organisations or BoP entrepreneurs has to be validated from the corporate head quarters.

C. The Micro Finance Institutions need to identify customers

Among providers of capital, only Micro Finance Institutions deal with BoP entrepreneurs, the main challenge is to attract as many trustful BoP entrepreneurs as possible. This challenge is actually shared by any business addressing the Base of the Pyramid segments (BoP) due to the attributes of their environment. The potential customers are often off-grid, located in areas with difficult access routes and do not openly communicate on the day-to-day issues they face (in our case, access to finance).

To solve such problems, Micro Finance Institutions develop networks on the field and send agents to identify the right customers to support. However, this marketing approach is limited due to the structural costs.

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[17] Approximate of USD amount for a 3,000,000 TZS loan.
[18] Available solar kit : it is to say the package currently designed by the retailer (including a 50W Photovoltaic solar panel, inverter, connections, phone charging equipments, etc.). Based on the assumed pricing strategy practiced by the interviewed manufacturers, the $1,900 loan would be nearly 9 times what an BoP entrepreneur would need to acquire such brand new system…
[19] Those credit access costs amounts represent from 13 to 15 business days of the current revenue of a small BoP entrepreneur in a remote area.
[20] Approximate of USD amount for a 1,500,000 TZS loan.
[21] Based on a 3,000,000 TZS loan base line for comparison purposes.
[22] Quote from an interviewed bank branch manager.

3.5.2 Business Model characterisation

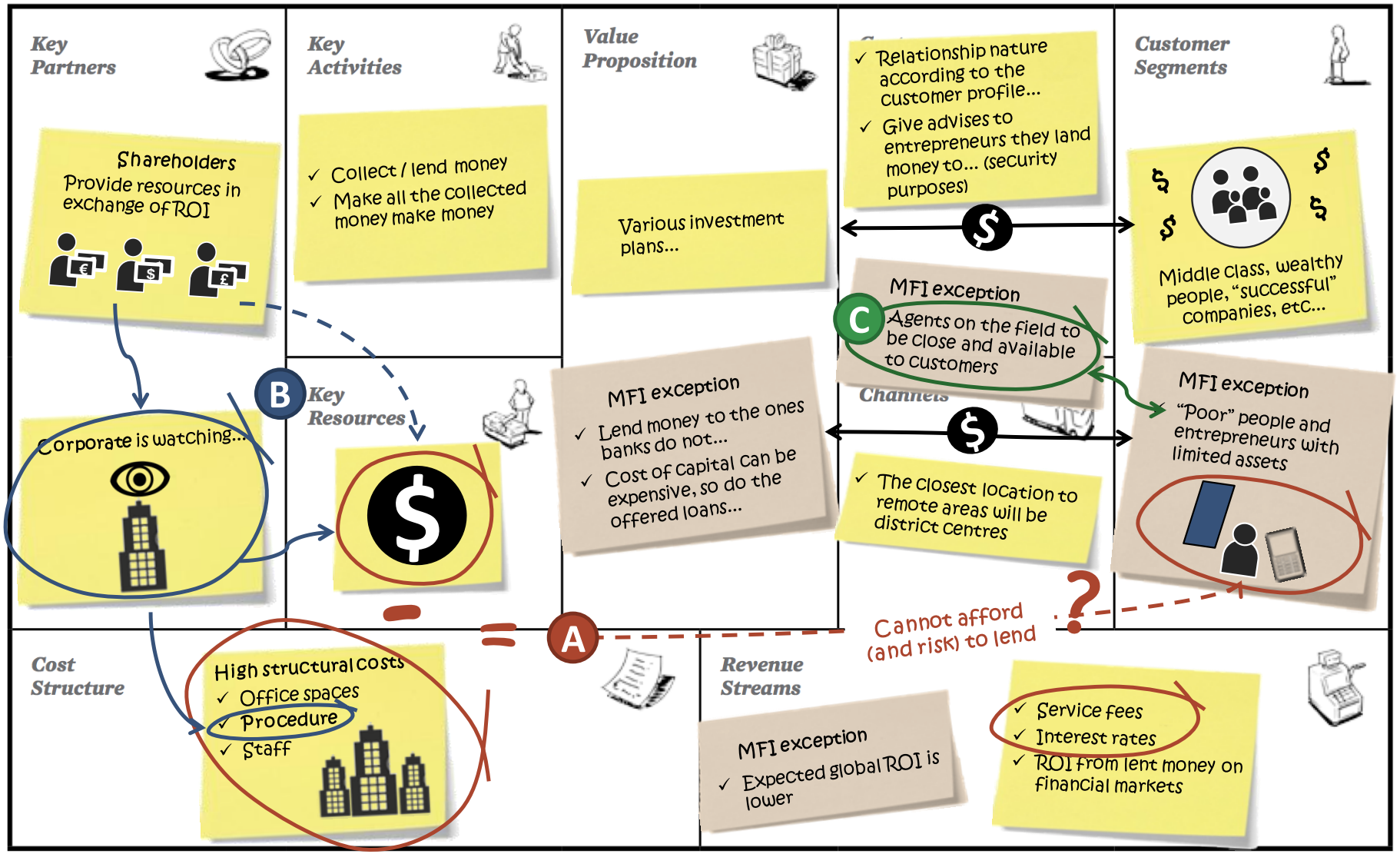


Figure 12 -- Business Model characterisation of the Bank/MFI typology (Source: *ENEA Consulting analysis, 2013*)

4 Recommendations to foster the value chain development

4.1 CARE2 model dedicated to the phone charging business

4.1.1 CARE2 Purposes and value proposition

GVEP International already uses a value chain approach, acknowledges BoP entrepreneurs' ecosystem (i.e. the value chain members serving the entrepreneurs) will influence their ability to succeed and grow. Strengthening the ecosystem should contribute to the BoP entrepreneurs' improvement.

This section gives specific recommendations and provides suggestions on how to solve issues which hinder the development of the solar phone charging value chain. By developing several activities and approaches, GVEP will address value chain members' issues and barriers, thereby maximizing the sustainable positive impacts on the BoP entrepreneurs.

