Organisational Learning in Business Model Innovation in the Bottom of Pyramid market

An empirical fieldwork about the market introduction of clean cookstoves in Mozambique

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Finally, we would like to endorse each other’s great work in this collaboration and for the perseverance and overcoming frustrating moments. We believe that this intense time has greatly enhanced our professional and social skills which helps us immensely for our future endeavours.
Abstract

There is a need for cleaner technology initiatives into the Bottom of the Pyramid (BoP) market to combat the effects of climate change. The difficulty of these initiatives lies in their business model innovation process, as those organisations struggle in finding adequate strategies to establish their business in the BoP market. The BoP market is characterised as highly uncertain, which makes the operation of businesses challenging. Hereby the thesis aims at answering the question on how organisational learning occurs in business model innovation in the BoP market. Through a case study approach, the thesis intends to understand the requirements to establish a functioning business model by analysing organisational learning under business model innovation within the BoP market.

This has been realised through a three week field study in Northern Mozambique, observing the market introduction of a cleantech company operating in this context. Hereby the business model innovation process and the environment of operation was analysed. This research contributes to the current discussion of business model innovation in BoP markets by detecting organisational learning as a useful mechanism and adding relevant insights on how organisational learning occurs in this specific context. Therefore the study opens the discussion on organisational learning in business model innovation in the context of the BoP market by asking for further studies on the topic.
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List of Abbreviations

ACE African Clean Energy
AMPCM Association of Mozambique for the Promotion of modern cooperatives
BoP Bottom of the Pyramid
OMM Mozambican Women Organisation
1. Introduction

1.1 Human Concern

The United Nation’s Food and Agriculture Organisation states that globally, the woodfuel sector is one of the substantial greenhouse gas producers with up to seven percent of total emissions (FAO, 2017). Half of the worldwide extracted wood from forests is used as fuelwood and the production of charcoal (FAO, 2017). Fuelwood and charcoal are important energy sources for households in developing countries, as 2.4 billion people still rely on the traditional use of wood fuel for cooking (FAO, 2017).

More than 700 million people in sub-Saharan Africa relying on traditional biomass cooking fuels such as wood and charcoal create a challenge for African cookstove initiatives and enterprises (Jürisoo et al., 2015). Mozambique is largely dependent on traditional biomass, such as firewood and charcoal, for cooking and heating (Takama et al., 2011). Takama et al. (2011) identify the use of charcoal in Mozambique as the most dominant fuel choice. However, they also mention the significant rise of charcoal prices in the country which makes it less affordable to middle and low-income households. Charcoal is produced by inefficient, artisanal methods in Mozambique, and places severe pressure on natural resources, as fuelwood and charcoal consumption are one of the main causes for deforestation in the country (UNEP RISØ, 2013). As shown in Figure 1, according to the Global Alliance for Clean Cookstoves (2018a), 96% of the population of Mozambique uses solid fuels such as charcoal or firewood, and the same amount is affected by household air pollution (HAP).

![Figure 1: Country Profile of Mozambique on Clean Cooking](Global Alliance for Clean Cookstoves, 2018a)
In order to reduce drivers of deforestation in Mozambique, improved fuel-efficient cookstoves and alternative fuels for cooking can be a solution and have a significant impact on greenhouse gas emissions (UNEP RISO, 2013). Especially those improved cookstoves that run on solid fuels from locally produced biomass such as pellets and briquettes are a way forward (Jürisoo et al., 2015). Jürisoo et al. (2015) argue that, when used properly, these cookstoves can significantly reduce household air pollution and improve efficiency, thereby promoting cleaner cooking. Moreover, unlike fossil fuel sources of energy that need to be imported, locally produced bioenergy also aid in poverty alleviation through the creation of employment opportunities, thereby positively improving the country’s macroeconomic balance sheet (Sander et al., 2011).

However, challenges have been identified within the market adoption of clean cookstoves (Atteridge, 2012). This is often due to a neglected understanding of the needs, preferences and constraints of the users (Atteridge, 2012). Various authors such as Jürisoo (2016) and Rehfuess et al. (2014) express the issue of finding an adequate and the difficulty to establish the right business model for clean cookstoves initiatives for the bottom of pyramid (BoP) market. Therefore, empirical research of the thesis encompasses the early stages of an attempt to establish a cookstove business model to detect issues and requirements of success.

A path for reaching a higher usage of requested solutions in Mozambique is through profit based, innovative, clean technologies. By cooperating with Pamoja Cleantech, we seek to support their goal of providing opportunities at the BoP market by focussing on inclusive business modelling (Pamoja Cleantech, 2017). The thesis aims to benefit the organisation by analysing ways to solve their issue of finding an adequate business model which leads to an efficient implementation of their solution. The organisation’s engagement is to establish clean energy technologies in Africa to excite sustainable entrepreneurship and climate change mitigation (Pamoja Cleantech, 2017). This study seeks to gain insights on how Pamoja can establish their business in Mozambique.

In the following section we discuss the need for research on the subject, before delving in the next chapter into previous research on clean cooking in Africa and analysing the theoretical background of business model innovation in the BoP market and organisational learning.

1.2 Research Issue

Business Model Innovation in the BoP market

There is limited research done regarding business model innovation with its varieties, especially focusing on hybrid models and inclusive solutions, in BoP markets (Gebauer & Saul, 2014). So far, business models have been studied in a more isolated manner and in organisational forms such as from the perspective of non-profit organisations, social
businesses and profit-oriented firms (Gebauer & Saul, 2014). Furthermore, organisations should favour small-scale studies, as smaller experiments enable a more efficient learning for implementing successful business models (Gebauer & Saul, 2014). This is an area where the thesis constitutes to, as it analyses a business model which is supervised and supported with technical expertise by a for-profit organisation, facilitated locally by a non-governmental organisation and implemented through local partnerships.

As business models for the BoP market require specific characteristics where “Western” business assumptions are often misleading, London and Hart (2004) ask for further case studies and empirical analyses in order to extend the current state of research upon this subject. Gebauer and Reynoso (2012) state that BoP research which promotes more “inclusive” business model innovation is desirable, as inclusiveness is a necessary factor to measure the level of sustainability and impact on the low-income segment. However, there has only been very little focus on research to understand the conditions under which social enterprises operate or their market strategies (Thompson & Macmillan, 2010). Service research thereby helps to develop understanding the scaling-up of transformative services in the context of BoP (Gebauer & Reynoso, 2012). Hereby, BoP is also a promising field for researching discontinuous innovations and their emergence (Michel et al., 2008).

Gebauer and Reynoso (2012) have also identified that more service research on the low-income segments is extremely important, because established service theories and empirical generalisations derived from data gathered in the medium- and high-income segment are not necessarily applicable to BoP markets, or at least not always in the same way. The authors furthermore state that the BoP market offers a great opportunity to study clean technologies such as renewable energies, which disrupt traditional ways of energy provision. Rehfuess et al. (2014) inquire further qualitative studies on cookstove initiatives in specific circumstances in the BoP market to strengthen an understanding of which factors are most important for the success of those projects.

Organisational learning in business model innovation in the BoP market

The subject of organisational learning in business model innovation has so far received only limited attention from scholars. Only a few studies have examined the relationship between team learning and business model innovation (Huang et al. 2014), even if most research has noted the influence of organisational learning on innovation (Lichtenthaler, 2009). Various authors acknowledge the need for further research along various dimensions such as: the motivations behind learning in situations where external pressure is not the only factor responsible for change (Sosna et al. (2010); the link between business model design, native capability and absorptive capability, as native capabilities have been seen as a requirement for success at the BoP (Ausrød, Sinha & Widding, 2017); the performance of different learning approaches to be conducted on firms under more unstable contexts (Andries & Debackare, 2013); the features in respect of the internal team features and the environmental factors influencing team learning (Zellmer-Bruhn & Gibson, 2006).
Finally, organisational learning in business model innovation in the BoP market has been mostly neglected by academic discussions, presenting an interesting area to study for this thesis. The only detected research so far focusing on the subject was initiated by the influential BoP researcher Ted London (London, 2015). However, this article version could not be analysed, even after being in contact with the author himself, who expressed his appreciation of the focus of this thesis (London, 2018, see Appendix I). London also explained that his research did not explore organisational learning in this context in sufficient depth (London, 2018).
2. Theoretical Background

2.1 Clean Cookstove Initiatives

Over the past decades, there have been ongoing efforts to replace traditional cookstoves with more efficient stoves in BoP markets (Atteridge, 2012). Improved cookstove technologies have been developed as a possible solution to environmental and health hazards that result from cooking on open fires (Kenney & Verploegen, 2017). Clean cookstoves are beneficial products creating significant health benefits which have push characteristics (Koh et al., 2014). Push products improve poor consumer’s lives; however, they are not readily demanded as indoor air pollution health effects are largely unrecognized by consumers, which is why the health benefits of clean cookstoves are not appreciated (Koh et al., 2014).

The following table shows an overview on recent clean cookstove studies:

Table 1: Literature review on clean cookstove studies

<table>
<thead>
<tr>
<th>Authors (Year)</th>
<th>Topic</th>
<th>Findings of study</th>
</tr>
</thead>
</table>
| Atteridge (2012)          | A combination of qualitative and quantitative research methods from the users’ point of view on how to transform household energy use. | 1. Need for understanding the social and cultural factors responsible for household energy use and decision making  
2. Need for a user focussed research approach when designing cookstove programmes. |
| Atteridge and Lambe (2012)| Case study on four villages in India aimed at understanding the most important influences of household energy choice. | 1. The influence of traditional fuels on food taste is highly appreciated by individuals.  
2. Heat regulation while cooking is highly prioritised by stove users.  
3. Households are able to pay high upfront costs for items such as cookstoves that may be considered investments through taking loans. |
| Atteridge and Weitz (2017)| Investigation of the functioning of the CCS sector in Kenya through qualitative interviews. | The Kenyan cookstove sectors suffers from weak strategic direction, low legitimacy within government and among households, poor knowledge accumulation and learning. |
| Goodwin et al., (2015)    | A project reviewing effectiveness of behaviour methods in cleaner cooking initiatives. | 1. Only a limited number of stove and fuel initiatives have been able to meet the air pollution reductions necessary to alleviate health |
2. A mixed picture of the role of behaviour change techniques in influencing cleaner cooking interventions.

<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Description</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson et al. (2015)</td>
<td>Case study analysis on development of NGO’s four cookstove projects in Cambodia, Kenya, Nepal and Rwanda through secondary data and qualitative interviews with stakeholders.</td>
<td>Examine the potential for successful scale-up and local market transformation through understanding user needs; market linkages and capacity development; testing of innovative business, distribution and finance models; and the support of the enabling environment.</td>
</tr>
<tr>
<td>Jürisoo et al. (2015)</td>
<td>Case study analysis on cookstove interventions across Sub-Saharan Africa.</td>
<td>Cookstove initiatives should recognize the value of biomass energy, access end-user finance for their products through innovative approaches, focus on end-user behaviour and preferences.</td>
</tr>
<tr>
<td>Jürisoo, M., and F. Lambe (2016)</td>
<td>Two case studies examining factors that influence purchase and continued use of clean biomass cookstoves in Kenya and Zambia.</td>
<td>1. The factors influencing stove purchase (Aesthetic appeal, saving money, accessing finance) are not the ones responsible for motivating continued long-term use. 2. Business Model Innovators need to carefully map the users’ journey in order to identify the area where users need support during their stove transition process.</td>
</tr>
<tr>
<td>Lambe and Senyangwa (2015)</td>
<td>Case study aimed at identifying the key factors influencing energy use and uptake of alternatives in Kibera, Nairobi.</td>
<td>1. Lack of awareness about the importance of efficient cookstoves among the people. 2. Individual level of aspiration plays a role in users’ choice of energy use. 3. Personality traits such as risk-taking play a role in users’ choice to uptake cleaner cookstoves.</td>
</tr>
<tr>
<td>Matin and Roe (2016)</td>
<td>A literature review of behavioural change approaches that have been used to understand cookstove adoption.</td>
<td>Behavioural change techniques are capable of operating alongside each other, therefore, this calls for a need for exploring the dynamics and interactions around them.</td>
</tr>
<tr>
<td>Patel and Nyangena, (2016)</td>
<td>10-month study testing fuel distribution channels and customer incentive schemes to increase the usage of pellet stoves in Kenya.</td>
<td>1. Using trusted members of the community eases market penetration, however they need to be supported through trainings to ensure accurate communication to</td>
</tr>
<tr>
<td>Reference</td>
<td>Activity</td>
<td>Findings</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Rehfuess et al. (2014)</td>
<td>Systematic literature review of cookstove initiatives over the last decades.</td>
<td>Factors of seven domains influence success of cookstove projects: fuel and technology characteristics; household and setting characteristics; knowledge and perceptions; finance, tax, and subsidy aspects; market development; regulation, legislation, and standards; programmatic and policy mechanisms</td>
</tr>
<tr>
<td>Tadesse Mengistu, A., and F.X. Johnson (2013)</td>
<td>Design and investigation of two alternative household energy scenarios in Ethiopia: moderate shift and high shift towards efficient biomass use.</td>
<td>Moderate shift scenario: urban households shift towards electricity and away from charcoal, rural households switch to improved wood cookstoves. High shift scenario: More households switch to efficient stoves and some use of biogas in rural areas and bioethanol in urban areas.</td>
</tr>
<tr>
<td>The World Bank (2014)</td>
<td>A report on Clean cooking based on inputs from policy makers, NGOs and key players in the clean and improved cooking sector globally.</td>
<td>1. Users unwillingness to pay for improved cookstoves remains a barrier to adoption in Africa. 2. Need for new investments to accelerate clean cooking appliances uptake in markets where clean fuels are already in existence.</td>
</tr>
<tr>
<td>Vulturius and Wanjiru, (2017)</td>
<td>The impact of social relations on individual behavioural change.</td>
<td>An improved understanding of the relevance of behavioural change techniques in the adoption of cookstoves in developing countries.</td>
</tr>
</tbody>
</table>

**Stove types and fuels**

Improved cookstove technologies are divided into five different categories (tiers) based on four indicators: efficiency, indoor emissions, total emissions and safety (Global Alliance for Clean Cookstoves, 2018b). These five categories range from tier zero to tier four, where tier
zero is the lowest performing and tier four is the highest performing (Global Alliance for Clean Cookstoves, 2018b). However, these tiers cannot be combined as a stove can be tier one on indoor emissions and tier four on efficiency (Global Alliance for Clean Cookstoves, 2018b). The stove solutions can further be classified into improved solutions and clean solutions, where the improved solutions are mainly characterised by small functional improvements in fuel efficiency, running on traditional fuel such as charcoal and wood, while clean solutions range from those with fans and natural-draft gasifiers, running on pellets and briquettes to those that use fossil fuel such as LPG and renewable fuel like solar and biogas (The World Bank, 2014, see Appendix II).

Sweeney et al. (2017) describe various requirements for the design of successful cookstoves, including performance such as efficiency, health, and safety; affordability including price and fuel consumption as well as usability, such as portability, time saving and ease of use. Rehfuess et al. (2014)’s review of clean cookstove studies discuss that the fundamental requirement of the design of cookstoves is to meet user needs in preparing local dishes with traditional cooking utensils and available fuels. Several key success factors for the implementation of improved cookstove technologies have been identified including efficiency, reduced emissions, a design that meets the users’ diverse needs or the ease of use, among others (Jürisoo et al., 2015). Atteridge (2012) analyses various factors that users consider when evaluating a good cookstove. According to the author, the desirability of a stove may vary depending on culture and traditions, social norms, cooking methods, household needs and even flavour preferences.

Within this discussion, Rehfuess et al. (2014) highlight the important role of improved solid biomass fuel stoves. These can be crop waste and dung, wood, briquettes, pellets or wood chips (Sweeney et al., 2017). Intermediate improved cookstoves, such as advanced biomass stoves with forced ventilation, have significantly improved energy efficiency and reduced air pollution, which is why they are widely used to promote cleaner cooking (Jürisoo et al., 2015). These advanced biomass cookstoves have a good mix of advantages to other stove types due to high health impact, high climate impact, high renewable potential and low cost (WHO, 2014). However, most fuel needs processing such as through cutting or pelletisation, thus increasing costs (Jürisoo et al., 2015). Clean fuels are considered to be those used in stoves that have high energy density, high combustion efficiency and high heat-transfer efficiency with sufficient heat control characteristics (Takama et al., 2011).

**Business model innovation in clean cookstove initiatives**

In order to implement cookstove business models successfully, all stages, from the choice of raw materials to post acquisition support, need to be considered in program planning and its implementation (Rehfuess et al., 2014). To get people to use the clean cookstoves, customers must know about the stove, where to find it, be able to afford it and be motivated to purchase it, know how to use it correctly and where to find support in case of problems (Jürisoo, 2016).
This shows the difficulty of business model innovation of clean cookstove initiatives, making it an interesting topic to analyse.

Various studies focus on how cookstoves can be implemented in an effective manner to both realise a social impact while ensuring functioning business through a for-profit model in regard to the individual provider or implementing organisation. Thus, experimentation in the cookstove sector has gone beyond technologies towards experimenting with new business models making stoves more accessible to the various segments (Atteridge & Weitz, 2017). A similar view is that efforts should promote more market penetration and scaling of technologies by building a bridge between technology and commercialization (Johnson et al., 2015).

Hereby Rehfuess et al. (2014) summarize in their systematic review enabling and impediment factors to the large-scale uptake of improved solid fuel stoves. The authors address seven domains which are influential and depend highly on the given context of the individual case: fuel and technology characteristics; household and setting characteristics; knowledge and perception; finance, tax and subsidy; market development; regulation, legislation and standards; programmatic and policy mechanisms. Some of the factors that motivate purchase of improved cookstoves include: saving, convenience, aesthetics and social effects (Jürisoo, Lambe & Osborne, 2018). Giving away of improved cookstoves to users for free or at highly subsidised prices is not advisable because even though this eliminates the problem of initial cost barriers, it also reduces the stoves’ perceived value, which is not sustainable in the long run (Jürisoo et al., 2015).

**Understanding customer needs**

A substantial and long-term impact requires cookstove initiatives to transform local stove markets to become self-sustaining and demand driven (Lambe & Senyangwa, 2015). Thus, the factors that motivate users to purchase a stove may not be sufficient to motivate its continued use. Therefore, a recommendation is that implementers devise a business model that re-motivates users to continue using the stoves long after their purchase (Jürisoo, Lambe & Osborne, 2018).