Based on its analysis of the value chain firms interviewed, ENEA Consulting recommends interventions around **four main pillars** detailed over the next sub sections (Figure 13). For each of the 4 pillars, the possible benefits for the different types of businesses to be engaged in the programme, are presented below:

Members	What they can expect from CARE2	What they are expected to bring to CARE2
Manufacturers	▪ Desperately need to be connected to the local distribution network ▪ Need to be able to secure data on market evolution, value chain members evaluations, business expectations etc.	▪ Can provide businesses further down the value chain with innovative technologies and technical insights on the industry innovations.
Wholesalers	▪ As with any dealer, the more it sells, the better... by integrating the CARE2 programme it can be part of a participants' network which would connect it to the value chain and with it to potential providers suppliers and customers.	▪ The wholesaler can help to identify potential BoP entrepreneurs to join the participants network and redirect them to a provider of capital from the CARE2 participants' network ▪ The wholesaler can help to provide technical assistance through electricians approved by GVEP.
Retailers *Nodal point to reach entrepreneurs*	▪ Most of them need **technical teaching**. ▪ Beside a value proposition upgrade, being part of such participants' network would bring potential new customers and improve their brand image. ▪ Help with accessing capital	▪ **The retailer can help to identify potential BoP entrepreneurs to join the participants network** and redirect them to a provider of capital from the CARE2 participants' network ▪ The retailer should be able to provide technical assistance to BoP entrepreneurs through electricians approved by GVEP.

Actors	What they can expect from CARE2	What they are expected to bring to CARE2
BoP Entrepreneurs *Programme's golden star*	▪ Various indirect benefits which would be provided by the programme's various actors, ▪ Direct benefits from GVEP support in terms of business and management knowledge, technical knowledge and assistance. ▪ Help with accessing capital ▪ Eventually, the programme would lead to a revenue increase up to 20% per annum[23].	▪ By acquiring a solar phone charging kit, the BoP entrepreneur feeds every actor's typologies of the upstream value chain and therefore justify their presence...
Banks/MFIs	▪ Look for spreading a bright brand image as well as identifying new customers (promising and as risk-free as possible); ▪ To feel secure they would appreciate the GVEP presence which provides a guarantee of sustainable business practices and therefore more secure expectation of getting their money back...	▪ To be part of the CARE2 Programme, providers of capital would be asked to deliver loans to BoP entrepreneurs supported by GVEP (70% of the solar kit amount): - through the distributors: able to interact with banks (bank only); - with direct contact with the BoP entrepreneur (MFI only).

[23] For small BoP entrepreneurs with current $25 revenue per day, assuming a phone charging activity could bring an additional $5 revenue per day.

4.1.2 Model characterisation

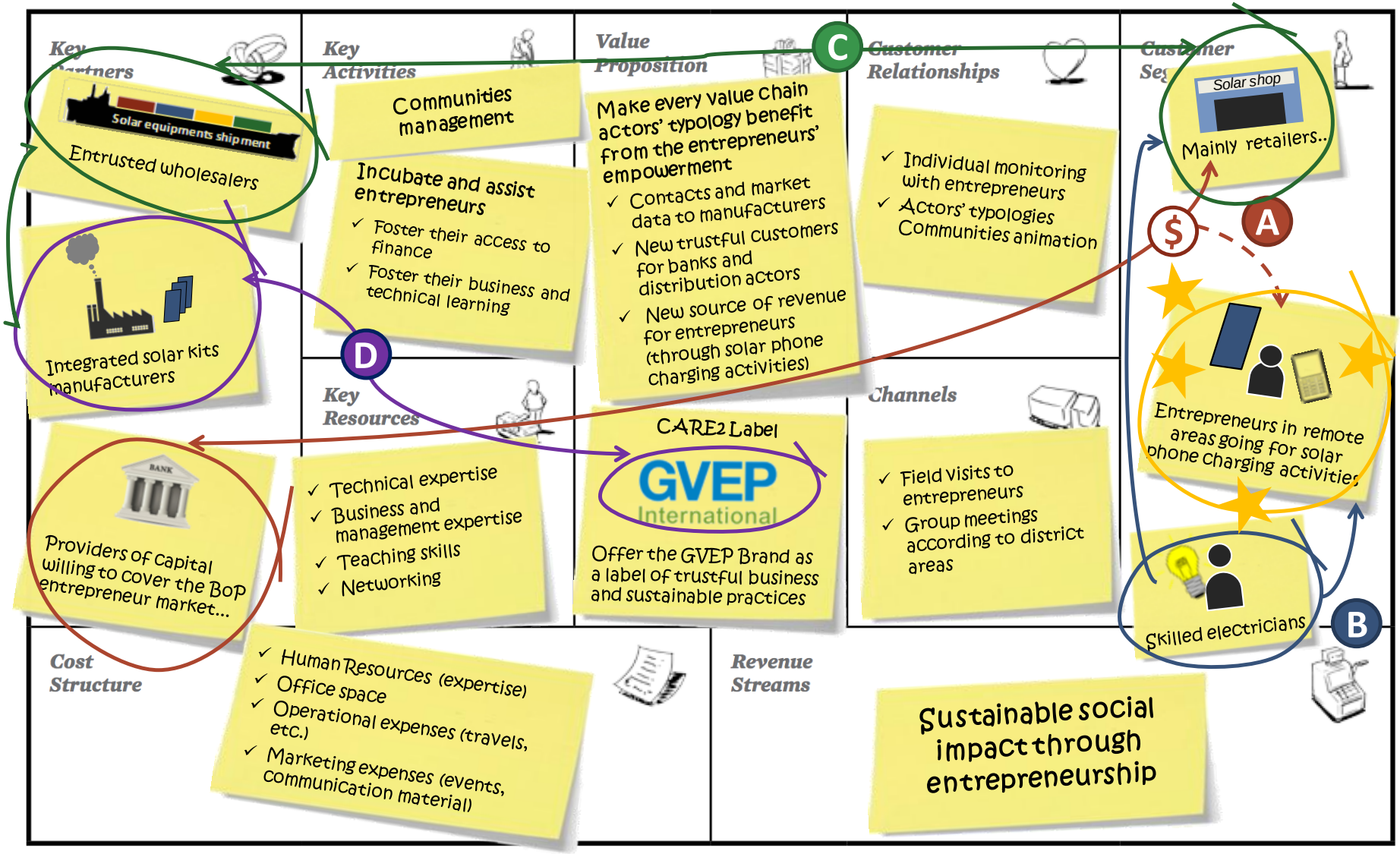


Figure 13 -- Model characterisation of the CARE2 Programme (Source: *ENEA Consulting analysis, 2013*)

4.2 Key pillars of the recommended model

4.2.1 (Pillar A) Support in financing the BoP entrepreneurs transactions

4.2.1.1 Problem statement

ISSUES ADDRESSED AND TACKLED BY THIS RECOMMENDATION PILLAR

- **Distributor**: Limited cash flow and existing fear of leasing its products.
- **BoP entrepreneur**: Not able to finance the upfront costs.
- **Micro Finance Institution**: Have difficulties in identifying trustworthy BoP entrepreneurs in remote areas.
- **Bank**: Do not share the same culture as BoP entrepreneurs and can't afford to lend them money.

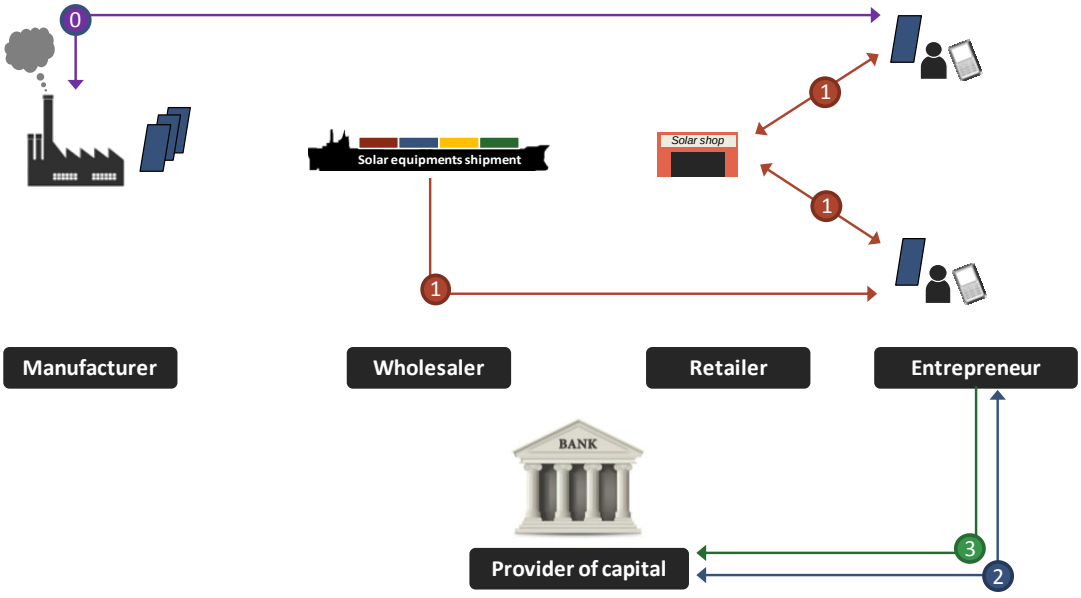
As discussed previously, one of the main issues to tackle is the very limited ability for entrepreneurs to acquire a phone charging system due to their lack of cash. Though they acknowledging the issue, members of the potential value chain face the following challenges:

- Banks are aware of this issue but never deal with such entrepreneurs and are not willing to do so due to the associated risks (few assets, no business skills, etc.);
- MFIs are willing to lend money to entrepreneurs but do not often know how to reach them and offer loans with a high administration costs.
- Distributors don't always have the cash flow (or prefer to use it to acquire more stock), or even if they do, they are afraid of not being paid back and therefore will not risk lending money or leasing products. PAYG is not established as a common financing mechanism in the region.

Therefore, the main problem to solve is ***How to make entrepreneurs able to acquire a phone charging system while making the other members of the value chain benefit from these transactions?***

4.2.1.2 Suggested interventions

The first pillar in our model would aim at facilitating the transactions by providing two financial options:



Step 1	The entrepreneur brings 30% of the solar kit amount (showing he is committed) and the retailer/wholesaler provide him with the product.
Step 2	The Financial partner provide with the remaining 70% of the amount (through the distributor or directly to the entrepreneur).
Step 3	The Financial partner collect the monthly payment of the entrepreneur.
Step 0	Manufacturer provides a leasing solution such as a "pay-as-you-go" service.

Figure 14 -- Plan illustration of the support in financing the BoP entrepreneurs' transaction (Source: *ENEA Consulting analysis, 2013*)

Through this scheme (illustrated in Figure 14), the BoP entrepreneurs gets financial support by following one of the 2 suggested plans:

- Plan A:
  - [Step 1] The entrepreneur brings a determined amount of cash, showing he/she is engaged and committed to the transaction (based on field observations, 30% initial payment).
  - The distributor brings the CARE2 MFI partner into the deal and leaves the two parties to conclude the agreement. The MFI accepts to support the transaction and provides the remaining 70% to the distributor [Step 2].
  - The entrepreneur receives the phone charging system and pays back the MFI on a periodic basis [Step 3]. In this plan, the MFI would be responsible for the relationship with the entrepreneur and would have to mobilize agents in the field to conclude deals (identified by the retailer) and manage the business relationship with the entrepreneur.
- Plan B: GVEP introduces a local agent to a provider of pay-as-you-go products. This agent supplies the product and manages payment (i.e. the plug-and-play kits and the associated scratch cards/mobile payments system) which to the entrepreneurs [Step 0]. In this configuration the distributor would be the one in charge of the systems provided on credit, except it would not assume any economic risk and just have economic interests to maintain a weekly relationship with its customer (benefiting from weekly top ups).

Supported by such systems, the BoP entrepreneur can have access to solar financing operations while the providers of capital or the PAYG supplier secures creditworthy customers:

- For the Provider of capital: dealing with reliable entrepreneurs (with low assets but proving to be trustful), at the same time it increases its brand image by showing it supports a GVEP initiative.
- For Manufacturer: extending its subscriber base in Tanzania.
- For all business in the value chain: working with partners/customers who prove to be reliable due to their affiliation to the CARE2 network. Indeed, **GVEP International is seen as a risk reducing factor due to its recognized skills and its mentorship impacts on BoP entrepreneurs**. Based on providers of capital testimonies, it can be stated that as long as the concerned BoP entrepreneurs, and the distributors are part of the CARE2 network, the lenders will feel comfortable enough to provide the remaining few hundred dollars or the necessary credit.

During the investigation process the interviewing team tested the concept (the illustrated plan A) to a potential provider of capital (partner of the programme). **Approving the concept idea, one of the interviewed Micro Finance institution declared it was interested in delivering micro-credit and was even willing to offer a 12% credit access cost (to the BoP entrepreneur) in exchange of the appearance of its brand logo on the front sign GVEP International would provide to every phone charging entrepreneur in the programme[24].** The provider of capital would be in charge of the credit relationship with the entrepreneur who would have been identified by the distributor. However, without considering the economic earnings the MFI would have (through the transactions and advertisement the partnership would provide), the key reason for this organisation to support such plan is that **it relies on GVEP expertise and mentorship to build entrepreneurs' capabilities and therefore lower the risk for the provider of capital**.

Beside a facilitated leasing or loan scheme, the pay-as-you-go value proposition must also be mentioned since it deals directly with the entrepreneurs' cash flow issues. By providing a system which requires only a small installation payments and essentially relies on regular payments (for accessing the energy provided by the device), such products allow:

- entrepreneurs access to phone charging plug-and-play equipment with minimal upfront costs ;
- distributors to make money on a regular and predictable basis ;
- to not require the involvement of any local provider of capital.

The main challenge with making pay-as-you-go phone charging systems available in the market is that the manufacturers are start-ups and primarily focused on the much larger market of household lighting systems.