Long-term adoption requires a significant shift in cooking practices, as stoves function differently imparting a different taste and food texture (Jürisoo, 2016). Thus, there is need to understand consumers’ perceptions regarding fuel availability and use as the main starting points of identifying users’ needs (Atteridge & Lambe, 2012). This includes motivating users to get past the learning phase of their user journey by behaviour change techniques in order to develop a new habit (Jürisoo & Lambe, 2016). Additionally, behavioural change techniques have been identified as factors responsible for customers’ decision for purchase and continued use of improved cookstoves (Matin & Roe, 2016). The authors encourage improved cookstove companies to carefully target their customers in terms of gender and cultural context. They further reveal the need for business model innovators to engage users
behavioural change techniques such as through incentives, use of trusted members of society and through the understanding of the physical environment to motivate purchase and continued use of improved cookstoves (Matin & Roe, 2016). Hence, raising awareness and behaviour change becomes a significant part of the business development of clean cookstove businesses (Cheney, 2017).

Developing a new habit can be achieved at minimum level through easily readable manuals with clear instructions and supporting pictures and through easy-to-use stoves which are convenient and practical in daily life (Jürisoo & Lambe, 2016). Thus, support is essential for the success of a cookstove project, including hands-on trials before purchase, ensuring that users know expectations, high-quality user manuals and building of a trustful relationship that continues after-sales to provide long-term support (Jürisoo, 2016). Hereby sales agents have the important role to provide active support and information to help users (Jürisoo, 2016). Another important detail of the support and success is that the fuel provision for customers should be consistent in quality, affordable, accessible and available in various sizes equal to charcoal and other widely used fuels (Jürisoo, 2016).

**Capacity building**

For a clean cookstove business, functioning supply chains combined with appropriate financial and human resources are needed to sustain operations (Jürisoo et al., 2015). Similarly, supply chain and infrastructure development as well as a logistical system for stove delivery are crucial for upscaling the cookstove business model (Tadesse-Mengistu & Johnson, 2013). The authors express the need for local distribution centres, coordinators and the establishment of decentralized institutional capacity to match the varied demand in urban and rural areas as well as the actors involved in the biomass resource supply system.

Johnson et al. (2015) thus emphasise the importance of strengthening linkages between the participating actors by training on marketing and distribution models. The authors highlight the significance of capacity building in cookstove initiatives and filling the often-existing knowledge gap among actors. They furthermore express importance of knowledge co-creation to enable a dynamic learning organisation, as the local knowledge provided is vital for selecting agents. Therefore, knowledge creation and transfer play a significant role to establish a business model for clean cookstoves.

**Tendency to fail**

Despite the advantages of clean cooking over traditional biomass fuel, their use remains limited in Sub-Saharan Africa (Takama et al., 2011). The level of adoption of clean cookstoves falls short of what is needed to achieve sustainable goals (Jürisoo, 2016). This leads to the question of why the cookstove projects of the last decades did not have a scaled impact or why these initiatives have a tendency to fail.
There is a need to better understand clean cookstove projects, as many of them fail after decades of programs due to lack of strategic direction, low levels of legitimacy among governments and the consumers and weak knowledge accumulation and learning (Atteridge & Weitz, 2017). The authors express that there is a lack of knowledge-sharing and undocumented learning which resides in few individuals and no activities are built on accumulated knowledge. From a user perspective, Lambe and Senyangwa (2015) mention several factors that limit the uptake of improved cookstoves by potential users. These include lack of awareness of the potential financial, environmental and health benefits from cookstoves; low levels of aspiration by individuals and the role of individuals’ personalities, where risk taking individuals are more likely to purchase the improved cookstoves than non-risk takers.

It has proven to be easier to build cleaner cooking stoves than to get communities to use them in the long term (Atteridge, 2012). Various additional factors are limiting the spread and continued use of clean cookstoves in BoP markets. There is often a multiple fuel and stove use among the customers who use the improved cookstoves alongside traditional stoves, a practice referred to as stove stacking (Rehfuess et al., 2014). In many cases, this may depend on various factors such as cultural reasons, variations in food taste and unavailability of fuel for the improved cookstoves (Jürisoo et al., 2015). Consequently, difficulty to access fuel is responsible for discontinued use by improved cookstove owners, since it draws them back into the charcoal chain, a factor which in the long run leads to tendency for clean cookstove projects to fail (Patel & Nyangena, 2016).

Atteridge (2012) identifies failure by improved cookstove implementers to understand their target users’ needs, preferences and constraints in their unique contexts. To encourage continued use, the author recommends an increased effort by cookstove implementers in understanding the users and incorporating insights about the users’ social and cultural differences into the stove designs. A study conducted in Uganda reviewing different improved cookstove businesses revealed that business financing, product technology and distribution and sales are some of the major operational challenges faced by the improved cookstove companies (Kenney & Verploeegen, 2017). The study revealed internal capacity of the business model innovators and the ease of access to finance as the two main factors that can aid in tackling the risks imposed by business complexity (Kenney & Verploeegen, 2017).
2.2 Business Model Innovation

**Business Models**

The term “business model” originated from Bellman et al. (1957) who investigated the construction of business games for purposes of training (Dasilva & Turkman, 2014). Since then, various scholars have developed a gradual interest in the study of business models and their innovation. However, it was not until the early 1990s that business models became an area of popular interest among researchers (Dasilva & Turkman 2014). Consequently, business model terminology has been used within several frameworks such as value creation, business strategy and business plan (Ghaziani & Ventresca, 2005). Klang, Walnöfer and Hacklin (2014), however, caution against the confusion of the business model concept with generic terms such as business idea and business plan. Unlike a business idea whose content is loosely articulated, a business model is more formally conceptualised (McGrath, 2010). In their review on the history of business model terminology, Dasilva and Turkman (2014) show that earlier references to business models were connected to technology-based companies as business models were seen as an explanation for how innovative undertakings within technology were formed in business terms.

Over the years, the business model concept has not always been considered flawless and has thus received criticism from several authors. Porter (2001) has been registered as the earliest critic of the business model concept as it is considered a poorly defined concept, inviting faulty thinking and self-destruction concerning strategy (Klang, Walnöfer & Hacklin, 2014). Moreover, the confusion in terminology was criticised as terms such as strategy, business model, and revenue model were being used interchangeably (Morris et al., 2005). In addition, earlier scholars have been criticised for their failure to agree on what a business model is as each scholar seemed to adopt an own definition suitable to their study purposes and thus hindered cumulative progress on the topic (Zott et al., 2011).

**Defining Business Models**

Despite the absence of a universal definition of business models, a concession on the subject is that whether implicitly or explicitly, all businesses employ a certain business model, which is vital for the success of the business (Teece, 2010). Moreover, the scale and speed at which industries and civil society today are being transformed by innovative business models has attracted even more scholars and practitioners’ attention (Massa & Tucci, 2013). To delve into the subject of business model innovation, we first describe what business models are. We hereby present some of the authors’ views and definitions of business models: Amit and Zott (2001) define a business model as that which depicts transaction’s content, structure and governance to enable value creation through exploiting business opportunities. Shafer et al. (2005) refer to business models as a representation of the organisation’s core logic as well as the strategic choices made to create and capture value, while Chesbrough (2007) defines a
business model as a series of activities ranging from procurement of raw materials to final customer satisfaction. Further, value creation and value capture are the two important functions performed by a firm’s business model (Chesbrough, 2007). According to the author, value is created when a new product or service is formed, while value is captured through the various activities developing and operating through the firm. Thus, business models have played an integral part since pre-classical times (Teece, 2010). Accordingly, business models should allow for the commercialisation of new ideas and technologies by innovative companies and are also viewed as a source of innovation through being a source of competitive advantage (Massa & Tucci, 2013). Chesbrough (2010), states that it is through business models that companies are able to commercialise their new ideas and technologies. The author states some of the functions fulfilled by a business model, which include: identification of a market segment, definition of the value chain structure and articulating the value proposition.

**Innovating business models**

Markides (2006) defines business model innovation as the process of discovering a fundamentally different business model within an existing business. It is the development or modification of business model elements (Gebauer & Saul (2014). Thus, new business models also represent a form of innovation (Teece, 2010). The importance of business model innovation is highlighted through the fact that new ideas and technologies are commercialised through business model innovation (Friedrich von den Eichen, Freiling & Matzler, 2015). Companies can only derive returns if they are able to capture the value they create for their customers through innovation (Friedrich von den Eichen, Freiling & Matzler, 2015).

A business model’s quality depends highly on the fit existing between all its components (Hamel, 2000). This is also referred to as the complexity of the business model (Andries & Debackere, 2013). Berends et al. (2016) confirms this by stating that changes in multiple components are involved in the process of business model innovation since eventual outcomes depend on the interactions between all the involved components. According to the author, this argument adds to the uncertainty associated with business model innovation. Companies in the process of developing new business models are often faced with high uncertainty (Anderson & Tushman, 1990). Uncertainty relates to the lack of sufficient information and results to strive for by a problem solver (Schrader, Riggs & Smith, 1993). Andries and Debackare (2013), suggest experimentation as one of the ways that firms facing uncertainty can develop new business models. Experimentation can thus be defined as a discovery process whose main aim is to gain cumulative learning from a series of failures prior to the discovery of a suitable business model (Massa & Tucci, 2013). Hereby Girotra and Netessine (2013) recommend a three-step process for companies to undertake during business model innovation as: first, auditing their existing business model, second, identifying new business model alternatives and third, experimenting on the identified alternatives before finally making a decision.
In today’s business environment, companies have shifted from the mentality that innovation only involves extensive internal research in laboratories and hiring the most brilliant people on the job market to produce novel products (Chesbrough, 2007). Accordingly, the increasingly shortening product life cycles have rendered reliability on technologies alone insufficient for satisfactory profit realisation (Chesbrough (2007). Therefore, researchers today consider innovation to include business models in combination with technology and R&D (Chesbrough, 2007). However, business model innovation is difficult to achieve, yet immensely important, a reason why only a few companies are able to successfully innovate their business models (Chesbrough, 2010). Companies thus find it easier to innovate technology than to innovate their business models as they have more processes and a stronger shared sense of the former than of the latter (Chesbrough, 2010). Firms are therefore advised on the importance of both internal and external environment when undertaking business model innovation as these create diversified perspectives (Friedrich von den Eichen, Freiling & Matzler, 2015). The authors advise companies to avoid defining their internal and external environment too narrowly when undertaking business model innovation. Sánchez and Ricart (2010) thus consider innovation an important factor for firms entering low income markets.

2.3 Business Model Innovation in the BoP market

The term Bottom of the Pyramid was coined by C.K. Prahalad and is used to refer to the poorest populations of the world (Prahalad, 2004). This thesis constitutes to addressing the issue of poverty that has attracted researchers’ attention following Prahalad’s publications on the fortune at the bottom of the pyramid. As stated, the purchasing parity pyramid is divided into four tiers with the countries with the highest purchasing power at the top tier, while the bottom tier, which is also the largest includes those with the lowest purchasing power (Prahalad, 2004). According to Hart (2008), the populations at the BoP pose a managerial challenge for the world’s wealthiest companies regarding distribution of products and services in a culturally sensitive and environmentally sustainable manner while retaining economic profitability.

New organisational architectures designed for sustainability issues and solving social problems are increasingly attracting scholars to the study of business models in BoP economies (Seelos & Mair, 2007; Yunus, Moingeon & Lehmann-Ortega, 2010; Massa & Tucci, 2013). Combined with sustainability efforts, there have been increasing efforts by the corporate sector to penetrate new markets in developing countries in order to reach more customers at the BoP (Prahalad & Hart, 2002). Researchers have thus been directed towards the study of business models as a result of the opportunities to address the economic needs in emerging markets. Firms are, therefore, looking for a way to align their search for profits with the socially benefitting innovations that help to solve sustainability issues (Massa & Tucci, 2013). The authors identify adoption of more sustainable practices and processes such as reducing energy as well as engineering and marketing of new technologies such as renewable energies and green materials as the two main ways for firms to create value for
sustainability. Additionally, Massa and Tucci (2013) state that companies see the widely untapped market in BoP economies as an opportunity to serve their customers while making a profit at the same time. They note a challenge, however, that business opportunities in BoP do not subscribe to the conventional way of doing business. For companies to combine profit with poverty alleviation, there is a need for the creation of radically new business models and the re-invention of products adopted to the BoP markets (London & Hart, 2004). London and Hart (2004) explain that when entering BoP markets, various local specifications must be considered. The authors explore that social contracts and institutions dominate, which is why reaching these markets require building a bridge of formal and informal economies. They state that traditional partners lack relevant experience and societal performance needs to be taken into account in order to overcome the liability of foreignness, as organisations face pressure to take over responsibility in societal issues.

Innovation activities in BoP are both disruptive and sustainable, two characteristics which reinforce each other and are complementary (Gebauer & Reynoso, 2012). Hereby, discontinuous innovations become more relevant when serving the poor, as they often lack skills to gain access to resources which they need to enhance their capabilities (Michel et al., 2008). The authors state that by integrating resources differently, many innovation possibilities for serving the poor are offered. Accordingly, discontinuous innovations for the BoP require reconfiguring value constellations which can lead to leapfrog technological progress (Michel et al., 2008). To have a real impact in the BoP, it is therefore necessary to integrate operant resources that enable new ways of co-creating value (Michel et al., 2008). Since the applicability of existing models may be limited and require adapting (Seelos & Mair, 2007), companies therefore have to reconsider various steps in their supply chain to develop suitable business models (Prahalad & Hart, 2002). Chesbrough et al. (2006) point out that companies that put in place the right business model tend to be more successful than those that do not, despite having the right product design when penetrating low income markets. Business models play an important role in the creation of distribution channels, as well as supplies and sales channels crucial for the successful business transactions (Massa & Tucci, 2013). Thereby, London and Hart (2004) describe important strategic implications for designing appropriate business models: collaborating with non-traditional partners, co-inventing customer solutions and building local capacity. The authors state that collaborating with non-traditional partners such as non-profit organisations and community groups helps to provide important information on customers and the overall business environment and to leverage social strengths through input from the civil society. They further explain that co-inventing customer solutions include to design a co-evolved business model, entry strategy and delivery, where user innovation and modification are allowed through maximizing local knowledge and entrepreneurship. Developing local capacity by valuing existing institutions and providing training to local entrepreneurs can be achieved through incorporating local capacity directly into the own business model (London & Hart, 2004).

Pioneer firms finding and establishing new business models in the BoP have to go through various critical stages; starting with the initial blueprint stage with the development of the business plan, product prototypes and exploring customer’s needs; followed by the validate
stage where the business model is refined; the prepare stage where growth accelerates and the final scaling stage (Koh, Hedge & Karamchandani, 2014). Therefore, firms pioneering new business models in BoP markets are faced with a burden as they need to refine their business models by trying them out in the low-margin marketplace (Koh, Karamchandani & Katz, 2012). The authors mention that failures and setbacks are expected in this context as a gateway from the blueprint stage to scaling. Additionally, heavy investments in educating customers about push solutions are also expected (Koh, Karamchandani & Katz, 2012). This is further emphasised by Gebauer and Saul (2014), who state that capacity building is a requirement for business model innovations including skills and competences related to market creation, cooperation between non-profit and profit organisations, “inclusive” business models, questioning existing approaches, preparing for the disengagement phase as well as small-scale market studies. Hereby Koh et al. (2014) discuss that there is a critical “pioneer” gap which needs to be supported financially and scaling barriers often due to the ecosystem around the firm. The authors also express the importance of facilitators, who play a vital role in resolving scaling barriers at the level of the enterprise and the business environment.

Philanthropic vs. for-profit models

When discussing business model innovation in BoP markets, Gebauer and Saul (2014) explain that serving low income markets can be achieved through an economically profitable business strategy through market-based approaches, where revenues cover costs. The authors explain that people’s awareness is being changed from getting something for free to receiving something valuable, which increases their motivation for usage and maintaining. Christensen et al. (2015) confirm this view through their long-term BoP study, where they explain that a for-profit approach is favourable over philanthropy when beyond the initial product adoption, repeat consumption and usage are the goal. Thereby the authors state that the likelihood of using a product which has a price is higher than the one of a free product, while pricing induces both initial purchase and long-run repeat use. This can also be observed in the case of cookstove solutions. Cheney (2017) observed that there was a significant problem of NGO practices in the past where cookstoves were given away for free. The author states that this is now seen as ineffective since recipients traded the product for generating income. Furthermore, this has led to the support of market-based solutions for clean cooking solutions, where people are treated as consumers (Cheney, 2017). Organisations where social goals dominate are thus increasingly changing towards economic ones, which means that they have to learn from profit-oriented firms how to organise the business and build entrepreneurial capacity (Gebauer & Saul, 2014).

Inclusive Business Models in BoP markets

A further requirement for successful business model innovation is stated by London and Hart (2004), who explain that BoP market entries require a great effort of inclusiveness. Karnani
(2006) acknowledges the creation of steady employment at reasonable wages as the best step towards poverty alleviation. Consequently, an increasing number of both non-profit and socially-oriented organisations have come up with innovative business-oriented approaches to achieve these missions (London, 2007).

According to the UNDP (2010), inclusive business models are those that include people into value chains as producers, employees and consumers. Koh, Karamchandani and Katz (2012) view inclusive business models as having the potential to generate social benefits which become scalable and capable of self-sustainability in the long run without relying on donor funds. Hence businesses, governments, donors and NGOs can collaborate in order to develop more inclusive markets leading to expanding choice and opportunities benefiting the poor (UNDP, 2010). This can occur for example through co-operations or small and medium sized enterprises as well as non-profit organisations using business principles and social business approaches to reach inclusiveness (UNDP, 2010).

Simanis and Hart (2009) further identify the importance of BoP initiatives in viewing the poor not simply as recipients but also as co-inventors of initiatives. BoP ventures operate hereby as a bridge between formal and informal sectors by exploring opportunities to utilize and enhance existing resources in order to connect local consumers and producers (London et al., 2010). By bundling resources and partnerships with other organisations providing an integrated solution, inclusive business models need to address productivity and transactional constraints of BoP producers (London et al., 2010). An inclusive business has the task to generate growth, include poor people into their value chains, contribute knowledge and capabilities, develop innovative approaches and replicate them across borders and to advocate for poverty alleviation policies (UNDP, 2010).