[24] The hard poster is a subproject under development. The main concept is to offer to any supported BoP entrepreneur (and possibly to retailer) communication material where the GVEP International logo stands along with the mention of the actors membership to the CARE2 Programme. Beside becoming a marketing platform to financial partners, the poster main purpose would be to spread the CARE2 community image of trustful businesses and sustainable practices.

4.2.1.3 Remaining uncertainties and actions to be conducted

- As mentioned, the conceptual recommendations have been designed to conformed to the phone charging environment when possible, but various elements and hypothesis still need to be tested and confirmed:
- Plan A: How many entrepreneurs would the MFI (or any competitor willing to be part of the plan) be able to support?
- Plan B: Can a provider of pay-as-you-go solar PV kits be persuaded to sell into the Mwanza area?[25] Would distribution for solar home lighting products need to be established first?

To make sure of the plans' feasibility, it is recommended that GVEP discuss these questions with the concerned members of the value chain. According to this feasibility check, it is suggested to GVEP:

- Plan A: To build on the existing Memorandum of Understanding with the interested MFI and test the scheme on a limited basis of entrepreneurs before potentially scaling up. Then, design a hard poster mock-up with advertising options to be presented to providers of capital in order to better convince them to join CARE2.
- Plan B: Assess the level of interest from potential suppliers of the technology. Raise awareness of local wholesalers/retailers of products entering the market. Set up a meeting between potential local agents and a provider of PAYG phone charging kits (with the intention of demonstrating the ability for both parties to be profitable while covering the BoP entrepreneur segment).

4.2.2 (Pillar B) Provide the right technical support

4.2.2.1 Problem statement

ISSUES ADDRESSED AND TACKLED BY THIS RECOMMENDATION PILLAR

- **Distributor (mostly retailer)**: Not able to provide technical after sales services.
- **BoP entrepreneur**: Loss of phone charging yields due to misuse, black out or malfunction.

Through the investigation, it was noticed that entrepreneurs equipped with solar phone charging equipment were delivering less than optimal performance (capacity of phone charges per day) due to a lack of technical skills and maintenance (such as basic tasks: cleaning the panel, preventing shadows, etc.).

Related to a general lack of education (the majority of BoP entrepreneurs did not go to school), it appears the entrepreneurs cannot always benefit from the right guidance to help them maximize the energy production and therefore their ability to generate revenue:

- The distributor who provided them with the equipment could not advise them properly on the technical side (the technical system sizing)
- The distributor who provided them with the equipment does not provide them with maintenance services
- The distributor who provided them with the equipment does not provide them with competent electricians

4.2.2.2 Suggested interventions

The second CARE2 model's pillar aims at securing the BoP entrepreneurs maximum phone charging yields by providing BoP entrepreneurs with technical support

[25] It has been mentioned earlier in the report that the provider of PAYG system is not focusing in servicing the BoP entrepreneur segment in Mwanza.

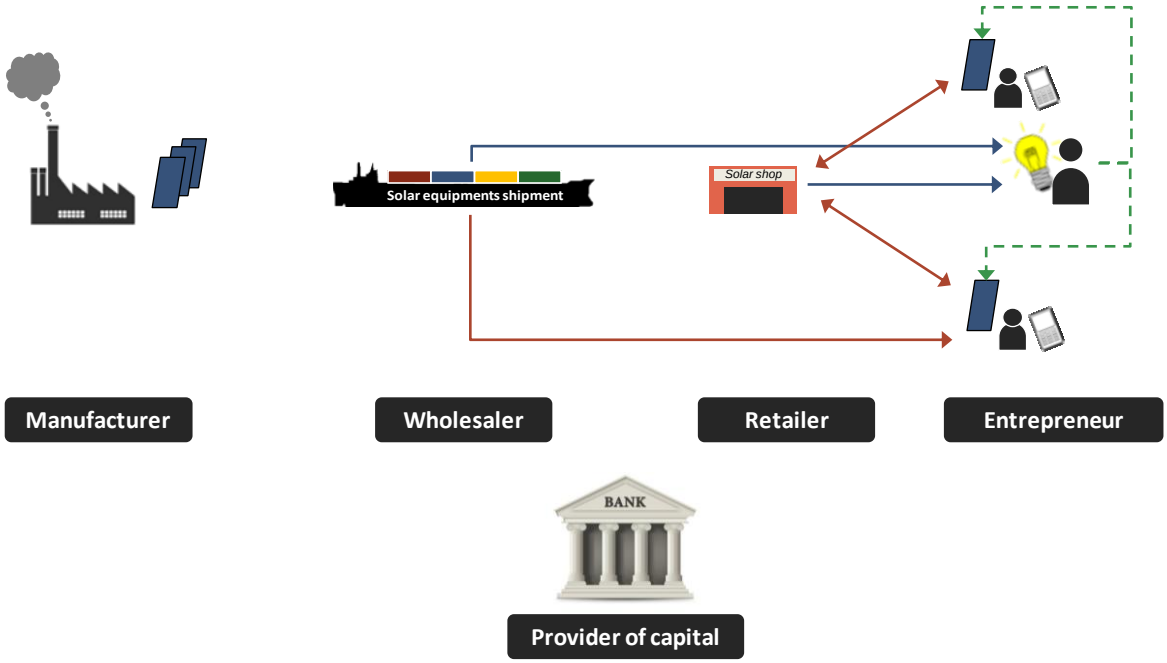


Figure 15 -- Plan illustration of providing the right technical support (Source: *ENEA Consulting analysis*)

Along with the first pillar, this recommendation bases the distributor (essentially the retailer) as a centre piece of the action plan[26]. To **make it compulsory for any distributor willing to join CARE2 to provide the entrepreneurs with proper maintenance services**.

Being in direct contact with the BoP entrepreneur makes the distributor (very often the retailer) closest to the BoP entrepreneur and therefore the most inclined to provide it with assistance and answers to any of its questions. The distributor would therefore benefit from training as well as specific support from GVEP in order to provide entrepreneurs with the right resources.

- Distributor capacity building: Train CARE2 retailers (and potentially wholesalers if a need is expressed) in basic product understanding to better advise the customers how a solar system works, what the key success factors of system productivity are, how to evaluate the entrepreneurs needs to better size the system that should be used, etc.
- Ensure the quality of the technical services delivered to entrepreneurs:
  - Oblige the distributors to provide a technical assistance to the BoP entrepreneur: either recruit electricians or refer freelance professionals (whose skills would be approved by GVEP International);
  - Supervise the electrician registration to CARE2 and test him in order to:
    - Accept him in the CARE2 participants' network.
    - If it appears the electrician do not fit the GVEP requirement: to provide him with extra training or redirect him to education programs in case of disqualification
  - Supervise electricians operations by implementing a workflow process where the electrician reports its operations to either the original provider or to the GVEP technical mentor.