Koh, Karamchandani and Katz (2012) agree on the ability of inclusive business models in transforming the lives of the poor and recognise that many of these business models are yet to be proven. However, many of these models are still operating at low levels of scale (Koh, Hedge & Karamchandani, 2014). The goal is mutual value creation, generating increasing economic returns by employing business strategies that alleviate local poverty with a business model design to be self-sustaining and scalable (London et al., 2010). Additionally, inclusive business models have further benefits beyond incomes, such as driving innovations, building markets and strengthening supply chains (UNDP, 2010). Moreover, they provide higher productivity, sustainable earnings and greater empowerment for the poor (UNDP, 2010).
2.4 Organisational Learning

Mirvis (1996) reviewed the historical background of organisational learning by describing different schools of thought which led to the origin of the term. Hereby the author expressed that the academic discussion flourished after Senge’s (1990) influential work of the “Art and Practice of the learning organisation”. The first school of thought was defined by organisations as social systems, including personal mastery and team learning, components of the learning organisation (Mirvis, 1996). This was followed by organisations as information processing systems, subsequent by interpretive systems, defined by the term organisational memory (Walsh & Ungson, 1991). The aim was to make organisational members smarter on a collective scale and a shared vision, another characteristic of the learning organisation (Mirvis, 1996). Further, Mirvis (1996) points out the school of thought of organisations as inquiring systems highlighting mental models and what organisations can learn which finally led to organisations as learning systems.

The first article on organisational learning was written by Argyris and Schön (1978), who stated that organisations do not learn from the past or are prepared for the future, which requires “double-loop” organisational learning, whereby a system scans itself and learns how it learns. In learning organisations people expand their capacity to create results they desire, where new patterns of thinking and collective aspiration are brought up and people continually learn to see the whole together (Senge, 1990).

Definition and differentiation

There are theoretical problems in defining organisational learning, including the difficulty of distinguishing the terms organisational learning and learning organisation, which are often used interchangeably (Mirvis, 1996). March (1991b) defines organisational learning as one of the main components required for the improvement of organisational performance and strengthening of competitive advantage. Organisational learning is the process by which a firm’s actions are improved through better knowledge and understanding (Fiol & Lyles, 1985). Learning is described as the development of insights, knowledge and associations between past actions, their effectiveness and future actions (Fiol & Lyles, 1985).

There can be a distinction drawn between two basic modes of organisational learning. Cognitive search and experiential learning (Gavetti & Levinthal, 2000; Levitt & March, 1988). This can be explained by Fiol and Lyles (1985), who express that one has to distinguish between cognitive and behavioural development. Hereby the authors distinguish between lower-level learning, focusing on repetition of past behaviours on a routine level, and higher-level learning through the development of complex rules regarding new actions through an understanding of causation. Cognitive search includes action following cognition, through forward-looking intelligence based on mental models, whereas in experiential learning, cognition follows action by backward-looking wisdom based on prior choices.
(Gavetti & Levinthal, 2000). Learning can be defined by developing competences through their use and among which competences organisations choose on the basis of experience (Levitt & March, 1988).

**How learning occurs**

Previous literature regards hereby team learning as a key component of and critical to organisational learning (Huang et al., 2014). Senge (1990) identified team learning as one of the five dimensions that differentiate a learning organisation from a traditional one. In the thesis’ empirical research case, the organisation is composed of a single team, which is why the terms are used interchangeably. Team learning starts with dialogue, which is the capacity of members of a team to suspend assumptions and enter a genuine thinking together (Senge, 1990). Team learning is on the one hand the process through which team members obtain new information or knowledge, while on the other hand it is also the organisational learning process that aids team members in decision making, increasing teamwork effectiveness and facilitating innovation improvements (Huang et al., 2014). Learning happens through the acquisition of knowledge and skills through sources such as study, experience or teaching (Chatterjee et al., 2018). Organisational learning occurs in two ways, the learning of its members, or by including new members to the organisation (Simon, 1991). What individuals learn in an organisation depends on what is already known by other organisational members and what kind of information is present in the environment (Simon, 1991). The author states that learning describes the transmission of information from one to another. Therefore, knowledge needs to be transferred for learning to occur.

**Knowledge transfer**

Knowledge is created through interactions between tacit and explicit knowledge (Nonaka et al., 2000). Explicit knowledge is formal and systematic; thus, it can be easily communicated and shared (Nonaka, 1991). By contrast, tacit knowledge is highly personal, hard to formalize and thus, difficult to communicate to others (Nonaka, 1991). The term tacit knowledge originates from Polanyi (1952) who describes it as an art or connoisseurship, thus a skilful action through a set of rules which are not known and cannot be designated clearly in words by those who perform them.

Nonaka et al. (2000) explains that knowledge is created only through interaction, among individuals or between individuals and their environment, thus knowledge creation occurs through the transfer of knowledge. Knowledge transferability depends on transmission and receipt through absorptive capacity of the recipient and that this needs to be expressed in a common language (Grant, 1996). Absorptive capacity can be described as the ability to recognize the value of new information, assimilate it and apply it to commercial ends, which depends on prior related knowledge (Cohen & Levinthal, 1990). Knowledge conversion
occurs through the SECI process of externalisation, combination, internalisation and socialization (Nonaka, 1994).

![SECI Process Diagram](image)

*Figure 2: The SECI Process (Nonaka, 1994, p. 19)*

This knowledge conversion occurs between explicit and tacit knowledge, where socialisation is the process of converting tacit to tacit knowledge through apprenticeship while externalisation occurs through tacit to explicit by for example a concept creation (Nonaka et al., 2000). Further, combination occurs through explicit into more complex explicit and internalisation through explicit to tacit knowledge by reflecting upon information to enrich procedures through action and practice (Nonaka et al., 2000).

**The role of the organisation in learning**

Hedberg (1981) expresses that while organisational learning occurs through the individuals, the organisation develops cognitive systems and memories preserving behaviours, mental maps, norms and values. A firm can be seen as a knowledge-integrating institution, whereas knowledge creation is individual and depending on each actor (Grant, 1996). Knowledge can only be accessed and utilized by the firm through the building of routines (Grant, 1996). Furthermore, an organisation’s ability to exploit new knowledge depends on the organisation’s absorptive capacity, which is a critical input for creating innovative capabilities. This ability depends on the absorptive capacities of its individual members (Cohen & Levinthal, 1990). There are four contextual factors which enable and reinforce organisational learning, including a corporate culture conducive to learning, a strategy that determines the learning capacity, an organisational structure that allows flexibility and the ability to balance consistency and change in terms of the environment (Fiol & Lyles, 1985).
3. Research Question

Due to the limited research on organisational learning in business model innovation in BoP markets, and the inquired need for suitable models for establishing solutions in this context, we aim to answer the following question:

*How does organisational learning occur in business model innovation in the BoP market?*

Hereby we want to explore the process of implementing a business model in the case of Pamoja. While analysing this question, we actively participate in solving Pamoja’s issue on how to operate their cooking stove business in Mozambique. We want to discover how the team operates internally and how the organisation enacts within its environment, thereby examining how organisational learning occurs in this specific context. Furthermore, we want to analyse under what conditions team members learn in business model innovation within the BoP market.

To answer the research question, we describe in the following chapter how the study was conducted and the methods of data collection, before analysing the business model innovation process of Pamoja Mozambique. This is followed by a discussion chapter where the findings of the study are compared to existing academic findings and interpreted in terms of the research question, before expressing the contribution of this study to the current state of research by theoretical findings and through the development of a model.
4. Methodology

4.1. Case selection

The BoP market provides an area for studying clean technologies (Gebauer & Reynoso, 2012). This research focus covers the range from MNEs to indigenous organisations such as NGOs, community-based organisations, private SMEs, and local entrepreneurs (Gebauer & Reynoso, 2012). These characteristics have been considered when choosing an empirical field for this thesis, a cooperation with Pamoja Cleantech AB, which provides an in-depth, single case study for analysing the research question.

The organisation is a for-profit social enterprise working in the field of rural decentralized renewable energy solutions (Pamoja Cleantech, 2017). Driven by business model innovation, Pamoja creates scalable and sustainable business solutions in order to achieve a real impact on pressing environmental challenges (Pamoja Cleantech, 2017). Pamoja Cleantech aims to provide health, income generation and empowerment to people belonging to the poorest economies (Pamoja Cleantech, 2017). Hereby the company focuses on addressing most critical needs for rural BoP markets in Uganda, Mozambique and India (Pamoja Cleantech, 2017). Enabling tech transfer for creating scalable and sustainable business solutions, the global born start-up develops innovative business models and system innovation (Pamoja Cleantech, 2017). Hereby Pamoja Cleantech applies engineering solutions with a focus on inclusive business modelling, to benefit the base of the pyramid market (Pamoja Cleantech, 2017).

The empirical research focussed on Pamoja Cleantech’s cookstove business in Nampula, the centre of the cashew industry in Northern Mozambique. Compared to the larger discussion about the adequate business model for clean cooking, Northern Mozambique reveals to be an under-researched market for implementing clean cooking. Thus, the case provides a new contextual setting to the state-of-the-art discussion. The case of Pamoja’s cookstove project implementation in Mozambique is relevant for the research question as the organisation is currently at the critical point of introduction. The business model is under construction and a business plan has not been established yet, which is why it represents an adequate case for studying business model innovation. Within the timing of empirical fieldwork, it was therefore possible to participate in and observe this process. Thereby, the fieldwork was carried out at a critical moment when all main actors of the project were also on ground. This provided moments of critical learning as there was a lot of enactment taking place at this time. Site selection criteria should not only consider the uniqueness of location for the exploration, but also timing to witness social dramas and critical incidents (Stewart, 1998). This made it a unique, appropriate and interesting case study to focus on.
4.2 Case Overview

Pamoja Cleantech AB is currently implementing clean cookstoves to the market. The project is currently in its introduction phase, where the organisation is still in search for the right business model and, therefore, still has a loose structure. In this phase the first batch of stoves is being sold and this process is accompanied by shifts in direction, changing opportunities and challenges. Thereby the organisation seeks support in acquiring knowledge on how to develop the business and marketing for the local context. This provides an eligible ground for observation and analysis of the project’s business model innovation process.

The cookstove project consists of four main actors: Olof, the project manager responsible for the development of the cookstove project, Sonia, the local operations manager, Filomena, the local marketing manager and Armando, the only sales agent so far.

The fuel used for the solid biomass stoves is dried cashew shells produced in the area. There are two ways to look at competition in the context of cookstove projects: Other clean cookstove projects and traditional fuel sources. There is no direct competition with any other clean cookstove operator in Pamoja’s current distribution area. In Northern Mozambique, the product competes mainly with the traditional fuel sources: Charcoal and firewood. Charcoal is fairly cheap in comparison to similar cookstove projects in Africa, with a price of 250 - 500 MZN for each bag, depending on the season and location (higher costs in urban areas). Furthermore, deforestation has not yet had a huge effect on the charcoal prices in the Northern part of the country. In addition, Mozambique has not yet had an economic rush such as other African nations, increasing the challenge.

*Figure 3: Charcoal vendors on the road*
Until March, 26th, 2018, 151 stoves have been sold by the organisation, broken down to 26 sold Peko Pe cookstoves and 125 stoves of the type ACE-1.

After the initial selling start in October with 35 sold stoves, mainly to Pamoja’s partners such as the workers in the Condor Nuts factory and employees of the Women Credit Cooperative, sales declined in the following months. During this stage the business had not been established yet, distribution channels not found, and sales agents not recruited yet. In February, sales increased to a total amount of 46 stoves. During this period, the marketing manager Filomena and sales agent Armando were recruited. Of the 151 stoves sold by March 26th, Armando sold 50 ACE-1, whereas the local organisation itself sold 75 ACE-1 and all 26 Peko Pe. Sales in March slightly declined again, as Pamoja is focusing only on the Peko Pe until the new ACE batch is delivered.

4.3 Research methods

Ethnographic methods

To gain significant insights during the on-site fieldwork in Mozambique, ethnographic research methods were applied. Research about inclusive business model innovation in BoP is influenced by the unique characteristics of the settings and the context, there is limited use for traditional quantitative questionnaires and formal structured interviews (Gebauer & Reynoso, 2012). Therefore, the setting should be explored through ethnographic case studies with participative and non-participative observation (Gebauer & Reynoso, 2012). A study can be considered ethnographic if its insights are collected from in-field observations of people as
they go about their daily activities (Sunderland & Denny, 2007). As a process, ethnography involves participant observations, where the researcher is taking part in the daily lives of people and observes and interviews the participants (Creswell, 2007).

Hereby, use of a mix of appropriate data collection methods is recommendable (Gebauer & Reynoso, 2012). Belk et al. (2012) also advise researchers to enhance their data with first person perspectives obtained from interviews, journals, videography, photography and audio recordings. Data is collected through multiple modes such as company documents, archival records, interviews, direct observations, participant observation, physical artefacts and photography. This is why visual anthropology was used as a supporting research method (see photo diary after appendices). Photography is a reliable research tool which extends the possibilities of critical analysis and contributes as a control factor (Collier & Collier, 1986). As an abstracting process of observation, photography gathers specific, selective information, with qualifying and contextual relationships with are usually missing from codified written notes (Collier & Collier, 1986). In conclusion, triangulation is important for purposes of validity since no single source of data is error free (Shulman, 1994).

**Case study method**

Case study research includes the study of a case within a bounded system, which the investigator explores through in-depth data collection (Creswell, 2007). Conducting the case study, researchers need to be socially and physically involved in order to accumulate local knowledge (Gebauer & Reynoso, 2012). Yin (1994) recommends the use of case study methods when carrying out research on complex social phenomena such as when general circumstances of a phenomenon are to be studied, or when the researcher has little control over the behavioural events. The author recommends case studies especially to answer research questions like “how” and “why”. Since the case to be studied is representative of a test to the existing theory, the unit of analysis shall be critically select (Yin, 1994).

**Participative observation**

We used participant observation as one of our data collection methods for primary data, as recommended by Stewart (1998). This entails the up-close involvement of the researchers in a participative role in the setting being studied (Stewart, 1998). Active participation requires one to be constantly self-critical and reflexive, to ensure analytical description and the interpretation of a case study (Gebauer & Reynoso, 2012). Belk et al. (2012) further recommends observation methods since they are popular for covering consumer and marketing research. As recommended by the authors, to obtain first hand eye witness accounts, the data was collected within a field site where consumer behaviour occurs to enable awareness of unconscious and subconscious processes while carrying out the research.
**Qualitative interviewing**

Another significant methodologic element was qualitative interviews. Their purpose is to contribute to a conceptual and theoretical body of knowledge and are based on the meanings of interviewee’s life experiences (DiCicco-Bloom & Crabtree, 2006). Their perceptions are explored to gain a better understanding of the user, who is encouraged to share rich descriptions of the phenomena, while leaving the analysis to the investigator (DiCicco-Bloom & Crabtree, 2006). A combination of unstructured and semi-structured interviews were conducted, depending on the interviewee and the specific context. An important issue in our research context was to be reflective on our own social role. As they shape the interview process, it is necessary to be reflexive of the researcher’s own social role, acknowledging power differentials and integrating reciprocity into the knowledge creation (DiCicco-Bloom & Crabtree, 2006).

The study was oriented according Tendai and Fletcher’s consumer behaviour fieldwork in the BoP market, combining a business focus as well as a consumer focus. The following figure shows our empirical research outline based on their research method framework.

![Research Process](image)

*Figure 5: Research Process*

*(adjusted from Tendai and Fletcher, 2012)*
4.4 Data collection

Empirical fieldwork was conducted within the timeframe of three weeks from February 19th to March 11th on-site in Nampula, Mozambique. Through active participation and observation from the 19th of February to the 2nd of March, the local conditions of operation were analysed and understood.

Our role as participant observers involved various tasks within the project: We designed marketing materials such as brochures (Appendix III) and a logo for the fuel bag to be used. We also designed user manuals (Appendix IV) for the various stoves to be distributed to stove users. Moreover, our role in the marketing activities extended to social media as we were assigned the responsibility of updating the project’s Facebook page with ongoing activities and information. During this process, we also provided insights based on our observations for improving future customer surveys. In addition, we took part in the testing and experimenting with the different stoves and adjusting the fuel as we observed the burning effects with each adjustment. We also participated in the operational organisation of events held during this period, such as the sales and marketing events in Anchilo, Nacavala, Namaita and at OMM.

This was combined with observations of the daily business, where internal procedures and operations, decision-making, organisational structures and hierarchies were inspected. Furthermore, the interaction of the main actors, employees as well as external partners was witnessed. We studied the interaction with customers, payment systems, financing, customer characteristics, trust building and customer education, distribution systems, product usage as well as marketing initiatives.

During this period, various meetings were held with prospective partners and facilitators, in which we took an observatory role. We observed two brainstorming sessions, one with Technoserve and InCaju on how best to utilise their online platform. The second one was with IKURU SARL on how best they can be involved as co-funders with Pamoja. We also attended a skype meeting with Miombo, the Peko Pe designers, in which insights about
similar cookstove projects were highlighted. Further, we attended a meeting with a representative from Mozacaju where we observed a discussion on the possibilities of using biochar in the creation of a circular economy collaboration. In our role as observers, we attended sales and distribution meetings for potential sales agents such as at OMM and in Namaita as well as for potential clients such as in Nacavala and Anchilo.

The empirical fieldwork was executed through qualitative, semi-structured interviews. This included an extensive interview with the project manager Olof Hallström on February, 8th, about Pamoja’s cookstove business model in Mozambique, which also gave contextual insights and thus prepared us for the on-site study. In addition, both local managers Filomena and Sonia were interviewed in Nampula about their roles, responsibilities and their work backgrounds, the business’ operation, target marketing and the products. The sales agent Armando was also interviewed about his tasks, sales strategies and customer preferences. The user perspective was made up through 10 semi-structured interviews with clients to understand their household’s usage, needs, preferences and opinions (see all interview guidelines and questions in Appendix V). Finally, information of potential clients was gained through unstructured interviews at the sales presentation in Nacavala as well as at the first meeting with the women organisation OMM.

The data collected in terms of observation notes, user and employee interviews and relevant secondary data obtained from the company was then analysed and classified according to Creswell (2007). Hereby the data was organised into file folders and text units, before reflecting on larger thoughts presented in the data by forming initial categories (Creswell, 2007). This was followed by the process of describing, classifying and interpreting, reducing the initial categories into families, and further into themes (Creswell, 2007). This analysis resulted in two first order themes, learning in the organisation and learning from the environment, which are broken up in second order themes, which are supported by empirical examples (see Appendix VI).

As recommended by Creswell (2007), a case was created basing on the established themes. For a case study, the analysis consists of making a detailed description of the case and the setting, which is done by pulling the data apart and back together in more meaningful ways and by describing a narrative with key issues which highlight the case’s complexity (Creswell, 2007). This is described in the findings through the business model canvas to enable the reader obtain details of the business model and its current state of operations. Hereafter, a description of the various proposed facilitators and possible partnerships with Pamoja is given to highlight some of the company’s prospects. Finally, we describe a typical week of business model innovation at Pamoja, highlighting the complexities of the business through the observed events during the field study.
4.5 Limitations of method

We experienced various challenges when undertaking our fieldwork in Mozambique. This was due to limited experience in the field, language barrier, the unknown context and culture as well as through difficulties to enable trust and gain access due to mobility constraints with dependency on the organisation. These challenges are also reflected by Tendai and Fletcher (2012). The authors observed particularly qualitative research issues in BoP markets, mainly due to data collection obstacles and operational challenges.

Since Mozambique is a Portuguese-speaking country and as only one of us spoke the language to conduct qualitative interviews in a sufficient manner, we had challenges in communicating with people. To ensure obtaining of correct information, this called for adjustment of our interviewing techniques such as simplification of the questions and direct verification of the answers through repeating their statement to enable better understanding for both the interviewer and interviewee.

Challenges also included gaining access and building trust due to traditional traits such as mistrust of strangers and the nationality of the researcher conducting cross-cultural research, as the researcher’s national identity evokes generalizations and stereotypes (Tendai & Fletcher, 2012). This was also experienced in the fieldwork setting. Trust had to be established within the organisation AMPCM to its members, as well as outside of the organisation. Especially when accessing clients to conduct user interviews, an introduction of the interviewer by a person of trust was necessary. Hereby a more extensive explanation why the interviews were conducted, and a confidential statement helped to establish a better interview relationship. This was also needed in case of the employee interviews to remove fears to express criticism. Another limitation was our influence of the own identity, which had an impact on the stakeholders and thus on their behaviour of an observed setting and had the consequence of a bounded neutrality of the observer (Stewart, 1998).

Furthermore, the establishment of contacts to gain access takes a long time and that language determines whether researchers gain access to target respondents and if they can create relationships (Tendai & Fletcher, 2012). While it took time to gain access to interview possibilities with the clients, we had strong support from Pamoja and especially the project manager to participate in events, notably in rural areas, which gave us the possibility to talk to users. Moreover, through their introduction of our study, we gained access to the Women’s Credit Cooperative which helped to realise profound user interviews. This helped to shorten the time of access tremendously.
5. Analysis

The case of Pamoja Mozambique

It is Sunday afternoon and Adriana, is preparing lunch for her family. She lives in a four-bedroom apartment with her husband and four children in Nampula. Sami, the youngest son has made a special request for meat while the others would like curry, beans and rice. Luckily for them, Adriana enjoys cooking and promises to have everyone's wish granted. She realises that this will be a long cooking process, but she is not worried since she recently purchased an ACE-1 stove from Pamoja, which is clean, energy efficient and cooks very fast. She resolves to start with the beans since they take a longer time. After filling the stove with fuel, she realises that she has no kerosene left to make a cashew shell-kerosene mix as recommended in the user manual for lighting the stove. It is Sunday and the shops are too far away to walk and buy the kerosene. Adriana decides to ignite the stove using some papers. This results into clouds of smoke that fill the entire apartment, causing a teary Sami to cough and cry. When she finally manages to get the combustion process started, she places the pot of beans on the stove. However, after five minutes, Adriana realises that the flame is very low because the fan is not working since it has not been charged. She then decides to switch to her old charcoal stove for the curry and rice instead. She now goes to the charcoal vendor in the neighbourhood to buy a bag of charcoal that she will use to cook. Later that evening, Adriana ponders about her energy costs as she makes a summary of her weekly expenses.

The following chapter provides an overview about the current project stage and Pamoja’s business and highlights subsequently various observed events to provide a better understanding of the complexity of the business model innovation process in this specific context.

5.1 Pamoja’s current business model

The Business Model Canvas

In this section, we give an overview about the current business model of Pamoja’s by showing their activities along the business model canvas (as described in Support.strategyzer.com, 2018). The following Figure 6 shows Pamojas Business Model Canvas as analysed and developed in this study.
**Key Partners**

Pamoja is in collaboration with various organisations to facilitate their cookstove business. These include: A joint venture with the local NGO AMPCM and the stove suppliers, African Clean Energy (ACE) and Miombo as well as the fuel suppliers Condor Nuts.

**AMPCM:** Pamoja is in collaboration with the Association of Mozambique for the promotion of modern cooperatives (AMPCM), a local NGO established to help organise cashew farmers in cooperatives. Pamoja currently uses AMPCM as the local partner organisation for implementing the cookstove business, hence one can speak of a hybrid organisation. Hereby AMPCM provides the office space and storage space for stoves and fuel and has the role to provide access to the market as they are in contact with farmers and organisations. Furthermore, the cookstove project is also in line with AMPCM’s objectives of poverty alleviation and rural development. However, since Pamoja is a profit-oriented company, this partnership cannot survive in the long run with expansion plans according to the organisation, considering AMPCM is an NGO. Plans are therefore underway for Pamoja to create and register its own company in Mozambique.

**Suppliers**

Pamoja is dependent on various suppliers. The organisation purchases the ACE 1 stoves from African Clean Energy in Lesotho, whereas the Peko Pe is produced by Home Energy Ltd. in Zambia and designed by Miombo in Norway. Therefore, both stoves are imported. By the end of our participation on-site, Pamoja has placed an order for 200 ACE Pellet stoves to be delivered within approximately 8 weeks.
The cashew shell fuel is produced by Condor Nuts in their cashew factory in Anchilo, around 30 km from Nampula. The region is the centre for cashew production in Mozambique, thus rendering a more than sufficient supply of cashew shells. The shells are dried to remove oil to make them suitable for burning. They are then sieved through a strainer to extract bigger parts required for good combustion and a clean blue flame. Furthermore, it must be mentioned that Pamoja currently maintains a monopolistic position on the fuel by contract to Condor as well as to clients purchasing the stove, who sign a contract to only purchase the fuel through the organisation.

**Key Activities**

Pamoja Mozambique can be seen as a retail organisation. There is no processing from raw materials towards finished products within the organisation, as all production from stoves to fuel is outsourced to suppliers. Their retail business model includes operations such as handling stove and fuel sales at the AMPCM office, finding adequate partnerships and distribution channels, while collaborating closely with the manufacturers in aligning the products to the users’ needs.

This includes a close collaboration with the supplier ACE, where Pamoja analyses their business in Lesotho to learn and replicate good practices which succeeded in their market. Pamoja also supervises Condor Nuts, the fuel suppliers’ process of sieving, packaging and delivering the fuel. Another task is to give feedback on the stove’s functionality with this fuel to the producers ACE and Miombo, where testing of the stoves plays a significant role of operations.

**Key Resources**

Pamoja’s key resources concentrate on the human dimension and their financial support. The organisation does not own physical assets yet as its currently working from the AMPCM office. Currently, the ACE 1 stoves are stored at the AMPCM office while the Peko Pe stoves are stored at Condor Nuts offices in Anchilo. Intellectual property consists currently of their effort to establish a branding for their project and the fuel, while customer data is so far based on Google forms, as the organisation is still looking for a CRM system. There are no further patents and copyright established yet.

**Human**

**Olof:** His role is to design the project’s layout, write applications for funding, set up the local team and design the business model. He is mostly located in Sweden but travels regularly to Nampula during crucial stages in the project development. Furthermore, he sees his responsibility in educating his team while expressing the necessity of providing very frequent feedback about their performance in the current stage. Olof envisions that the cookstove
project is exemplary for showing that renewable energy supply can be fully produced locally by African nations themselves without being import dependent. The main challenges he experiences with the project so far are uncertainty in the business environment when it comes to daily operations, access to customers and the difficulty in accessing credit.

Sonia: She handles the project’s daily operations in Nampula such as monitoring activities, payment executions and writing weekly and monthly reports. She is in daily contact with Olof by phone and a shared Google platform where Olof is able to guide her on what to do. The main challenges she sees regarding the current project development are the absence of transportation facilities, the unstable current operations, and the clients’ impression of the product. She finds the stoves a good solution, however, she also points out the importance of understanding how to use them.

Filomena: She is responsible for the promotion of the cookstoves, accessing the market and supporting the sales agents in their sales promotion of the products. She has previous experience working in product commercialisation and capacity building of local farmer associations and NGOs for communitarian participation and good governance, which gives her access to various groups of people required for her current role of distribution. As the newest recruit in the project, Filomena expresses that during this time of project development, she is in a phase of learning and trying out ways on how to succeed in her tasks. She receives guidance from Olof who drafts plans of her responsibilities and gives her feedback. The main challenges she sees so far are regarding transport and materials needed to support both the employees and educate the clients. She worries about the current instabilities within the organisation, such as her unstable labour contract and the lack of social security.

Armando: He is responsible for finding potential clients for the stoves and providing support to existing users outside of Nampula. He gives feedback to the local management about the users’ needs. As a village leader he has access to a wider market in the countryside where he is able to communicate with other village leaders and transfer ideas to them. His main selling arguments are the less fuel costs and the additional stove features, the LED light and the telephone charger. When a sale is made, his tasks are to sign contracts with customers and distribute stoves and fuel. Furthermore, he sees his responsibility in the importance of explaining to people the stove’s use.

Financial

The project is financed by the Norwegian Agency for Development Cooperation (NORAD). The project started in August 2017 and was planned to be developed in three milestones. For the first milestone, the project received 50,000 USD which covered the first batch of 200 Peko Pe stoves and 150 ACE-1 stoves which have been sold by now. The organisation received another 100,000 USD via NORAD to cover a larger batch in the range of 1,500 stoves for the second milestone. The idea was that the project would be ready to attract private financing by the end of the second milestone and be able to order a pellet unit and
start a commercial business. According to the project manager, there is a need of funding for at least another year before the project can be able to run on its own. Moreover, there is an open decision of an application for funding from the Nordic Development Fund for about 500,000 USD which would facilitate the business for another two and a half to three years. Other alternative sources of funding for the project are through shareholder loans, since the NORAD project only covers salaries, travel costs and consulting fees, but not the actual purchase of the stoves.

**Value Proposition**

The cookstoves have a very high potential to reduce dependency on charcoal and people’s high energy expenditure for cooking, both in urban and rural areas. This also includes that users can now afford to cook more often. The additional features of having a light and the possibility to charge a phone empowers people by saving time and being used as an energy source, thereby alleviating poverty in rural Mozambique.

This value creation is established through the selling of two types of cookstoves by Pamoja, the ACE 1 and the Peko Pe which have different technical features (see Appendix VII).

**The Products**

**ACE 1:** The ACE 1 designed to burn all kinds of fuels such as wood pellets or twigs, with a burning time of approximately 35 minutes with the current fuel in use. It is sold together with an LED light and a solar panel for recharging. An extra feature it has is a USB port which can be used for phone charging.

**Peko Pe:** The Peko Pe is a simpler version with no extra features. It is also designed with a larger combustion chamber than the ACE-1, giving it a longer burning time of approximately two hours. Due to its longer burning time, it is being sold as the solution to foods that require longer cooking periods and simmering.

Both the ACE 1 and Peko Pe stoves require strict following of the user guidelines to function as intended. Despite their smoke free flames, both the ACE 1 and Peko Pe create soot on the pots when cooking and tend to produce a lot of smoke when not lit properly and when exposed to wind. The stoves have a guarantee of three years and a lifespan of around ten years, but the guarantee can only be claimed if the stove has been used according to the specified instructions and strictly with fuel provided by Pamoja.

Even if product choice would be an option, the promotion of the stoves mainly included the focus on one product. Within our observation, Pamoja mainly promoted the ACE 1, while an increase in Peko Pe promotion occurred when the stock of ACE 1 stoves was almost depleted, which implicated the needed shift towards selling more of the Peko Pe stove.
ACE Pellet: Pamoja is planning to discontinue the ACE-1 stove and introduce a new stove, also designed by African Clean Energy. The new stove is, referred to as ACE Pellet since it has been originally designed to burn wood pellets. It is a tier 4 stove, and even with the gasification of cashew shell fuel, it gives off a clean blue flame. The ACE Pellet has the same additional features as the ACE-1 but includes a smaller battery and thus comes at a lower cost for Pamoja, making it more affordable than the ACE-1.

The Fuel

The fuel being used for the stoves is a solid biomass fuel made of dried cashew nut shells. Pamoja has created the slogan “Moro Wakoroxo” in the local Makua language for the fuel, which translates to “Fire by Cashew.” The recommended method to light the stove is by creating a mixture of some of the cashew shells with kerosene and spreading them on top of a cup of cashew shell fuel to ignite the burning process. There are no major unexpected problems if the stove is lit and used strictly according to the instructions in the manual. However, issues occur when the fuel is not used correctly. Pamoja plans to invest in a pelletizing machine and start locally producing pellets from the cashew shells in future. Furthermore, a sample of the cashew shell fuel was sent to African Clean Energy in Lesotho to align the holes for primary air of the new ACE Pellet to the cashew fuel for an ideal gasification process.

Customer channels

Current distribution is divided into two different areas: Some are located within Nampula city, and others in the villages on the countryside within a distance of the city. Clients in the city are accessed through AMPCM’s network, the organisation’s contacts and partners such as the Women Credit Cooperative supporting people in rural areas and in poverty with the possibility to access, which acts as a sales point to gain market access within the city of Nampula and to attract members of the cooperation. The rural areas are accessed through contact with village leaders. Reaching contact in the districts is largely supported by AMPCM’s community work in farming communities by establishing cooperatives.

The fuel distribution occurs through packaging of 15kg fuel bags at the Condor Nuts factory and transportation by Pamoja with the help of Condor employees on frequent fuel deliveries to the distribution centres, the sales agent’s home and the AMPCM office, where customers can purchase them.

These rural areas include the communities of Anchilo, Nacavala and Namaita. Anchilo is the strongest rural distribution area, as the organisation’s sales agent Armando is a local village leader in the community, which is why Pamoja appreciates here high trust and a strong network. Moreover, the sales agent has valuable contacts to other leaders in Nacavala, which
increases sales there, too. Besides these two, there are first sales occurring in Namaita as a first contact is established in the community.

![Map of distribution areas](image)

*Figure 8: Current distribution areas*

Potential clients and the target market remains within the area, hence Pamoja’s strategy to scale is to deeply penetrate those geographical markets and create trustful relationships. First focus was on urban areas through AMPCM and the Women’s Credit Cooperative, whereas now higher sales shifted towards rural distribution channels. The reason for higher current sales in the rural areas can be traced back to the ease of access through village leaders, who have a trustful relationship to their community and the strong need for a better cooking solution. However, the organisation expresses the problem of having no direct access to users, rather only through facilitators or agents.

**Customer segments**

The different distribution areas feature two customer segments: Urban clients and rural clients. Pamoja started by targeting clients in the urban areas, however as they realised that the product offers high benefits to the needs of rural clients, the organisation then diversified their market and decided to target the rural customer segment as well. In this way, Pamoja is less vulnerable to fluctuations in demand of one segment, making the business more robust.

Whereas people in urban Nampula are often connected to electricity, they still use mainly charcoal for cooking. On the countryside, people mainly use collected firewood for cooking, whereas especially in the rain season there is a strong dependency on charcoal too. Furthermore, rural customers do not have a grid connection in most cases. Since main sales focussed on the ACE-1 during the observation, the following information deals with ACE-1 users.
People of both customer groups mainly purchase the cookstove due to economic reasons. Due to the high costs and strong dependency on charcoal, users welcome the alternative with enthusiasm. Customers in the urban areas all state that they have used charcoal for cooking before purchasing the new stove, and their issues with its high cost. Some purchased around three to four bags of charcoal a month, thus spending at least 1000 MZN on energy for cooking, whereas others cooked less due to the high costs, spending up to 400 MZN for each bag of charcoal depending on the season. For customers in the rural areas, a further important purchase decision is to have less work, as it is difficult to access firewood and it takes time and effort to light the fire and cook. Besides this, firewood smokes a lot. In the city, the cashew shell fuel is purchased at the sales point in Muaija, a town district, or directly at the AMPCM office, whereas on the countryside it is purchased at the sales agent’s home. Another reason for both customer groups is the ease and flexibility of usage and the good functionality, especially through much faster cooking. Customers mention that it takes half the time to cook rice and fish with the new stove instead of using charcoal and firewood. The light feature as well as the possibility to recharge a phone are additional factors leading to a purchase decision for both customer groups.

Nevertheless, many customers continue to use the old stove at the same time. Their main reason for continuing to use charcoal is to grill, a function which is not possible with the clean cookstove, or for cooking meals which require a lot of time, such as beans, as the use of the new ACE-1 stove for long-term cooking would include higher cost of fuel than with the traditional solution. Moreover, the stove burns too strong to simmer. Whereas some customers fully understand how to employ the stoves, others use their previous solution parallelly expressing that they do not know enough about their new stove. These clients also express that they require some time to learn, appreciating the user manual in their language. Others claim that the stove size is not sufficient for their family size.

Both customers in the city and in rural areas cook various dishes on the stoves such as chima (pap made from corn flour), rice, potatoes, curries, fish, beans and meat, among others. Depending on type of meal, they need to refill the stoves several times. Most customers have to refuel the stove at least once for cooking a full meal, as the fuel lasts on average for around 30 to 40 minutes. Some customers respond that they need to refuel around three to four times in order to cook a full meal which takes around two hours of cooking. During refilling, the dishes need to be put aside. Hereby it has to be mentioned that some users run the stoves up to five hours daily for cooking. Customers state that they use the stove between two to three times daily to cook for between five to nine persons. Moreover, they explain that they did not change their cooking habits, so they cook in the same way with the new stoves.