Beside the monitoring purposes, the electricians' operations supervision bring interesting value for CARE2 and the resources the programme is mobilizing.

[26] Indeed, CARE2 programme is already planning to provide technical insights to entrepreneurs while training them on business management. As a result, no entrepreneurs' training has been discussed any further in the report's recommendations. recommendations.

CARE2 would be hosting a network of 550 entrepreneurs that would be followed and supported. However, considering the large travelling times between the entrepreneurs' remote locations as well as the GVEP technical resources (1 mentor). It could be very complicated for the technician to dedicate the necessary time to each of the 550 entrepreneurs who would need his help. By keeping an eye on registered electricians' operations, the **GVEP technical mentor would use extra human resources to cover part of his supervised territory and therefore focus their efforts where they are needed most**.

To conclude, it can be assumed that supported by such a system, the BoP entrepreneurs could have access to proper technical maintenance while the retailers receive more customers:

- Skills increase and higher performance in answering the customer needs
- Securing the customer's satisfaction during the product life cycle and therefore increasing customer loyalty
- And even develop increased capacities to evaluate the products they need to source and distribute and therefore select and order better products (related to Pillar C).

4.2.2.3 Remaining uncertainties and actions to be conducted

Even though the global feasibility of this recommendation has been brought to a technician aware of the specific issues of the phone value chain, some complementary information must be collected and analysed to confirm what actions should be taken before effective implementation:

- Distributors' training: what should be the global technical syllabus? What should be the expected competences at the end of the session(s)? How many sessions have to be organized per training programme? Where should the training take place? Would distributors have to be tested regularly on their knowledge and ability to advise on technical aspects?
- Electrician test and registration to CARE2: what should the test be about (theoretical/practical)? What are the technical requirements to be accepted among the CARE2 electrician network? What kind of training should be delivered to "unskilled" technicians? What is the turning point (in terms of capacity) from which GVEP should redirect the technician to regular education programmes rather than delivering training?
- Technicians monitoring: what are the global reporting processes to be implemented in order to collect as much information as needed without building a "time-burning" mechanism? Should entrepreneurs be able to complain or deliver comments on the operation (with direct access to the GVEP technical team)?

To make sure of the plans' feasibility, it is therefore recommended that GVEP discuss these questions with the concerned parties as well as with the GVEP technical mentor. According to this feasibility check:

- Distributors' training: according to the distributors' interests toward the concept (1), a training syllabus should be designed (2), before developing a training session to be implemented on a distributor sample (3), to be scaled up to the entire distributors' network after the test feedback (4).
- Electrician test and validation: remaining questions must be answered (1) to lead to the design of an integration process and test of potential electricians (2).
- Technician monitoring: according to the implementation of the electrician test and validation, a workflow and reporting process should be designed (1), tested on the field in a limited geographical area (2) and scaled up after corrective improvements (3).

In order to properly implement this pillar, the CARE2 programme may need to **recruit extra technical mentors** to support the work of the current (and only) technical expert, in order to be able to:

- Supervise and support hundreds of BoP entrepreneurs split over the Mwanza region[27]
- Supervise and support dozens of distributors split over the Mwanza region
- Monitor the hundreds of electrician operations over the Mwanza region

[27] The current objective is to support 550 BoP entrepreneurs.

4.2.3 (Pillar C) Connect the retailers to the members of the value chain that are further up

4.2.3.1 Problem statement

ISSUES ADDRESSED AND TACKLED BY THIS RECOMMENDATION PILLAR

- **Wholesaler**: only 1 wholesaler has been identified in the Mwanza area so far and it is not familiar with plug-and-play innovation. The business agents who coordinate local M-Pesa agents, who have been introduced to Fenix by Vodacom, could be considered a kind of wholesaler but they deal only with the one product.
- **Retailer**: Not able to source its products from abroad and/or to source innovative quality products.
- **BoP entrepreneur**: Having few solar kit options at its disposal and being delivered with fake or unreliable products.

As previously reported the value chain is generally not aware of the existence of plug-and-play products while retailers do not always purchase the right solar products to be distributed to entrepreneurs. Those two main issues mean the BoP entrepreneurs are offered limited solar charging system options in terms of range (no plug-and-play kits are available) and quality (their providers are not always able to offer them quality products).

Based on the previous analysis and statements, the main issues discussed over this section can be summarised as follows:

- There is only one referenced wholesaler in the Mwanza region. The main implication of this is that only one business is keeping up-to-date with solar innovation, so without its network and knowledge, limited new products can be spread over the retailers
- The only wholesaler is not aware of the plug-and-play phone charging systems. Since it supplies products to the rest of the value chain nobody can access it yet
- Small retailers are not connected to providers abroad and big retailers are mostly connected at a domestic level. None of them are connected to manufacturers since they do not have the proper negotiation or English skills or financial capacity to purchase large volumes
- Various retailers prove to not have the necessary technical skills to be properly able to source quality products.

4.2.3.2 Suggested interventions

The purpose of the third pillar is to improve distributors' ability to source quality products from various providers.

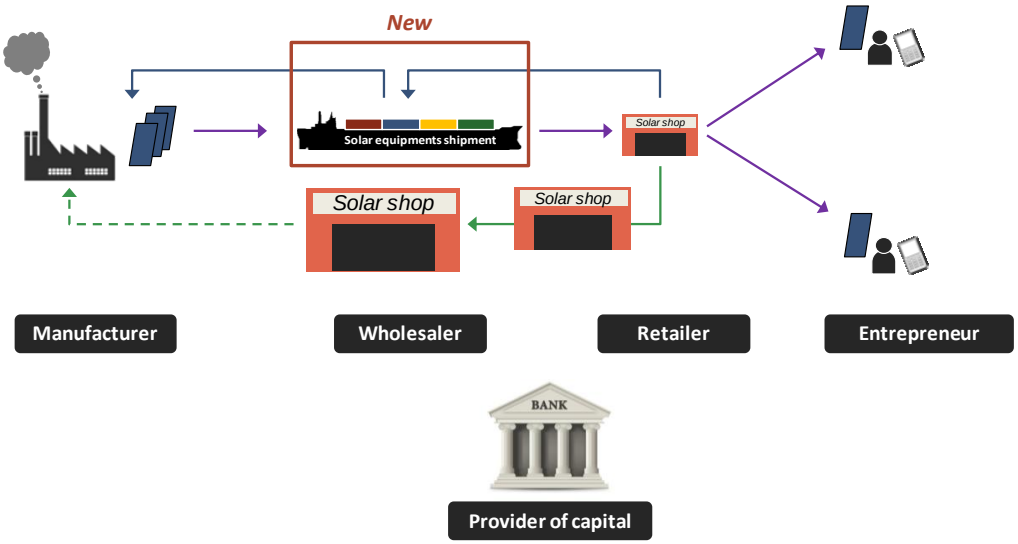


Figure 16 -- Plan illustration of connecting the distributors to further up the value chain (Source: ENEA Consulting analysis)

When a distributor sources its stock from a limited range of providers due to its lack of negotiation experience and technical skills, the end customer, the BoP entrepreneur, is potentially deprived of the most reliable tools to expand its business.