In order to ignite the stove, users describe that they add one cup of fuel and light it then with sticks or dried grass, mostly combined with some petrol, and then turning on the ventilator after five to 20 seconds. Hereby customers explain that the cookstoves produce a lot of smoke if not ignited properly, and especially with sticks or paper. Customers mention various problems when using the product. Most common and especially in urban areas, they bring up the issue of high release of smoke and strong smell, including smoky taste of food and black
wells in the house. They also mention that the stove burns too strong with the ventilator fully turned on to cook typical dishes. Furthermore, customers state that the stove is not sufficient in size and more difficult to refill than the charcoal stove. Additionally, they are not able to access assistance on the weekend, in case of problems such as if the ventilator is not working. In rural areas, customers seem to have less complaints, especially about the smoke issue, which can be due to the fact of cooking mainly in the open.

Hereby a different social impact for the customer segments in the city and those on the countryside can be observed. In the city, the charcoal issue seems to be even more dramatic, as the prices are higher and city dwellers express that they do not have the possibility to collect wood. In the rural areas, the purchasing power is lower, but there is a high potential. Here especially the additional features of having a light and the possibility to charge a phone seem to have an impact due to the lack of electricity. People are thus not dependent on charging stores, where they have to walk long distances and spend 10 MZN for each phone recharge. Rural customers also express that the project brings confidence, as they have more time for other duties as they do not have to collect wood any longer. This shows that the stove empowers people by saving time and being used as an energy source, thus helping on alleviating poverty in rural Mozambique.

Customer Relationships

Pamoja aims to have a long term and deep relationship with their acquired customers. As part of the programme, an ambassador system is created which brings both incentives to customers and creates an inclusive solution by providing income possibilities. Ambassadors receive points for paying on time, purchasing fuel regularly and especially for recommending the stoves to new clients as well as through their recruited clients’ payments. The gained points can be used by clients to make fuel purchases and monthly stove payments.

Table 2: Examples of the ambassador point system (Pamoja Cleantech, 2018b)

<table>
<thead>
<tr>
<th>Earn points</th>
<th>Use points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find a new client: 200 points</td>
<td>Fuel bag: 120 points</td>
</tr>
<tr>
<td>On time payment of client: 1 point / 50 MZN</td>
<td>Stove payments: 1 Point = 1 MZN</td>
</tr>
<tr>
<td>Late payment of client: -1 points / 50 MZN</td>
<td></td>
</tr>
<tr>
<td>On time own payment: 1 points / 25 MZN</td>
<td></td>
</tr>
<tr>
<td>Fuel purchase: 1 point / 25 MZN</td>
<td></td>
</tr>
</tbody>
</table>

Ambassadors can also receive prizes such as free fuel bags, cooking pots, or even smartphones. Ambassadors use the product regularly, promote and support the attracted
customers and act as an exemplary client. Moreover, the system acts as a facilitator for creating job opportunities. If ambassadors are on a certain level of attracting new customers regularly, they can become an agent and be paid on commission. From being a sales agent, they can furthermore climb up the corporate ladder to be part of the organisation and receive a fixed salary. This system is handled in an informal manner at the moment and is not fully operating yet.

The ambassador system is combined with regular customer relations events planned on a one or two-month basis in the villages for ambassadors, customers and interested people. Hereby learning sessions are offered, the awarding of the ambassadors takes place, and free meals are provided, while it is possible to communicate with representatives from the organisation. Pamoja hereby promotes the stoves and fosters the relationship to its customers.

**Cost Structure**

As Pamoja offers a high-price investment to a low income earning market, the firm focuses on a value-driven cost strategy. The ACE 1 stoves have a cost of around 120 USD including import fees each for Pamoja. The Peko Pe is a simpler version with no extra features and costs around 30 USD for Pamoja.

For the first batch of stoves imported, Pamoja incurred very high import duties that resulted into a higher purchasing price for Pamoja’s stove order. Attempts to request for a tax exemption from the tax office in Mozambique have been fruitless so far, which is why Pamoja is looking for other ways of lowering costs. They have approached the microfinancer IKURU and requested them to import the next batch of stoves on Pamoja’s behalf so that Pamoja does not have to incur the high importation costs. As a microfinance organisation, IKURU receives some tax exemptions on goods imported into the country. However, this decision has not yet been finalised by IKURU.

For the fuel, Pamoja pays 20 USD per ton, which has an energy provision of 1.2 Kilowatt hours per kilo. Thus, the organisation pays 16.7 USD per Megawatt hour, compared to a stated average of 60 USD per Megawatt hour, a fairly low price.
Besides the cost of goods, the organisation incurs other fixed costs such as salaries. Hereby Pamoja has the plan to recruit an own specialised sales team paid on a base salary besides agents, in order to have more control and less fluctuation of personnel. Sales agents receive a commission of 200 MZN for each sold ACE-1 and 100 MZN for each sold Peko Pe, which are paid in relation to customer instalments. Furthermore, they receive monthly starter bonuses for the first and second month as well as a three-month cycle bonus of 30 MZN per contract for less than 60 contracts, 60 MZN per contract for 60 to 90 made contracts as well as 80 MZN for each contract when making 90-150 contracts.

Revenue Streams

In order to buy a stove, clients have to sign a contract and make a direct payment of the first month. In most cases, buyers receive the stove directly when the contract is signed. There is a plan to organise prepayments and later delivery, too, however it is unclear if clients will accept this. The cost of the ACE 1 is 7.500 MZN (120 USD), and the Peko Pe costs 3.000 MZN (50 USD). Due to high delivery and importation costs, no profit margin is reached yet, which makes the selling of the stoves itself not a profitable business at this stage. Profitability however is planned to be reached with the new ACE Pellet, as it can be purchased for a lower price, expecting to thus create a margin of around 25-30 USD.

Payments can be made in cash, through vouchers or mobile money (M-Pesa). Mobile money produces transaction costs for Pamoja. As it creates a challenge to sell a product of 100 USD to a person earning 2 USD a day on average, payment is made in instalments overtime, which are pre-financed by Pamoja itself. Usually clients pay monthly instalments of 360 MZN for 24 months, or 530 MZN for 12 months respectively for the ACE 1. The Peko Pe costs 1030 MZN monthly in three months instalments, 360 MZN for nine months and 530 MZN for six months. This creates a risk on the business if people sign up for 24 months payment and fail to complete these instalments. This is why Pamoja is envisioning to install down payments with 10-20% before clients receive the stove in order to make it more likely that customers finalize their payments. The risk could also be controlled due to the monopoly on fuel, as agents can register who fuel bags are sold to, and only clients who have paid their monthly dues can be eligible to purchase fuel. A cashew fuel bag of 15 kg costs currently 120 MZN.

Further collaborations

The organisation expresses the need of establishing more collaborations, as so far there are only limited running projects and established collaborations with facilitators. This is why the organisation seeks potential future collaboration with four partners:

**OMM:** The Women Organisation of Mozambique has been considered since it could act as a future sales point and distribution centre, where key responsible persons could become sales agents, as the organisation has a large access to potential clients.
**MozaCajú**: The collaboration aims at creating a circular economy model. MozaCajú is an organisation that aims at supporting the expansion of the Mozambican cashew industry in a way that allows producers and processors to meet the requirements and preferences of buyers through working toward a more productive, efficient, and transparent cashew value chain. Pamoja is considering potential collaboration with a one of their projects that produces bio spray for the cashew trees. The local cashew production has had problems with a fungus, which is solved by the government through the subsidization of chemicals to deal with this. However, there is a bio spray which can be produced locally and made from the cashew apple. As the gasification of cashew shells in the cookstoves produce biochar as a by-product, this could be collected and thus used as a fertilizer for planting the new cashew seedlings for producing the bio spray, and stoves could be used for cooking the molasses of the spray. This is an idea to create a circular economy model, as the bio spray further increases the harvest of cashew and thus fuel for the cookstove project.

**Technoserve**: The third collaboration in discussion is the possibility to take part in a new platform designed by Technoserve for its INCAJU project, which Pamoja can use as a CRM and distribution channel. Technoserve is an NGO that is aiming at improving cashew farmers’ livelihoods through cashew commercialisation. INCAJU is responsible for policy setting, coordination and strategy definition of the Mozambican cashew industry and provides services to farmers on the district levels. Technoserve is designing a digital platform aimed at promoting the commercialisation for the farmers and they would like to involve more stakeholders so that the platform can benefit more users. Through the platform, which can not only act as a CRM for Pamoja, farmers and plantation workers of the cashew industry can be accessed as potential clients. Furthermore, Technoserve’s agents in the field can be involved, who also could earn commission on stove sales. Hereby Pamoja’s product portfolio can be increased by adding a smartphone to the stove package and incorporating pay-as-you-go software into the ACE Pellet stoves. Adding a smartphone to the product portfolio will enable the farmers to access the platform to find buyers for their produce and is at the same time a step towards poverty alleviation through the provision of communication and energy through the cookstoves. Incorporating pay-as-you-go software in the stoves will create a smart connected product which will enable the company to track fuel purchases and monthly stove payments more efficiently.

Thus, the question for Pamoja is which platform to use. The company has three options for implementing a CRM solution in their business model: designing an own CRM, using the solution of ACE or participating in the new Technoserve platform for INCAJU.

**IKURU**: A further potential partnership collaboration is with the financing organisation IKURU to discuss micro financing possibilities as Pamoja will require more liquidity as they continue to expand. Hereby Pamoja could benefit from IKURU’s network of potential customers and know the market well. In future, they could also partner in funding the pelletizer. However, regarding this long-term proposal, IKURU inquires about Pamoja’s business plan, which is not yet complete since the project is still in its pilot phase.
5.2 A week of Business Model Innovation for Pamoja Mozambique

Table 3: Relation of key events, business model canvas and second order coding themes

<table>
<thead>
<tr>
<th>Day</th>
<th>Event of Business Model Innovation</th>
<th>Relation to Business Model Canvas</th>
<th>Second Order Coding Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUE</td>
<td>Inefficiency of urban distribution</td>
<td>Customer channels</td>
<td>- Lack of understanding of local managers - Importance of feedback at current stage - One chance to transfer knowledge - Trial and error</td>
</tr>
<tr>
<td>WED</td>
<td>Product functionality</td>
<td>Value Proposition</td>
<td>- Uncertainty - Trial and error</td>
</tr>
<tr>
<td>THU</td>
<td>Understanding customer needs</td>
<td>Customer segments</td>
<td>- Lack of understanding of local managers - Sales agent - Shared context for transferring knowledge - One chance to transfer knowledge - Learning from customers</td>
</tr>
<tr>
<td>SAT</td>
<td>Reaching new customers</td>
<td>Customer channels</td>
<td>- Lack of understanding of local managers - Sales agent - Shared context for transferring knowledge - Learning by team members</td>
</tr>
<tr>
<td>SUN</td>
<td>Establishing relationships</td>
<td>Customer Relationships</td>
<td>- Lack of understanding of sales agent - Customers - Shared context for transferring knowledge - Trial and error</td>
</tr>
</tbody>
</table>

The following chapter describes observed key events and the daily operations and tasks which are occurring at the current business development stage, narrated through the description of a typical week for Pamoja Mozambique.
Monday
Trouble with the new stove

At the AMPCM office, Sonia and Filomena are packaging T-Shirts to be distributed as prizes to sales agents and ambassadors. Armando comes in to register contract details about three new stove sales. He presents the bank slips as proof of payment from the new clients, which Sonia records in Pamoja’s database. During this moment, Sonia takes the advantage to explain the new ambassador system to Armando. They discuss about commission payments and how much customers are able to pay in advance. As Pamoja will be holding its first customer relations event in Anchilo on Sunday, hosted by Armando at his house, the team discusses event preparations.

Walking home in the evening after a long working day, Olof is carrying a prototype of the new ACE Pellet stove and a plastic bag with cashew fuel that will be used to do testing later when he gets home. When the stove is tested, it gives off a disappointing orangish flame that leaves soot on the pot. Other concerns include difficulty in reducing the level of heat once the stove starts burning, production of smoke once the fuel has burned out, difficulty in re-filling the fuel while the stove is burning and burning only larger sizes of the cashew shells. Olof is concerned and needs to discuss this with the producers at ACE.

Tuesday
Decision battles at OMM

Pamoja is targeting the members of the Organisation of Mozambican Women (OMM) for stove sales within the city. They have organised a workshop to be held in order to educate them about the project. The workshop takes place at the OMM offices and is attended by three ladies who are representatives of the organisation. Sonia makes a presentation about the ACE 1 stove and explains its various features such as the solar panel and lamp. She explains that the reason it is called “Ultra Limpio” is because it provides much cleaner cooking and does not smoke.

Later in the presentation, she explains the stove price and payment options. At this point, the women express concern about the high price of the stove. They are low income earners and question if it is worth buying a product that expensive while wondering how long it lasts.

“We have economic difficulties, we are here in the city and cannot collect wood. We have problems with charcoal: Stoves are sometimes not working, so we have 3 Stoves. Charcoal is also smelling very bad. We are dependent on charcoal, payments are adding up for all those things. There has not been any alternative yet.”

Understanding this, Sonia replies that there is a three-year guarantee and a ten-year life span for the stove. She also mentions that it burns on cashew shells from Anchilo, a nearby village,
at which one of the women stands up and comes to take a closer look at the fuel. Sonia explains that the cashew fuel is cheaper than charcoal. She also explains that a new stove comes with a free fuel bag, and then passes a cup of fuel around to the other women who smile as they take turns to look at it. She further explains that there is an ambassador point system where customers can receive points and get prizes.

Sonia then starts the stove demonstration and lights the stove as the women watch her. She explains that the stove burns as fast as a gas stove and demonstrates how to regulate the flame. The women ask a number of questions like what food they can cook on it, and she explains that it cooks all kinds of food such as fish, chima, and other local dishes. When asked about their cooking methods, the women explain that they normally cook for one and a half to two hours for a typical meal, which is why they think that this could be a solution to their current struggles with charcoal.

Meanwhile at the office, Olof has been trying to improve the ACE Pellet prototype’s gasification process for cleaner burning. For this he has drilled further the primary air holes to extend the airflow. Unlike the previous time, there is now less soot foaming on the pot and no smoke is produced from the stove after the fuel has burnt out. This is assumed to be an effect of the extended holes drilled in the stove and as a result, Olof regains his trust in the prototype which is why he decides to order the new ACE Pellet for the next batch instead of the ACE 1.

Following the workshop, Sonia and Filomena meet again with the women leaders at OMM to discuss the prospects of becoming sales agents. The ladies request for a second stove demonstration. This time it is headed by Filomena who starts by once again explaining the different components in the stove package and their functions before she proceeds to show how the stove is lit. However, as she tries to light the stove, she realises that the battery has not been charged and asks if she could plug it into a socket, explaining to the ladies that they need to wait a few minutes for the battery to charge. During this time, Filomena takes the opportunity to talk about the Peko Pe stove too and its payment scheme, responding to the women’s questions. After about 15 minutes, she decides to light the stove but because she starts the ventilator too early and the amount of fuel is too low, the resulting flame is weak, and the stove starts to smoke. She then moves it to the balcony where she lights it again strictly following the instructions. This time, the stove burns like it should, with a strong and high flame. Filomena then offers a sales agent contract to one of the women and explains the

Figure 10: OMM Women looking at fuel
terms of the contract. The women show interest in trying out a collaboration, however they are not ready to sign the contract yet. They need approval from the organisation’s managers and struggle with the commission-based payment offered by Pamoja, requesting a basic salary.

In the late afternoon, Filomena and Sonia discuss the disappointing collaboration results with Olof in the AMPCM office. He points out that the idea of making several OMM members sales agents might be dangerous and explains that it would be better to have only one agent at OMM to avoid competition while explaining how he imagines the design of the future sales team.

**Wednesday**

**Cooking struggles in the office**

It is Wednesday morning at the AMPCM office and Sonia and Filomena are discussing amongst themselves about the preparations that need to be made for the upcoming customer relations event in Anchilo. They are discussing what foods to be cooked, and the price estimations on various commodities to be bought. In the kitchen, Holandes, one of the AMPCM employees is preparing lunch for the day. He is preparing Chima, a local Mozambican dish to be served with fresh fish cooked with dry mangoes. He fills up the Peko Pe stove with fuel and lights it up, before preparing the fresh fish. After 30 minutes, the dish is ready, and he moves on to the Chima, which is made by mingling maize flour with hot water. The dish takes him about 20 minutes to prepare, at the end of which the Peko Pe is still in the middle of its burning process, with a strong and stable flame. This flame will last another approximately one and a half hours, but Holandes is done cooking for the day. He wonders what to do to put the flame out and decides to lift the burning stove and pour out the fuel into a metal container. The kitchen is immediately filled with huge clouds of smoke that quickly escape all the way into the corridor and office area. This leads to some discussions about the usage of the stove among the team. Hereby Sonia expresses her worries about the impressions the stoves could make, since they are sold as “ultra-clean” but tend to produce vast amounts of smoke when used incorrectly.

Later that afternoon, Olof returns from Condor with the new fuel bags that are now ready for distribution. The cashew shells have been sieved with a different strainer which takes out all the tiny particles that have been suspected to block air circulation and create smoke in the stoves. However, only 20 out of 100 bags have been sieved with the new strainer since the people at the factory were not made aware about it before Olof arrived. More tests are then done on both the Peko Pe and the ACE pellet stove with the new sieved fuel. The ACE pellet now burns with a steady, short and hot blue flame that creates only a little soot on the pot.

The Peko Pe flame is bright, hot and steady, however, towards the end of the burning process, it gives off a lot of smoke filling the AMPCM offices with huge clouds of smoke once again.
Suspecting clogged holes for air circulation, a new Peko Pe is tried out. The stove burns well but after a while, it starts to smoke too. Olof lights up a piece of paper and drops it in the stove, which ignites the flame again.

Thursday
Tactfulness in sales demonstrations

The day starts with a stress filled moment as Sonia and Filomena have not yet made all the necessary preparations for the sales meeting with the village leaders of Nacavala and Olof is concerned that they are running out of time. They did not print out sales contracts and questionnaires for the new clients, which now causes a delay in leaving for the sales meeting. Olof sees being on time as a respectful gesture to clients. Twelve ACE 1 stoves are loaded on to the car together with fuel bags for each new user. Meanwhile, Olof is visibly upset and expressing concern that when he gives them a task, they only do it to the limit of his instructions and don’t go beyond. Later in the car, Filomena and Sonia reflect on Olof’s outburst, saying that he is acting very bossy and has strong authority. The two co-workers did not understand the importance of the meeting and its preparation.

In Nacavala, the meeting is held in attendance of various village leaders of the community. Armando kicks off the presentation with a demonstration on how to light the lamp and an explanation of the process of lighting the stove using paper and kerosene but does not give an actual demonstration of lighting the stove. Meanwhile, Sonia and Filomena observe his presentation and make note of what he is doing right and wrong. They later talk to him and inform him that the correct way is using a cashew-kerosene mix and not paper, which is reflected in his later explanations about lighting the stove.

Armando’s sales presentation is performed with confidence, he explains the details of the stove in a descriptive manner and listens to the attending village leaders. When he starts responding to questions about the stove, he asks for the names of those he doesn’t know and takes time to listen to the participants. When the user manuals, that are written in English, are passed around, the participants are perplexed by the foreign language and ask whether it is possible to get them in Portuguese. Later, as the stove discussion is going on, some of the people consult the leader of Nacavala, who has had the stove for some days already, on his opinion. In response, the village leader expresses his satisfaction with his new investment.
Armando now explains the stove price and payment plans for the ACE 1 and goes through Pamoja’s flexible payment options such as M-Pesa. He also explains the fuel prices and how long a fuel bag lasts. At the topic of stove prices, one of the men reacts in surprise and says that it is very expensive, which sparks off a discussion on prices among the people. Filomena interjects nervously and adds that there is a ten-year guarantee for the stove, to flatten the discussion. However, this is not accurate as the stove’s guarantee is only three years but with a ten-year lifespan. The people seem satisfied with this information and by the time Armando has gone through the explanations about the stove benefits and asks who would like to buy the stove, a number of attendants are convinced enough to make the initial payment required to purchase the stove. Two of them raise their hands immediately and the contract signing commences as the new customers make their initial payments depending on their payment plans. During this time, Sonia fills out the sales questionnaires with the new clients. By the end of the day, nine stoves have been sold. As the new clients take their time to choose the colour of stove they want, they are very positive about the new stove and hope to reduce the money they spend on charcoal costs.

On the way back to Nampula, Sonia purchases some charcoal bags from the vendors on the main road for her family, being satisfied as it is much cheaper on the countryside than when buying it in the city.
Friday
Learning from failure

Olof has scheduled a skype meeting with Jan from Miombo to inform him about his testing issues, the progress of the Peko Pe stove sales and inquiry about a quotation for a forthcoming new order. Miombo has in the past sold Peko Pe stoves in Zambia, however, the project failed after some time. During the meeting, Olof asks Jan about their experience with the Peko Pe in the Zambian market and why the project was not successful, to which Jan explains the importance of maintaining a close relationship with the clients in order to get feedback and ensure continued support for the use of the stoves after they have been bought.

He further explains that the main problem they experienced in Zambia was discontinued use after the introduction phase due to difficulty of accessing fuel.

“If you look at literature about cookstove projects in Africa, there is lack of use after introduction time has passed. Very often mentioned is the hold charcoal has on the market. It is easier to fall back to charcoal. The logistics of charcoal is much better than any other biomass. This was also true for Zambia, it was not really convenient for users to buy pellets. If we don’t make it available, they fall back to the charcoal stove. We don’t see any maintenance problems on the stove, which is often happening, but not in this case with the PekoPe”

At this point, Olof presents the problem he has had with the smoking Peko Pe stoves during the week and inquires what the problem could be.

“The flame is unstable, and it starts to smoke. I don’t know why because I have cleaned the bottom. There is an air gap which allows for more primary air, but I can’t see any obvious reason why it is not performing very well. This first one did not have such a big gap as the ones produced in Zambia. So, in future we might get problems. The gasification process does not produce enough heat for the flame in the secondary phase.”

Jan expresses that he is hearing this for the first time but promises to look into the matter.

That afternoon, the new brochures and user manuals in Portuguese are completed and now ready for printing. Already at the print shop, they seem to attract a lot of attention from different people who are curious about these new stoves. The people are all surprised that they run on a cheaper cashew nut fuel and not charcoal. Moreover, they are particularly intrigued by the slogan “Moro Wakoroxo” in reference to the cashew nut fuel. Before leaving, the owner of the print shop insists on keeping a copy of the brochure as he is very interested in the novel solution, too.

However, back in the office, the local managers seem not to understand the potential of the brochures and the manuals. When Sonia sees the bulk of material, she whines about having to store them somewhere in the office and the extra work of spreading them to out. The local
management does not have the awareness of this supporting material, seeing it as an issue instead of help.

**Saturday**

**Exploring new terrains**

On Saturday morning, a meeting is held with a prospective agent in Namaita who has been recommended by Katia from the credit co-operative. Filomena starts the meeting with a presentation about the Peko Pe stove, where she explains how the stove works, which fuel it uses and how to light it using the kerosene-cashew mixture. During her explanations, Olof interjects to explain details she has missed every now and then. When she talks about the fuel, he adds that it does not use charcoal. When she talks about the stove’s ten-year guarantee, Olof interjects to correct her and says that it is three years guarantee, but with 10 years life span. Filomena continues and briefly talks about the ACE-1 stove too, its features and costs. The man is made aware that much as the stove seems expensive, it can be used for a long time and payments can be made in instalments. At this point, the man is asked whether he would like to buy a stove, but he is unable to make a decision and suggests a second meeting with the village leader in attendance. Nonetheless, Filomena continues and starts to explain the ambassador system to the gentleman, but half way through, she turns to Olof and asks if he can explain it better. While Olof talks, Filomena takes notes while Olof describes the ambassador system in detail. The man gets excited when he explains the opportunity to earn points and commission on stove sales as he sees this as a business opportunity. Olof continues to load him with more information about the contract, the brochures and monthly newsletters. At this point, the man starts to look overwhelmed as he now starts to repeat every word Olof is saying. When he does not ask any questions, Olof continues and talks about the reuse of the by-product biochar. In the end, Olof re-emphasises the stoves’ efficiency and the importance of explaining every detail about the stove and how to use it the right way when making a sales presentation.

**Sunday**

**Building Relationships**

On Sunday, Pamoja holds a celebration in Armando’s backyard in Anchilo. The event is intended to bring the village’s clients, prospective clients and staff together to share insights about the project and knit a closer relationship among them. In the morning, the Pamoja staff arrives early to start the cooking preparations with the help of a few volunteers from the village. The intention is that the stoves being promoted will be used to cook so that the people can get to see how they function. However, as the staff prepare to cook, they explain that the pan for the rice is too big to fit any of the stoves, so they get some wood and light a fire in a small hut functioning as the event’s kitchen. They also explain that the chicken cannot be grilled on any of the stoves, so they get some charcoal for that too.
As people start trickling in, Olof and Armando talk to them about the stoves and give brief demonstrations for the ACE 1 and the Peko Pe. Olof poses a brain teaser to the group of men, now seated, and asks: Which disease has the highest death tolls between Tuberculosis, Malaria and HIV? The men start discussing amongst themselves, and some say that it is no longer HIV since there are available ARVs that can prolong life. As a hint, Olof tells them to consider that a lot of smoke related diseases affect women and children as they inhale a lot of smoke while cooking on firewood in the kitchen. The men discuss and say that inhaling smoke can be uncomfortable, but the effects are very long-term. They come to a consensus that the answer is malaria and not tuberculosis. Meanwhile in the now smoke-filled kitchen, Filomena is also explaining to the women about the dangers of cooking with firewood, charcoal and inhaling the smoke. Some of the women react to this with surprise and start to discuss amongst themselves. After a while, it can be observed that Armando has only invited prospective stove buyers to the event, with the exception of a few already existing clients as he sees the day as a great sales opportunity. However, the Pamoja team, expecting to meet existing customers and provide them a service, only brought the new user manuals in Portuguese instead of brochures to the event, which Armando passes around. Thus, potential customers receive manuals which they use in order to get to know the stove better.

![Figure 12: Participating villagers looking at the manuals](image)

After some time, Helena, the AMPCM president arrives and introduces herself to the people. She explains her role and tells the participants:

“We want to make you confident about the project, we want to promote. People die from fire and indoor smoke, which is a problem and the reason for this project.”

She continues to explain the health issues and the benefits of the stove, speaking in Makua to ensure that everyone understands it.
Helena walks to a group of women seated and speaks to them, while Armando passes around the new stove user manuals that have now been printed in Portuguese. Meanwhile, one of the Peko Pe stoves starts smoking due to the wind and draws a lot of attention because of the large amount of smoke it gives off. Olof manages to relight it, while Armando continues a discussion about the stove prices and the payment scheme. There is a heated discussion as people are disgruntled about the high prices. In response to this, Armando explains the 3-year guarantee and 10-year stove lifespan, at which the discussion starts to calm down. Olof tells the participants that the project is not just about selling stoves, but also creating a family, and that if someone purchases regular amounts of fuel and the stove breaks after 5 years, the client gets a new one for free.

Later at the event, Armando receives a smartphone from Pamoja as a present for being part of the organisation and so that he can use it to register sales into the shared Google platform. He is told to pass by the AMPCM office the next day to receive a tutorial on how to use Pamoja’s Google docs platform so that he can be able to update sales data directly from his phone. Armando then holds an emotional speech in Makua about how he just ran into this project and did not get paid in the beginning but got a stove. He says:

“...then I really believed in this idea and the solution and now it is spreading immensely. And they take me into their family, and now I am a staff member...”
One of the elders also gives a speech of appreciation and thanks Pamoja for choosing Anchilo as the starting point for the cookstove project in all of Mozambique, a very poor country. He expresses appreciation that these people and this location have been selected for this solution. Afterwards, all visitors receive a large plate of chicken and rice and all participants enjoy lunch together, before the event calms down and people start to walk home.

Case Summary

The case shows the struggles of finding an adequate business model during the time of introduction for a clean cookstove implementer in Sub-Saharan Africa. Hereby business model innovation is accompanied by uncertainty and knowledge gaps between the different stakeholders and organisations involved. The organisation reacts to the unstable environment through a try and error approach, while gaining knowledge from facilitators, customers and partner organisations. It shows how the main actors react to this circumstance through the effort building capacities within the team while forming the education of clients. Thus, the following chapter analyses knowledge transfer and team learning during business model innovation and how the organisation learns from its environment under uncertainty.
6. Discussion

6.1 Empirical Contributions

6.1.1 Learning in the organisation

The problem of transferring knowledge

The observations show that the project’s success is lying within its details, as for example the usage of the product requires following exact procedural steps. Hereby the importance of the creation of knowledge and its transfer can be realised. There is an observed knowledge gap from users to sales agents, from sales agents to local managers, and a difference in understanding between the local managers and Pamoja’s project manager from Sweden. However, knowledge differences occur within the team in all directions.

This knowledge transfer problem can be observed, for example, in the performance and statements of the local managers Filomena and Sonia, as well as the sales agent Armando. Filomena expresses during sales presentations, a wrong guarantee time, whereas Armando explains the ignition of the stoves incorrectly and does not demonstrate it when interacting with potential customers. Kogut and Zander (1992) describe that this difficulty of transferring knowledge is due to the need of codification of knowledge for transfer, so the ability to structure knowledge into rules and relationships easily to communicate, and due to complexity of knowledge. Complexity is increasing through the information’s number of parameters, so the number of operations to solve a specific task (Kogut & Zander, 1992). Due to the lack of knowledge transfer, customers often used the stoves incorrectly, not aware of the mistakes they made or in some cases did not know the dangers of indoor smoke.

Often it could be observed that especially higher hierarchy employees had a better understanding, for example by Filomena asking Olof to explain the ambassador system better, or through the discussion and teaching by Sonia and Filomena to Armando in the sales meeting. Hierarchy leads to coordination and cooperation problems, which is why there is a barrier to vertical knowledge transfer (Grant, 1996). Vertical transfer is difficult as the shared codes of groups differ, asking for higher-order organisational principles which act as mechanisms by which to codify knowledge into a language accessible to all individuals (Kogut & Zander 1992).

An important core issue of transferring knowledge is tacitness. Tacit knowledge is complex and non-codifiable (Kogut & Zander, 1992). It is highly personal, hard to formalise and thus, difficult to communicate to others (Nonaka, 1991). Thus, tacit knowledge is deeply rooted in action and in an individual’s commitment to and involvement in a specific context (Nonaka, 1994). Polanyi (1952) explains that it is know-how created only through experience and only given from a master to apprentice through personal contact, as tacit knowledge is less diffusive and cannot be transmitted by prescription. In the case, examples of tacit knowledge
are for example relying within skills of managing the business and dealing with the current stage of implementation, which could be observed in the project manager’s ability, but lacking in the team’s other members. Olof had a much higher management understanding and business perspective, which he could not easily transfer to the local team. This lack can be reflected in the local staff’s missing awareness of the importance of tools such as brochures and manuals for the users or the missing sensibility by continuing to use charcoal at home, not understanding the bigger picture of the project and the importance of being exemplary. This can also be reflected by O’Dell’s and Grayson’s (1998) explanation that the biggest barrier to the transfer of internal best practices is ignorance at both ends of the transfer. Ignoring both the fact of being exemplary and ignoring the explanation that the team has to act so. The failure of transfer of tacit knowledge is also shown in the missing business know-how of the local agents, reflected in their misunderstanding of preparation for the sales meeting and being on time when meeting new clients or to deal with sales agent team design when collaborating with OMM. The hard to formalize sensibility for constructing the business, thus for business model innovation, is also seen in the sales agent’s wrong understanding of seeing the customer event in Anchilo as a sales purpose, but not for the creation of a long-term relationship with customers.

There was also an observed knowledge transfer problem in the opposite direction, as the sales agent understood the necessities of customers better, whereas this was sometimes neglected by local agents. As mentioned, the transfer of knowledge depends on transmission and receipt through his absorptive capacity (Grant, 1996), which depends on prior related knowledge (Cohen & Levinthal, 1990). As Armando comes from a user background, he has the prior related knowledge which the recipient, thus the other team members, sometimes missed. The absorptive capacity of the recipients could be observed in various examples: It was shown in Olof’s technical and business-related background and his rapid application of novel knowledge; or in the first contact meeting in Namaita where the recipient was overloaded with information which he was not able to process. The absorptive capacity of the recipient is another common barrier to the transfer of knowledge, besides the lack of a relationship between the source and the recipient, so the absence of a personal tie between the two (O’Dell & Grayson, 1998). This has also been observed in this situation.

Knowledge creation

In many situations the team’s individuals were aware of their own knowledge gap, expressing those in the need to gain more information and formation, as well as aware of an existing lack of understanding among customers, for example. Also, users themselves often showed an understanding that they needed more learning, however, it was not always possible for them to access the required knowledge.

As described, knowledge is created only through interaction between individuals or them and their environment through the transfer of knowledge occurring through the SECI process of externalisation, combination, internalisation and socialization (Nonaka et al., 2000).
Externalization happens through articulation by converting tacit into explicit knowledge (Nonaka, 1991). This could be observed in the situation where Olof explained the ambassador system to the contact in Namaita and Filomena taking notes of how he explained this in order to remember how to explain it herself. Combination includes connecting explicit into more complex explicit knowledge (Nonaka, 1991). Observations included Sonia’s learning of how to use the Google platform for extending her knowledge and the direct transfer of explicit information from Pamoja’s project manager to the local managers and the explanation of the points system from Sonia to Armando at the office. Internalisation, which means the embodying described by procedures actualised through practice from explicit to tacit knowledge, such as reading manuals and reflecting upon them to enrich the tacit knowledge base (Nonaka et al., 2000). The strong demand for user manuals in the local language shows an example, as those have the role to transfer explicit knowledge for tacit knowledge application. As the stove handling requires exact procedures, the manuals provide this knowledge which is highly requested by users. Finally, the conversion from tacit to tacit knowledge occurs through socialization, which however is a limited form of knowledge creation, as skills are transferred but neither of the actors gains systematic insights into the craft knowledge (Nonaka, 1991). This occurs in workshops held by the local managers and the sales agent in demonstrating and explaining the stove usage to other leaders and users. The use of the stove can be seen as tacit knowledge, as the handling is understood by the transmitter and recipient, however they are not able to state the underlying system of the gasification process.

Nevertheless, the transfer of tacit knowledge is often difficult and requires empathizing (Nonaka et al., 2000). This difficulty was also understood by the organisation, observable in Olof’s expression to the contact person in Namaita that the selling has to include the right explanation due to the complexity of the procedure. The transfer issue was especially seen as users often showed and expressed that they were not able to handle the stoves in the right manner. This has to be analysed further. First, in many observed cases, a demonstration of how to ignite the stove to users and distribution partners occurred only one time, and often there was no demonstration at all. This means that recipients need to be able to receive and replicate the knowledge from one sample only. Moreover, when the stove produces smoke during the demonstration such as at the OMM workshop, thus showing the difficulty of operating them, this single moment could also stimulate a negative impression. Winter (2010) discusses the issue of replication of knowledge. Hereby the author expresses that tacit knowledge requires a personal learning process, which depends on background knowledge which enabled the person to learn the skill. However, this awareness might be unnoticed increasing the difficulty for the recipient to learn from this replication moment (Winter, 2010). The recipient’s learning process requires thus feedback and appropriate training, challenging further the replication which is why the organisation needs to develop experience for how to replicate and transfer knowledge (Winter, 2010).

Second, transferring knowledge successfully requires a common ground of transmitter and recipient. For knowledge creation, a shared context is needed, in which knowledge is shared, created and utilised, as contexts provide the basis for one to interpret information in order to
create meanings (Nonaka et al., 2000). This is described by Kogut and Zander (1992) through the sharing of a common stock of both technical and organisational knowledge that facilitates the transfer of knowledge within groups. Small groups hereby create shared coding schemes, which differ from other groups due to different professional languages (Kogut & Zander, 1992). These shared coding schemes can be observed in Armando’s ability to communicate with users due to their shared language and social background, or in the positive reaction of users to the fuel slogan “Moro Wakoroxo”. Nonaka et al. (2000) describes this shared context as “Ba”, a place where participants share time and space to where information is interpreted to become knowledge. The common space and time can be seen in the attempt of Pamoja to create a relationship event with clients and partners in Anchilo.