To overcome such issues it is suggested the CARE2 programme should aim at connecting the retailers and wholesalers with providers of innovative products. At the same time other potential wholesalers should be investigated and the capacity of new wholesalers developed. This objective could be reached through the following initiatives:

- [Step 1]: Businesses with similar characteristics to the sole existing wholesaler should be identified throughout the country. Through such initiatives GVEP International would be able to enlarge the value chain and therefore generate more opportunities to develop the value chain over Tanzania. Beyond Mwanza such task should be conducted in Dar Es Salaam.
- [Step 2]: "Small" and "intermediate" retailers should be better connected to a broader range of wholesalers and bigger retailers who receive trust from GVEP due to the reliability of the products they offer. In addition to referencing distributors, main GVEP interests are to build up an active distributor network (professional community) that can collaborate with a common interest of developing sustainable profitable businesses. Such networks would also receive the visits of manufacturers who could present their innovations and contribute to the marketing and technical education of distributors.
- [Step 3]: Various retailers do not have the resources to acquire stock from abroad. But with the proper support and coaching from GVEP, those retailers might be more capable of sourcing a more diversified and higher quality stock from a broader panel of international exporters (manufacturers included). The purpose of step 3 is to train promising retailers toward the status of wholesaler.
- [Results]: By identifying new wholesalers [Step 1], building up new wholesalers [Step 3] and connecting distributors and manufacturers together [Step 2], GVEP International could allow new phone charging technologies to penetrate the local market thereby offering entrepreneurs access to more diversified and better quality products.

4.2.3.3 Remaining uncertainties and actions to be conducted

The feasibility of various points in this pillar have been discussed with GVEPs' team. However, some complementary information must be collected and analysed before effective implementation:

- [Step 1] Besides a pre-existing list of wholesalers held by plug-and-play manufacturers, or a list of important solar importers potentially held by the ministry of commerce, what could be the means to scout and reference the potential existing solar wholesalers of the country?
- [Step 2] What events should be built up? What interventions could manufacturers provide to contribute to the network while providing new knowledge? With what frequency should the network be solicited? Could a contact directory of the entrusted distributors be a useful tool to reference and promote?
- [Step 3] Big/intermediate retailers trained to be wholesaler: what should be the exhaustive list of qualities and economic capacities to be filled in order to be supported by GVEP? Besides being coached on "customs management", "order and demand of quotations", "rules and behaviours of international negotiation", "cash flow management", "solar principles and system sizing" what should be the exhaustive list of knowledge to be transferred? How should the "wholesalers' class" be managed and at what frequency should they be run? Could the manufacturers be involved in the "wholesaler class" content or take over part of the teaching (since they know better than anyone what their basic expectations regarding business relationship with wholesalers are)?

While answering the previous statements, GVEP International can conduct the following first set of actions that should be conducted in order to launch the previous steps[28]:

- Structure a few arguments to convince manufacturers and every distributor typology to integrate the GVEP network (benefits to brand image, opportunities to find customers or contact with the upstream, etc.)
- Develop a sustainable practices charter any member of the value chain should follow to be involved in the network.
- Get in touch with the manufacturers to invite them to join the network. Establish with them what material and knowledge they could bring to the network in exchange of having access to the directory.
- Based on the local team knowledge, refer the distributors according to their estimated revenue and skills and propose to them that they join the programme according to their characteristics. At the same time intend to raise their feedback in terms of subject/knowledge they would be willing to capture through the network and GVEP coaching.

[28] Considering the very limited size of the pool of actors composing the typology, such steps could be developed in a more informal way.

4.2.4 (Pillar D) Be watchful to manufacturers development

4.2.4.1 Problem statement

ISSUES ADDRESSED AND TACKLED BY THIS RECOMMENDATION PILLAR

- **Manufacturer**: No experience of the local market and its value chain entities.
- **BoP entrepreneur**: Unsuitable products according to its needs.

Interviewed manufacturers are driven by the opportunity of offering a game changing value proposition to BoP entrepreneurs. By developing **plug-and-play kits below the current market price (up to half price of the current market alternatives according to some manufacturers' interviews), the manufacturers' value propositions deserve to be supported**. However, this support has to be as long as the offered kit does not confine the BoP entrepreneur in a complicated situation on a midterm basis

The fourth and last main pillar's objective is therefore to monitor the manufacturers' results and their customer satisfaction in terms of technical reliability, phone charge yield efficiency and product adaptation to the market. In exchange for such data access, the CARE2 Programme would provide its network and market data collected in the field by CARE2 mentors.

4.2.4.2 Suggested interventions

Potential downsides of an effective lock-in strategy

Manufacturers intended to design the most efficient products by using direct continuous power (DC/DC) instead of converting the energy and losing a lot of efficiency (DC/AC/DC). By doing so, their product only needs a 15W photovoltaic panel instead of 50W photovoltaic panel to charge up to 20 phones per day and does not need an inverter. On the other hand, not every device can be connected to the platform since it needs to be DC/DC compatible.

This technical system includes a business strategy which leads the customer to (almost) exclusively relying on any additional products the manufacturer is selling and therefore ends up "locked-in" to the platform[29] due to high switching costs (investing in a new equipment rather than purchasing additional items/extensions).

For this main reason it is necessary to monitor customers' satisfaction over time and determine if they suffer from being "locked-in" in terms of opportunity costs in the phone charging market.

Adaptation of a standardized product to an environment of customization

Plug-and-play solar kits are standardized products with extra items and available upgrades[30] to be delivered from the manufacturer. However, as standardized products follow a certain "lock-in" strategy, it cannot be customized following the owner's imagination or wish to plug in other devices.

Thanks to the field investigation, the team raised some concerns in terms of product adaptability to an environment which is perpetually testing homemade adaptations. Few accessories are developed for phone charging business owners that might not be adapted to a plug-and-play system (please see the left side of Figure 17). According to this picture handmade accessories are developed. Even though they can appear very attractive to an entrepreneur (ability to charge 30 phone at the same time while the plug-and-play system might be designed for 5 to 10 phones), they might damage the phone charging system while delivering poor services to their customers (time per charge, issues to deliver fully charged batteries, etc.)

On the other hand, phone charging customers have habits and beliefs which have to be allowed for. One of them is the widespread fear of phone loss or robbery (at the phone charging station) this leads them to mostly leaving the phone charge provider with the phone battery instead of the entire phone (right side of Figure 17).