**Learning within the organisation**

Knowledge which is created through the SECI process can trigger further spirals of knowledge creation, expanding horizontally and vertically across the organisation (Nonaka et al., 2000). As learning refers to the acquisition of knowledge (Chatterjee et al., 2018), learning can be related to internalization, which is required to create new organisational knowledge (Nonaka et al., 2000). Internal learning and knowledge transfer is an interactive, ongoing, and dynamic process that cannot rest on a static body of knowledge (O’Dell & Grayson, 1998). During the observed business implementation process of Pamoja, learning occurs constantly through close interaction of the various team members. Local managers express that they are in a current phase of learning, mostly occurring through Olof’s input. Hereby team learning is not only happening through direct instructions by the project manager in the office and between the different actors, such as Armando receiving a tutorial on how to use his smartphone to register sales, but also during meetings such as in Namaita, where Filomena is proactively taking notes of technical information, and in the situation where Armando receives direct guidance on his sales approach by the local managers. This can be described as informal learning, which is defined as learning which is unstructured, experiential and non-institutionalised (Marsick & Volpe, 1999). Informal learning occurs when employees learn informally by talking to others, searching information, giving and seeking feedback from colleagues and supervisors (Schürmann & Beusaert, 2016). Most learning in the workplace happens in an informal manner and it takes place when carrying out daily activities and tasks (Schürmann & Beusaert, 2016). Thus, informal learning happens as a result of experiences (Marsick & Volpe, 1999).

**Requirements for enabling learning**

Edmondson et al. (2001b) describe that the educational background and experience has no impact on the learning curve within teams. This can be observed for example in the fast way Armando and Filomena improved their performance in the short-time they are involved in their roles. During the ongoing learning of the organisation’s members, a learning process by the improvement of individual’s explanations could be observed, such as Armando’s better
explanation of the stove usage and his improved understanding of the importance to educate the customers, or Filomena’s correction of the misleading guarantee statements. Edmondson (2011) states that learning from failure in organisations is difficult as it requires attitudes and activities to detect and analyse them, which are often short in supply and context-specific learning strategies are underappreciated. However, the author expresses that those mistakes often generate valuable information. Analysing of failures requires openness, patience and tolerance in order to have early bad outcomes leading to a learning effect, which requires a need for leadership to establish this tolerance (Edmondson, 2011).

In order to transfer internal best practices, organisations need to create the environment for enabling the transfer, including the right culture and leadership (O’Dell & Grayson, 1998). Hereby leaders are responsible to establish and reinforce a supportive culture for sharing and transfer (O’Dell & Grayson, 1998). This is also reflected by Edmondson et al. (2001a), asking for the expertise of skilled team leaders who can manage a project and create the respective environment where team learning can occur by their critical role in communicating. Supervisors need to give freedom to learn and apply those in the context of work, and leadership should support individual risk-taking, innovation and freedom (Chatterjee et al., 2018). This can be seen in the local manager’s expression that they receive constant feedback and input from the project manager Olof, who divides responsibilities and facilitates the learning environment through instructions, feedback and the creation of a team environment by his effort of breaking hierarchical structures and his push to realise constant learning of the team members.

Hereby the organisational culture has an impact on the transfer of learning, and flexible organisations are more supportive due to higher supervisor and peer support, and better performance coaching (Chatterjee et al., 2018). Stable organisations with strong hierarchy are non-supportive for the sharing of tacit knowledge, whereas adhocracy has a positive transfer environment (Chatterjee et al., 2018). Flat authority structures, psychological safety, team stability and organisational factors promote learning in teams (Edmondson et al., 2001a). Psychological safety can be described by the individual’s perception of the safety of the interpersonal climate within the team (Edmondson et al., 2001a). It is defined as “shared belief that the team is safe for interpersonal risk taking” (Edmondson, 1999, p. 354). However, this is not guaranteed in our case, as the team members express the instability in the current operations and working conditions, and their involved tasks. Hereby a psychological safety is not given, as the actors fear that making mistakes could lead to a failing business. There is no testing possible, as every decision and act has a direct and real-time outcome. Team membership stability is another factor to enable a learning environment, through a focused, stable and intact team (Edmondson et al., 2001a, Edmondson et al., 2001b). As in the case the team is fairly immature, unstable in its fluctuation and also ahead of further recruitments, this is also not seen as an ideal plus for the learning of the team. The observation shows that employees handle the instability within the team through constant feedback among the team members, which is analysed in the following.
Feedback dependency at current stage of business model innovation

In the case there is constant feedback-giving within the team and by the project manager to the local employees. Especially complex information of the project and how employees should perform is transferred continuously and directly in this way.

Feedback encourages employees in their ability to perform well and explore novelty (Schürmann & Beausaert, 2016). An informative feedback helps employees to have a clear picture of how their work is seen and facilitates adjustments and creation of new ideas (Son & Kim, 2016). This feedback process is often not structured and detailed (Schürmann & Beausaert, 2016). It happens in a given situation, which can be observed where Olof gives Filomena and Sonia, after the cooperation talks with the Women’s Organisation, insights on how to design the sales team by describing the danger of competition among possible multiple sales agents in one channel. During informal learning, feedback giving, and seeking is a main learning activity for employees to progress, receive new inputs and perspectives (Schürmann and Beausaert, 2016). Thus, feedback drives informal learning (Schürmann & Beausaert, 2016).

The local managers Sonia and Filomena express that they learn the most through Olof’s direct assessment of the team member’s performance. Both of them state that they depend on his input in order to evolve, trusting his expertise. The employees’ perception on the feedback sources learning orientation plays a significant role to evaluate the feedback quality and source credibility (Son & Kim, 2016). Thus, the high perceived leader’s learning orientation leads to a strong perceived feedback quality of the employees, which facilitates learning (Son and Kim, 2016). Furthermore, the feedback acceptance also supports employees’ creativity when the employees view the organisation having a learning culture, as it allows and facilitates communication more openly and facilitates feedback as useful information for improving performance (Son & Kim, 2016). These interactions with colleagues and supervisors are crucial in the informal learning process (Schürmann & Beausaert, 2016). This can be observed in the case, as employees feel free to ask for insights and feedback and learning mainly occurs through the feedback from Olof and the interaction among the team in the office and on the field.

However, in Pamoja’s case, there is a strong dependency on Olof’s feedback. The local managers find it difficult to seek own tasks without the input from him, which requires a regular and short feedback loop between them and the project manager. Olof himself is aware of this dependency, as he states his responsibility to control, provide knowledge and guide the local managers frequently. He also expresses that currently it is necessary to provide constant feedback in order to ensure the right performance of the local team. The case shows the dependency on the project’s managers feedback in the current phase of business model innovation, which can create a threat for the business. As Olof is not located on-site in Mozambique most of the time, the conditions for providing feedback and transferring knowledge are different than those observed during this empirical study, which can create a challenge for facilitating learning within the team.
6.1.2 Learning from the environment

Acquiring external knowledge

Organisations are molded by environmental forces through the mediation of human minds (Cangelosi & Dill, 1965). Hedberg (1981) argues that whereas much of organisational learning occurs through the individuals within the organisation, it should not be mistaken to be the cumulative result of the organisational members. Firms often acquire external knowledge specifically to respond to turbulent environments, and this strategic action underscores the importance of environmental influences (Cassiman & Veugelers, 2006). Pamoja seeks to transfer to and acquire knowledge from clients and facilitators in order to gain a better understanding of their environment. The firm’s environment implies the various stakeholders who influence operations such as the clients, competitors, and facilitators. An organisation’s performance is affected by its ability to learn in changing environments (Miles, 1982). Moreover, organisations align with their environment to achieve long term survival and growth and to remain competitive and innovative (Fiol and Lyles, 1985). This alignment implies the potential of the firm to learn, unlearn and relearn based on its past behaviours (Fiol & Lyles, 1985). Starbuck (1978) argues that through learning, an organisation is able to build understanding and interpretation of its environment in order to create viable strategies. The results of these are cognitive systems and memories shared by the organisational members (Fiol & Lyles, 1985).

An illustration of Pamoja’s learning process is their effort to learn from the cookstove producer ACE’s practices and experiences in their market. By studying successful concepts of ACE’s business model, this provides insights for Pamoja to include into their own business model. Lichtenthaler (2009) uses the term exploratory learning to refer to a firm’s acquisition and application of external knowledge. The author states that firms are reliant on external knowledge in order to improve their performance. Additionally, in order to successfully absorb new knowledge, firms require a knowledge overlap with an external knowledge source (Mowery, Oxley, & Silverman, 1996). This once again depends on a firm’s absorptive capacity to gain external knowledge (Cohen & Levinthal, 1990).

Several examples in the case show incidences where Pamoja not only transfers knowledge to the users but also receives knowledge from them. This is a solution to adapt to the context, while educating customers shapes the context (Ausrød, Sinha & Widding, 2017). Through the client survey forms that are filled in by new stove users, the organisation attains more information on user behaviour which enables them to improve their operations. On these occasions Pamoja also learns the importance for the users to be able to regulate the flame on the stove when cooking since different dishes require different levels of heat. A more vivid example in the case is through Armando, who not only transfers knowledge to users and other village leaders, but also gives feedback on user behaviour to the organisation. Through him, the organisation realises that the English user manuals are not useful for their clients who would prefer manuals in Portuguese instead. The firm’s absorptive capacity depends on the
individuals who stand at the interface of the firm and the external environment, who have a key role to extract the external information (Cohen & Levinthal, 1990).

Native Capability

Pamoja’s efforts to establish collaborations with various facilitators can also be explained through the concept of native capability as described by Ausrød, Sinha and Widding (2017). The authors state that business model innovators in BoP markets are advised to integrate themselves into the local routines by teaming up with non-traditional partners, NGOs and fringe stakeholders in an attempt to foster adaptation of local conditions. It is through these collaborations that the business is able to create a network through which its business model can shape and be shaped by the market (Mason & Spring, 2011). Pamoja’s proposed collaboration with Technoserve could for example not only become a solution for the company’s search for a CRM platform but it could also be a link to new market terrains for the company to tap into.

Furthermore, on Pamoja’s learning from its environment, the organisation has been able to learn from their facilitators such as Miombo who shared their experiences as to why the Peko Pe stove was not successful in Zambia. For inter-organisational learning to take place, the student firm needs to be able to recognise the value of the knowledge from the external firm and be able to assimilate and commercially utilise it (Lane & Lubatkin, 1998). Martin and Salomon (2003) describe parallel to the absorptive capacity the transferor firm’s ability to transfer knowledge as source transfer capacity, which is the ability of a firm to articulate uses of its own knowledge, assess the needs and capabilities of the potential recipient and transmit knowledge so that it can be put to use in another location. The authors express the need of a collaborative transfer event to convey the knowledge under the same circumstances. This is expressed by Kogut and Zander (1992) through the importance of establishing a relationship within a learned and shared code to facilitate the trading of know-how among firms. Therefore, Pamoja needs to understand how to integrate and use the knowledge from Miombo to avoid making similar mistakes as their cookstove business failed in Zambia. Organisations like Pamoja may not have many lessons to draw from their own experiences as expressed by March, Sproull and Tamuz (1991). A suggested solution for organisations in this situation is that those could learn from the experience of others (Levitt & March, 1988). This is in line with Lane and Lubatkin (1998), who claim that a firm is capable of learning from other organisations. Additionally, the authors argue that the learning process is possible when there is a similarity between the learning firm and the teaching firm. In the case of Pamoja and Miombo, they both are social entrepreneurs selling a similar product to clients in the BoP sector which provides a similar context of operation.

Moreover, native capability facilitates an environment to build capabilities to enable gaining of trust from the locals (Hart & London, 2005). Furthermore, social embeddedness is an essential aspect in native capability building, increasing of trust as well as easing market transactions (Ausrød, Sinha & Widding, 2017). This is seen at the customer relations event in
Anchilo where Helena, the AMPCM president, gives a speech to the people to assure them about the project, which helps them to gain trust in Pamoja. This concept is further strengthened by Kogut and Zander (1992), who argue that joint ventures aid in the service of new markets by providing a vehicle for combination of organisationally embedded learning by firms.

Ausrød, Sinha and Widding (2017) assert that understanding the needs of BoP customers can be challenging due to their unique social, cultural and institutional situations, and thus requires deep customer intelligence which can be obtained through non-traditional partners and people on the fringe society. The authors argue that a firm needs to position itself in a way that it learns from the customers. That said, Pamoja’s learning process from the environment still leaves a lot to be desired as there are still a number of unaddressed issues from the customers’ feedback to the organisation. These include the sizes of the stoves which are currently produced in one size whereas customers express a desire for bigger stoves suitable for cooking larger meals. Another issue is the expression of users who have problems with smoke emitted by the stoves which is a result of insufficient training on how to use the stoves. In addition, the stove’s insufficiency to serve all the users’ needs such as grilling is a factor that draws customers back into the charcoal chain, an issue that is also yet to be addressed. Hereby the recruitment of Filomena as the marketing manager can be seen as an attempt by the organisation to improve the understanding of the local culture and alignment to the environment, as she has vast experience in operating with local communities and the commercialisation of products in the region.

**Uncertainty in Business Model Innovation**

Our observation during this period was that the company is operating their business model in its pilot stages under conditions of high uncertainty. We observed a number of issues regarding uncertainty in the project, such as the functionality of the stoves like the Peko Pe and ACE 1 with the unique cashew shell fuel, which tended to smoke sometimes under unexplainable situations. Further observations included the process of implementing a sales and distribution system for the stoves and the fuel, and the uncertainty of collaboration with various partners and the future of current partnerships such as the local organisation AMPCM. Part of this uncertainty is expressed by the employees regarding their current working conditions and the question of their employment contracts and instabilities within the organisation.

York and Venkataraman (2013) state that entrepreneurs seek to address the underlying challenges embedded in uncertainty. Likewise, as expressed in the case, by maintaining a close feedback loop with the employees during their daily operations, Olof seeks to resolve any underlying challenges that may deter their performance as there is uncertainty in their business environment. The managers’ interpretations of their environments interact with their organisational routines and beliefs that are retained from their past experiences to shape the firm’s responses to the environment (Sosna et al., 2010). However, March, Sproull and
Tamuz (1991) offer an interesting insight on how learning can be problematic for an organisation when its own history offers only meagre samples of experience. This is why the authors recommend that those are required to experience more richly, formulate interpretations from various perspectives and focus on critical incidents. An example in Pamoja is that after every sales event or meeting, Olof, always discussed his perceptions with the local managers in order to create a uniform understanding of their clients and environment.

Entrepreneurs create value through embracing uncertainty and accepting risk since uncertainty surrounding environmental problems reduces with the absorption of risk (York & Venkataraman, 2013). In the case of Pamoja, the uncertainty of their business environment has driven them to undertake various courses of action to absorb the risk, based on their past experiences. One such example is their proposed partnership with IKURU for the next batch of stove importation in order to avoid heavy import duties which occurred the first time. However, considering that the partnership has not yet been finalised, there is still a level of uncertainty regarding their next importation.

The range of possible outcomes in uncertainty contexts is often high, thus the business model builder is advised to adjust their initial mind-set to simply a desire to reduce the uncertainty to risk (Thompson & MacMillan, 2010). This process is said to create a basis for experimentation and learning for the development of a feasible business model (Thompson & MacMillan, 2010). In order to deal with the uncertain environment, Pamoja is trying out various ways how to succeed in nailing their business much as the company is still in its pilot phase and therefore still struggling to find a suitable business model for their operations in Mozambique. At the moment, while they are operating on a retail business model, they have plans to start producing the stoves locally and pelletizing the fuel. Amidst these are the proposed collaborations with various organisations that are underway, as well as the question of which CRM platform the organisation shall use, an indication of the uncertainty still existing in the organisation. These various plans may need to undergo a series of trials and errors before they are fully implemented, an attempt which is discussed in the following.

**Experiential Learning**

Sosna et al., (2010) suggests that uncertainty calls for an experiential learning approach which is then followed by constant revision, adaptation and fine tuning. Our observation was that Pamoja’s learning process is being guided by experiential learning, where experiential learning is a backward-looking trial and error process (Gavetti & Levinthal, 2000). Organisations learn from experiential learning through feedback received from the actions they take (Gavetti & Levinthal, 2000). According to Levitt and March (1988) experiential learning involves past experiences getting encoded in routinised actions in a bid to retain successful actions. An example of Pamoja’s constant learning from its past experiences within its operational environment is their discovery that stove users who have had the stoves...
for a couple of months tend to use more fuel, which is a reflection of these users’ adoption to the stoves and thus increased use.

During a learning process, organisations form programs and operating procedures that their members can execute on a routine basis (Nystrom & Starbuck, 1984). It is these routines that support continuity and therefore, failure to adapt this collective knowledge could result into an inability to face environmental uncertainties, thereby decreasing the firm’s chances of long term survival (Sosna et al., 2010). These routines are created through both search and trial and error experimentation (Sosna et al., 2010). Levitt and March (1988) argue that routines change through trial and error experimentation and that the likelihood of using a routine increases when it is associated with success in meeting a target and decreases with association to failure. As a start-up, Pamoja is still in the process of trying out different elements of their business model in order to establish proper routines in their operations. An example is the customer relations event held in Anchilo, that was the first of its kind and as it was deemed to be successful, the organisation is planning on holding similar events on a more routinised basis. Through trial and error experimentation, organisational members are able to retain those actions that produce desired results and discard those that do not (Argyris, 1976). Therefore, learning is generated through trying out organisational actions and correcting detected errors (Sosna et al., 2010). The founding of new businesses and innovations is normally preceded by a process of many trials and errors (Aldrich, 1999).

Experimental learning has been recommended by several authors when dealing with uncertainty. McGrath (2010) suggests experimentation as one of the experiential processes that promote learning in business model innovation. This can be observed by Pamoja’s testing of different distribution channels. The organisation experimented with different ways of accessing customers such as through AMPCM contacts or cooperatives like the Women organisation and the rural credit cooperative in the city, while customers in the countryside were accessed through employing village leaders as sales agents. New business models undergo an exploratory and implementation stage where they are conceptualised, and these stages are characterised by market uncertainty and unpredictability (Sosna et al., 2010). In Pamoja’s case there is a financial risk resulting from trusting customers to pay their monthly instalments in a timely manner as agreed. Hereby the organisation explores ways to envision a higher down payment as it is hard to make customers pay before they receive the product. This is attempted through experimentation by the control of fuel purchase as the organisation has a monopoly on the fuel and additionally through the incentive of receiving points when paying on time through the ambassador system. Firms can use exploratory learning as a way to capitalise on changing environmental conditions through the creation of new products and thereby serving the needs of customers in emerging markets (March & Levinthal, 1993). Experimentation can be recommended as a way by which firms can gather customer and market feedback from their environment to be used in adapting their business models (Minitti & Bygrave, 2011).