[29] such strategy is broadly practiced by worldwide leaders in western mass markets: Gillette (razor blades), Xbox or PlaystationPlayStation (video games), Apple (electronic products), etc.

[30] Even though current systems are quite locking-in their customers, with high interests to sell them accessories after providing the platform, it must be acknowledged various systems are developing options to purchase by the competition. It is to say plug-and-play sockets become more and more USB sockets which allow any DC/DC competitor accessory.

Rather than an exhaustive list of potential challenges, both presented challenges should be considered as illustrations of potential incompatibilities between the market environment and the current plug-and-play kits design (limited compatibility with non-manufacturer branded accessories, phone charging system instead of phone battery charging system, etc.)

In conclusion, specific attention should be paid to the plug-and-play solar kits penetration and to both BoP entrepreneurs and phone charging customers' behaviour.

Figure 17 -- Environment challenges to plug-and-play kits: Homemade socket and battery charging instead of phone (Source: *ENEA Consulting field investigations, 2013*)

Potential downsides of manufacturers will to manage entities further down the value chain

Interviewed manufacturers admitted one of their main development challenges consisted in identifying reliable distributors as well as keeping an eye on the ultimate customers' satisfaction and behaviour toward the product. To do so, most of them claimed to select their distributors and restrict it to a limited number of channels so they can have better control of it.

By doing so and partnering with telecommunication marketing leaders (such as Vodacom or Tigo), those businesses may negatively impact a large range of the current value chain: businesses with no possibility to align their offer and therefore forced to hope the product would not be a major success among BoP entrepreneurs.

Therefore, CARE2 Programme must be alert of the potential negative impacts such massive marketing penetration may have on retailers which will be excluded of those products' distribution chain... It is to say they would not be able to compete with a Vodacom or a Tigo (which have marketing and communication muscles wholesalers and retailers do not have) if manufacturers prove to go exclusive with huge Telecommunication companies from those products'.

Successful branding ripple effects of counterfeit copies increase

The last main element the CARE2 Programme must be careful of is a plug-and-play solar kit developments' ripple effect which is not under the manufacturers' control: the counterfeit copies that may be delivered to ignorant BoP entrepreneurs.

As highlighted previously in this report, BoP entrepreneurs are not really influenced yet by solar branding, they tend to buy on the basis of the retailer's reputation. If a strong branding strategy were unique enough to attract attention to a specific product unethical competitors might seek to copy that branding. For example, the day a Vodacom red branded plug-and-play solar kit arrived on the market and attracted lots of attention, counterfeit copy producers might seek to take advantage of rising awareness of the product.

Following several field investigation observations and professional testimonies regarding Tanzanian markets vulnerability to such issues would justify the CARE2 Programme monitoring the appearance of such phenomenon and possibly to support manufacturers in BoP entrepreneurs' education on this issue.

Indeed, such a ripple effect would have negative impacts on both the manufacturers (brand damage) and BoP entrepreneurs who unwittingly buy fake products.

4.2.4.3 Remaining uncertainties and actions to be conducted

Unlike the previous pillars, the **purpose of Pillar D is to reduce uncertainties regarding plug-and-play penetration and ripple effects** in terms of pros/cons to BoP entrepreneurs. For this, collaboration with manufacturers is key. It is therefore suggested GVEP proceed as follows, thereby gathering the necessary data to appreciate plug-and-play technologies' impacts:

- Get manufacturers to collaborate in "impact observations". Based on ENEA Consulting experience, such businesses have interest to participate in impact assessment studies which generally provide them with marketing data and customer feedback. Both pieces of information are key for further market penetration.
- Set up key metrics to be analysed and survey principles to be followed
- Administrate the surveys following the customer data base shared by manufacturers (customer directory).

5 Concluding remarks

Through this value chain study supported by a field investigation, the team has been able to identify value chain actors strengths, concerns and challenges related to the phone charging market. Main profiling outcomes are the following:

- **Manufacturers:** located outside of Tanzania, their main challenge is to identify the right reliable distributor/channel which will offer them security and control. Without this distributor they can't afford to cover the market since their intention is to go "lean"[31] by limiting implementation capital. As a consequence they don't properly handle regional specificities and businesses in their presence. Maximizing their entry's impacts with a strong branding strategy, they may face several threats due to market unfamiliarity to standardized products (counterfeit copies by manufacturer's partners, product incompatibility with local behaviours) that they would try to master with customers' lock-in tactics.
- **Wholesaler**: the only identified one by GVEP is located in Mwanza, the wholesaler is able to source its products from abroad. It is familiar with international business and negotiations whereas it is not familiar yet with plug-and-play products. It can afford to pay upfront for important orders and believe word of mouth is the most efficient marketing tool in Tanzania. As a distributor, it puts together individual component products that allow any BoP entrepreneur to run a solar phone charging company. Since it imports any electronic products related to energy it should be able to provide plug-and-play kits as well once it is introduced to such technology.
- **Retailers**: based in Mwanza or in a region district town they are often small business men and women without proper technical skills, or international business knowledge, or English speaking capacities ("small" and "intermediate" retailers). As a result, most of them are forced to purchase their products from domestic retailers/wholesalers and have difficulties in expanding their range. Since they don't have technical knowledge they may purchase products of lesser quality and are not able to advise the customer on the products' technical aspects. Some of them require the assistance of a freelance electrician who might be talented, or not. Others prove to be promising dealers with possibilities to become wholesaler one day.
- **BoP entrepreneurs**: The most highly educated ones have been to primary school when a large part of the interviewed pool didn't have this opportunity. They do not know how to do cash flow forecasting and share a common physical isolation due to their remote villages. As a result they have trouble with any business management task they cannot execute with efficiency (marketing for instance), they have never been to a bank before and often do not have enough cash to pay for solar kits upfront. Beyond the previous issues, they do not have solar technical related skills and can be easily taken advantage of in this aspect.
- **Banks/MFIs**: While banks have a gigantic cultural gap to face with BoP entrepreneurs, Micro Finance Institutions are more adapted to BoP entrepreneurs' environment and needs. However, both types of capital provider usually deliver expensive services for business owners claiming between $25 and $40 turnover a day. Both Bank and MFIs look for new customers to serve and are interested in expanding their brand image: reliable business owners with secured assets and promising turnover for banks, trustful BoP entrepreneurs for MFIs.

Capitalizing on these statements, GVEP International should consider retailers as a nodal point of their programme (Pillar B and C) to identify as many BoP entrepreneurs as possible (willing to expand their business into phone charging) while using its own resources with efficiency, the CARE2 Program should rely on the retailers' presence and efforts. As the first communication entry to the industry and possibly as the ultimate provider, the **retailer should be a nodal point of the CARE2 Programme**. By providing them with the right business and technical support as well as building up a strong business network around them, GVEP would contribute building their capacities and allow them to:

- identify the BoP entrepreneurs GVEP International would like to help ;
- Contribute to surrounding the BoP entrepreneur with financial support delivered from banks or MFIs ;
- Provide the right technical services to the BoP entrepreneurs ;
- Provide quality products to BoP entrepreneurs thanks to its better business connections.

In addition to retailers' involvement, providers of capital (and potential providers of pay-as-you-go services) have an important role to play as well (Pillar A). While the retailer is the first entry point of the BoP entrepreneur to the chain, the provider of capital (or PAYG provider) can seriously facilitate the entrepreneur's acquisition of the phone charging

[31] "Lean" approach: referring to the intention of reaching the market as fast as possible while reducing as much efforts, investments, costs as possible in order to raise the proof of concept and eventually adjust to maximize the viability.

system by providing the necessary loan/lease to curb its cash flow issues. In this regard, the presence of GVEP is a strong lever to establish a business agreement between the 2/3 parties. At the same time by providing advertising material, GVEP contributes to expand the brand image of providers of capital and foster a broader access to micro-

To finish, it is recommended GVEP collaborate with plug-and-play manufacturers to confirm the positive impacts on entrepreneurs. This collaboration should take the shape of an observation of customers' behaviour and market reactions to such innovation (Pillar D).

6 Annexes

6.1 Approach illustration – Questionnaire for BoP entrepreneur

Organisation profile

1. What product/service do you offer?
2. What is your most successful product/service?
3. For a regular day: what is the turnover? If you already provide phone charging services, what is the daily turnover of this activity?
4. How much time do you spend at the shop per day?
5. How many Human Resources work for the company? What are their skills and/or degrees?

Upstream relationship

6. What kind of provider/retailer do you use? What are they selling?
7. Have you eared about phone charging device? Who told you first about the system? Do you know any specific brand/system? Where did you learn about these brand?
8. Do you think there is a market for such service (phone charging)?
9. Do you know any retailer able to provide you with phone charging device? At what price do they offer you the product? Do they offer any financial support (lease/loan)?
10. Do you think you would know how to use/repair it or would you need to be trained? Just told once how it works or a stronger/deeper training?
11. Do you have any relationship with Bank/IMF that would help you for acquiring such system? Which bank? What would they expect from you in terms of guarantee?

Downstream relationship

12. For a regular business day: How many customers come at your business? Do you keep tracks of the cash exchanged (cash in / cash out book keeping)?
13. Do you have a process to collect your customers' expectations? What are they in term of phone charging?
14. What are your marketing tactics and plan to reach your customer?

6.2 Business Model Framework methodology

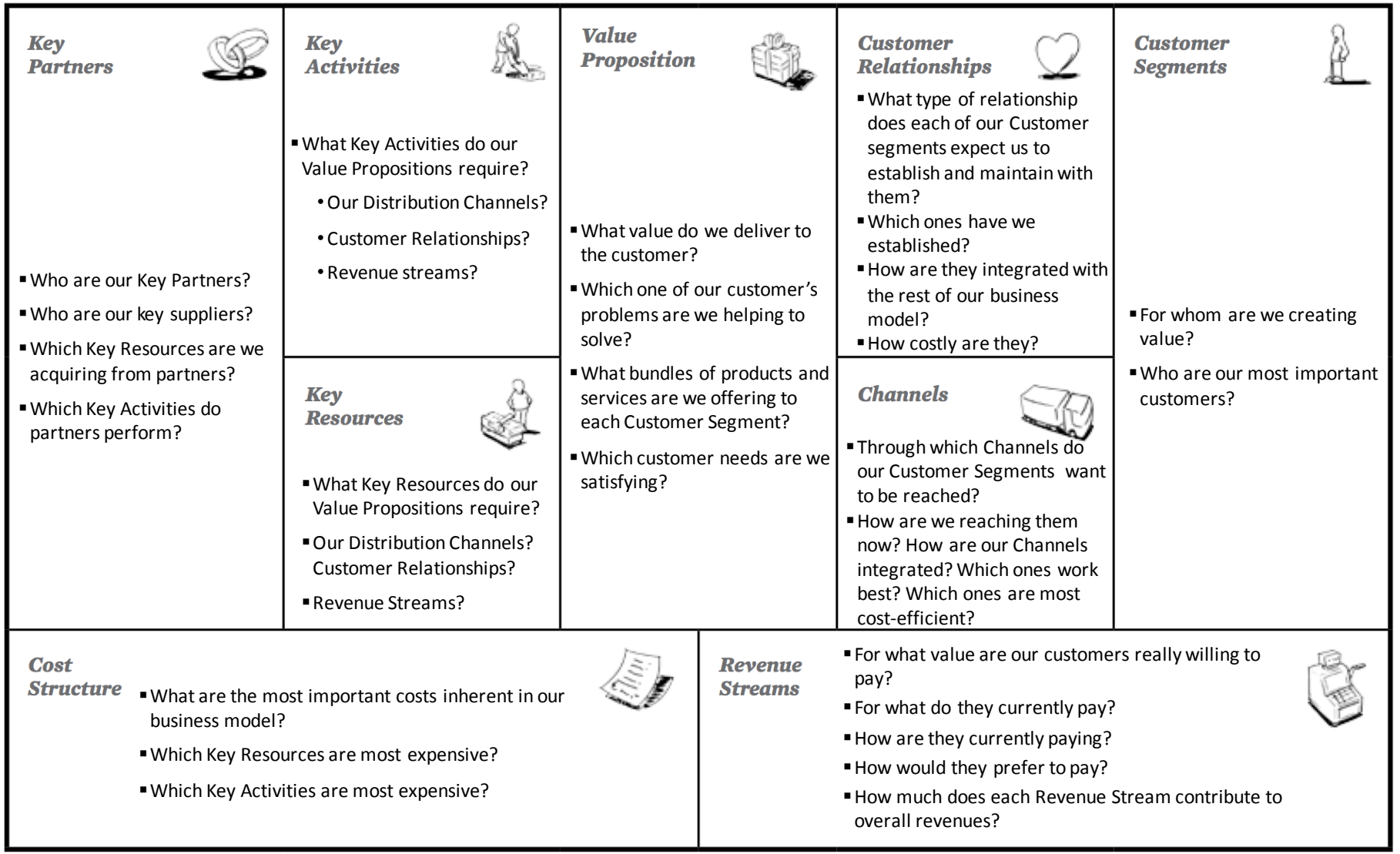


Figure 18 -- Business Model Framework methodology (Source: *Business Model Generation, 2010*)

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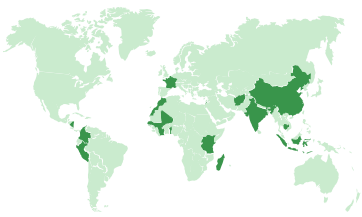

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