However, Chesbrough (2010) cautions entrepreneurs about the cost of experimentation both in terms of the direct costs of conducting the tests and the cost of failure in case the
experimentation fails to yield the expected learning results. Entrepreneurs are cautioned to distinguish failure from mistakes, where failure is said to be a natural outcome of an experimentation processes and is useful to learning (Thomke, 2002). Pamoja’s initial target to direct the sales efforts and on customers higher up in the income segment combined with a distribution strategy focussing on the city became a learning point from failure, as this did not lead to the desired sales numbers. They realised that the ACE-1 stove was more suitable for customers on the countryside who needed it not only for cooking, but also as an energy and a lighting solution. From this information, the organisation was able to adjust their operations and start focussing on the rural areas too in order to reach more customers. Chesbrough (2010) hereby encourages firms to strive for cumulative learning from a series of failures on their journey to discovering a viable business model.

A firm can generate data and learn ahead of its market when it undertakes active tests to probe upcoming markets with new potential configurations of its business model elements (Chesbrough, 2010). Another example of failure is the experimentation with bringing user manuals to the Customer Relations Event in Anchilo, which thus were used as brochures. Chesbrough (2007) argues that firms have no way of knowing what their future business models will look like, rather they can only conduct some experiments from which they gather evidence in order to identify the most promising direction and then ran more experiments until a they are able to scale a more promising model. The author acknowledges that this may be expensive and time consuming, but it is still a better alternative than competing with an obsolete business model against other firms that might have taken the risk to innovate a superior business model (Chesbrough, 2007).

As decision makers face challenges regarding organisational realignment, mobilisation of scarce resources and development of competencies to promote learning and adaptation (Sosna et al., 2010). Sensemaking can be suggested as a way for organisations to focuses on the search for meaning so as to deal with uncertainty (Weick, Sutcliffe & Obstfeld, 2005). It can be described as a process that is not about truth and getting it right, rather about continuous redrafting and of an emerging situation in order to make it more comprehensible. (Weick, Sutcliffe & Obstfeld, 2005). Sensemaking often occurs during an experimentation process as the participants make sense of an ongoing circumstance from which they extract cues and make plausible sense retrospectively (Weick, Sutcliffe & Obstfeld, 2005). An illustration of this concept is regarding the testing of the new ACE Pellet stove prototype, which was originally designed to burn pellets, but being tried out with cashew shells instead. When tested the first time, it produced a lot of smoke, so through a sensemaking process, the primary air inflow was extended by drilling larger holes in the combustion chamber in order to have an ideal gasification process for the cashew shell fuel. This provided a solution for the smoking but did not create a solution for the soot created on the pots. Thus, the prototype was tried again with cashew shell fuel that had been sieved with a bigger strainer to leave only the larger cashew shells, which reduced the soot created on the pots.

Consequently, this influenced Pamoja’s decision to market the ACE Pellet stove and discontinue the ACE-1 after realising that the ACE Pellet would serve a similar function but
at a lower cost. This shows that Pamoja is drawing lessons from these exploratory experiences in order to eventually establish their business model. Businesses in the start-up stages are more experimental than they are in their later stages because it is often difficult to get things right the first time (Hellström & Sjölander, 2005). This concept is further backed by Teece (2010), who states that a common case during business model innovation is that the right business model may not be obvious from the beginning, a situation that calls for learning, adjustments and provisional solutions. An example of such provisional solutions seen in the case is Pamoja’s collaboration with AMPCM, which was initiated as an intermediate solution to gain market access and cost cutting by sharing office space, despite the fact that Pamoja knew that it would not hold in the long run with their expansion plans, planning to collaborate with IKURU to create a local subsidiary Pamoja Mozambique.

Massa and Tucci (2013) also encourage entrepreneurs to engage in experimentation and challenge their initial assumptions by investigating numerous “what if” questions. Thus, as also observed in the case, there is a high need for experiments and experimental learning for business model innovation during uncertainty, which is why experimental learning has a prominent role in the specific context.

6.2 Theoretical contributions

The empirical contributions showed two forms of how knowledge is created and how learning occurs in the organisation, through internal organisational learning and the organisation’s learning from the environment. This is why in the following, the role of organisational learning in business model innovation in the BoP is further discussed. First, we want to express the background of how organisational learning is created through the two mentioned forms, before showing the importance of how a firm learns in business model innovation. Hereby we found that various existing theories have been confirmed. Then we want to highlight organisational learning especially during uncertainty and the unique context of the BoP market, which was researched with the market implementation of Pamoja’s cookstove project in Northern Mozambique. We found within this subject matter that organisational learning has not yet been brought to light in the academic discussion about business model innovation in BoP markets, where this study adds important insights to. Especially the concept of needing to balance internal and external organisational learning seems to be neglected in the business model innovation literature within this context.

This is why this research brings important insights to the discussion of how organisations learn in business model innovation in the BoP and in which way the facilitation of organisational learning influences business model innovation in the BoP market. Finally, the chapter ends by presenting a model of organisational learning in business model innovation in the BOP market by highlighting how firms learn under this specific condition, before highlighting the important role of inclusiveness in this context.
The recipe of organisational learning: The micro and macro perspective

Nonaka (1994) explains that whereas knowledge conversion through socialization, externalization, combination or internalization can create new knowledge independently, organisational knowledge creation occurs through the dynamic interaction between those four modes. New knowledge results from incremental adjustments to improve existing knowledge by individuals or new combinations of existing knowledge (Tsai & Wu, 2010). Simon (1991) states that what individuals within the organisations learn depends strongly on what is already known by other members, and what kind of information is present in the environment. Organisational knowledge creation takes place when the organisation manages the four modes of the SECI process in a continual cycle, facilitating both the organisation-internal knowledge level as well as the inter-organisational knowledge level (Nonaka, 1994). Thus, the creation of organisational knowledge occurs when both the internal knowledge creation and the creation of knowledge enacting with the organisation’s environment is managed.

This is also expressed by Nonaka et al. (2000), who state that knowledge is created where micro level and macro level interact and influence each other. The key for the knowledge’s development is the joint creation of knowledge by individuals and organisations, who play a critical role in mobilizing tacit knowledge held by individuals through a dynamic entangling in the knowledge conversion in a process referred to the spiral of knowledge (Nonaka, 1994). This spiral shows the interplay of the different modes while highlighting the importance of both facilitating intra-organisational learning and inter-organisational learning (Nonaka, 1994). This is why internal and external knowledge creation facilitates organisational learning. Organisational learning results from two firm-level processes, which are the acquisition of external knowledge-based resources existing outside the boundaries of the firm and the integration and exploitation of these resources to create new knowledge in the firm (Sinkula, 1994). This can be confirmed through the findings of this research.

When analysing team learning, also Zellmer-Bruhn and Gibson (2006) expressed that team learning can only be fully understood when considering the influences provided by the team’s macro context alongside the micro context features within the team. Within-team learning is the sharing of knowledge within the team context, whereas market learning is the knowledge gained from outside, such as competitors, suppliers and customers (Huang et al., 2014). Thus, team learning depends on the factors both internal and external to teams (Zellmer-Bruhn & Gibson, 2006).

Through internal learning, teams improve the collective understanding of a situation in members while improving quality and efficiency of their work (Huang et al., 2014). External learning helps team members to find other experience partners to learn from, identify important practices and learning to implement them (Huang et al., 2014) A firm’s willingness to proactively engage its external environment is of great influence on its knowledge acquisition (Kreiser (2011). In addition, the external networks formed and utilised by a firm provide the firm with an expanded resource base and enhanced learning opportunities (Tsai,
2001). These networks possessed by a firm create access to information which is crucial for organisational learning (Kreiser, 2011). Kreiser (2011) argues that by utilising these dimensions, firms can generate maximum levels of knowledge acquisition, integration and exploitation. Thus, the two observed forms of learning taking place at Pamoja’s business in Mozambique constitute the firm’s organisational learning during the process.

**Balancing internal and external organisational learning**

Nevertheless, it has to be considered that there is a trade-off between the two forms, the internal, micro and the external, macro context of organisational learning (Cohen & Levinthal, 1990). Cohen and Levinthal (1990) demonstrate that the trade-off relies in the efficiency of internal communication against the ability to assimilate and exploit information originating from the environment, thus a trade-off between inward-looking and outward-looking absorptive capacities. This affects the relationship between knowledge sharing and diversity across the team, which further influences the development of the overall organisational absorptive capacity (Cohen & Levinthal, 1990). March (1991a) sees this challenge in the need for balancing exploration and exploitation in organisational learning by searching for new ideas, markets and relations while diffusing and refining knowledge inside the organisation.

The case interpretation showed an in-balance in favour towards the macro-context of organisational learning, as the team’s members had various different expertise gained from their enactment with the environment, while often knowledge gaps existed within the team and internal team learning included various ongoing challenges in the effort to facilitate common understandings, which might be due to the reason that the team’s composition is fairly new. Thus, the balance of internal and external learning defines the extent and success of organisational learning.

**The relationship of organisational learning and business model innovation**

The importance of organisational learning with its internal and external dimension in business model innovation has been a major finding of this study. This outcome confirms existing literature. Organisational learning has been used as a theoretical lens to aid in the understanding of business model innovation (Berends et al., 2016). Hereby, Zellmer-Bruhn and Gibson (2006) express that there is a direct link of the achieved team learning and the performance success of the team, thus the organisation. According to March (1991b), the effects of learning in an organisation are seen through changes in the performance distribution. The author states that learning processes do not always increase both average performance and variation, however, increased knowledge often reduces variability of performance, thus knowledge makes performance more reliable. This is why organisational learning facilitates business model innovation.
The interrelation of organisational learning and business model innovation has to be explored further. Hereby, the question arises how team learning affects business model innovation and firm performance (Huang et al., 2014). The key issue in regard to this is to apply external and internal knowledge, enhance teamwork effectiveness, meet customer needs, strengthen firm performance through effective team learning and thus align various team learning models with organisational innovation in order to help creating competitive advantages (Huang et al., 2014). Hurley and Hult (1998) describe that organisational cultures emphasizing learning lead to higher levels of innovativeness, and a learning orientation functions as a prerequisite to innovation orientation. The authors express that when team members are encouraged to learn and develop, while being able to influence group decisions, the group develops a higher ability of innovativeness, relating again to Cohen and Levinthal (1990), who indicate that the absorptive capacity of the organisation depends on the one of the firm’s members. Thus, organisational learning is an antecedent and requirement for business model innovation.

As business model innovation focuses on enhancing customer value proposition, organisational teams have to acquire both external and internal technology, which is why team learning is an appropriate mechanism for strengthening business model innovation (Huang et al., 2014). The authors express that internal team learning strengthens business model innovation, where teams must engage in exchanges with outside organisations to gain new knowledge and innovative ideas by external market learning processes. Thereby, Huang et al. (2014) highlight that both within-team learning, and external market learning are the prime facilitators of business model innovation. This is where the study constitutes to, by showing the importance of balanced organisational learning in order to establish a new business model.

Organisational learning & business model innovation in the BoP market

During the observed process of business model innovation, organisational learning happened in the setting of the BoP market. There was a highly uncertain environment observed in the case, which had a major influence on the process of Pamoja and the team’s effort to learn from this environment. This is why organisational learning has to be further analysed in this specific context. As discussed earlier, business model innovation in the BOP occurs under high uncertainty, which was confirmed with this study. Gebauer and Saul (2014) express that business model innovations in the BOP market require certain capacity building by strengthening the skills, competencies and abilities of the organisation in a way that this can successfully implement their business model. The authors state that capacity building takes significant amounts of time, which is why the organisation’s long-term commitment should focus on the development of human resources through recruiting, developing and rewarding local managers for developing and implementing the new business model.

Our empirical findings confirm the existing theory about the need for experimental learning in business model innovation under uncertainty, as discussed in the empirical contributions. The first pursuit of business model innovation is usually faced with challenges as there are
difficulties resulting from uncertainty about the effectiveness of a new business model (Berends et al., 2016). Firms under uncertainty may not be aware of which exact values their business model dimension should take but they at least know which business models are relevant (Andries & Debackere, 2013). Experimentation and learning are important when designing a new business model since entrepreneurs are not always able to rationalize and fully articulate their new business models (Teece, 2010). Hereby experimentation can be seen as the way forward when dealing with barriers during business model innovation (Chesbrough, 2010). This study confirms the way organisations learn by experimenting in order to establish their business model under a highly uncertain environment.

However, in relation to the BoP market, organisational learning in business model innovation has been mainly neglected by the academic discussion so far. Furthermore, theory has not related the importance of balancing both internal and external organisational learning with business model innovation. This is where this study constitutes to, by showing empirical evidence of role and difficulty of organisational learning within this specific context.

Moreover, we found a contradiction to the argument that business model innovation in the BoP market occurs in a disruptive and radical manner (Gebauer & Reynoso, 2012; Michel et al., 2008). Our findings on organisational learning show that business model innovation in the BoP requires an incremental learning process, which requires gradual adjustments, feedback loops and trial and error experimentation. This is why in our findings, business model innovation in the BoP market occurs in a phased, progressive manner through a learning process.

**Model of organisational learning in business model innovation in the BoP market**

As a result of the insights made with this study, we propose a model showing how organisational learning occurs in business model innovation in the BoP market. The model shows which factors influence learning during business model innovation in the context of uncertainty in the BoP and how organisations such as Pamoja can facilitate their organisational learning process, as literature has not interrelated the subjects yet.
During business model innovation in the BoP, learning occurs as integration between an external and internal knowledge creation. Within the organisation, learning occurs between its members, inter-organisational learning occurs between the organisation and its environment. It is an iterative process by teaching the environment, such as sharing knowledge with facilitators and teaching of customers, while the organisation learns from the uncertain environment through trial and error experimentation. Another learning process might occur within the environment, such as among the customers and facilitators which, however, was not observed in this study.

Firms acquire knowledge from the external environment and integrate it into their internal environment through the team members individual’s absorptive capacity. The internal team learning facilitates business model innovation of the organisation, constantly improved through new knowledge extracted from the environment. Learning occurs within the organisation as an iterative learning process in an incremental, progressive way through a dynamic interplay of internal and external learning. Organisations such as Pamoja need to balance these in order to enable an organisational learning process which enhances performance and thus the firm’s business model innovation. An inadequate balance between external and internal learning cannot facilitate business model innovation in a suitable required manner.

The internal learning requires a shared context in time and physical space. If a member leaves this common space, the internal transfer of knowledge cannot be facilitated and internal learning fails, leading to knowledge differences. Moreover, external stakeholders such as customers can get drawn into the organisational learning process through inclusiveness, a solution approach and recommendation which is discussed in the following. This refers back to Gebauer and Saul (2014), who explain the need for a capacity building strategy during
business model innovation in the BoP market. Thereby the authors state that organisations have to create all skills and competencies part of this capacity building strategy, including inclusive business models.

**Inclusiveness as a facilitator of organisational learning**

We especially want to highlight the role of inclusive business models here. Inclusiveness in our view has the potential to support and facilitate the organisational learning process in this matter, as it includes external stakeholders into the organisational learning process.

Entries in the BoP market need a great effort of inclusiveness (London & Hart, 2004). Inclusive businesses contribute building up knowledge and capabilities, by developing the business’ human resource pool through training and skills development, enabling employees to advance or train local producers (UNDP, 2010). Inclusiveness plays also an important part of Pamoja’s business model. This can be observed not only through the recruitment and training of new team members and the desire to have a fully employed team with a regular salary. The organisation also seeks opportunities for inclusiveness in new collaborations such as offering new opportunities to Technoserve’s agents. Especially the ambassador system shows Pamoja’s effort to offer an inclusive business model, drawing customers into the team by first offering discounts, nominate ambassadors which can further be promoted to a commission-based agent status offering income opportunities along the distribution chain. As those ambassadors act exemplary by using the cookstoves frequently and see how it works while promoting the product to their social environment and participating in events, they tend to have a higher understanding of the usage of the cookstoves and the project.

This is why the ambassador system, which was Pamoja’s effort to inclusiveness, can act as facilitator for organisational learning and the transfer of knowledge. Nonaka (1994) demonstrates with his spiral of organisational knowledge creation that the amount of knowledge conversation becomes larger in scale and faster in speed as more actors in and around the organisation become involved. Thus, through the ambassador system involving more actors from the environment in the system, knowledge creation increases within the organisation. Hence, organisational learning in business model innovation could be facilitated through this inclusive tool in our case.

This is why we want to suggest inclusiveness as a solution to facilitate organisational learning during business model innovation in the BOP market, giving inclusive business models a special and prominent role in organisational learning.
6.3 Limitations and further research

Besides our empirical findings and the theoretical contributions, the following limitations of research need to be considered. The qualitative single case study on Pamoja’s cookstove project in Mozambique asks for a novel view on business model innovation in the BoP market through recommending the prominent role of organisational learning as its facilitator. This research is limited due to the study of a single case, the limited time frame and range of the master thesis, as well as constraints of the on-site fieldwork as mentioned previously. To generalize these findings and confirm our inductive reasoning, it is important that further research repeats the study. As we looked into a very early stage of business model innovation, this further attempt shall observe Pamoja’s cookstove project in Mozambique in future, where the business might be already established on a larger scale and customers might use the product already for a longer time, as well as on other cases on clean cooking. This study might also be transferred to other clean technology and renewable energy projects across the BoP market in order to prove the results. If similar patterns can be found, a generalization of these findings can bring an important insight to the current business model innovation discussion.
7. Conclusion

This thesis has been aimed at analysing how organisational learning occurs in business model innovation within the BoP market. Using the case of Pamoja Mozambique as our point of reference for the study, we have first of all given an overview of the current state of research on cookstove initiatives within the BoP markets, with main focus on studies carried out in Sub-Saharan Africa. Secondly, two main theoretical foundations have been explored to answer the research question: business model innovation and organisational learning. Hereby especially the BoP market and the importance inclusiveness has been described.

Presenting Pamoja’s efforts of establishing their cookstove business in Northern Mozambique, we have found the important role of organisational learning to facilitate business model innovation in the BoP market, and the difficulty to establish it. Hereby learning in the organisation has been discussed, displaying the difficulty to transfer knowledge and under which requirement learning occurs within the team while expressing an emphasis of feedback. Regarding learning with the environment, we brought attention to the condition of uncertainty and how trial and error experimentation as well as the development of native capability can be an answer to this.

Finally, the thesis confirmed the importance of experimental learning in business model innovation, but also revealed contradictions to previous research on business model innovation in the BoP market, describing an incremental learning process in order to develop a successful business model. In addition, we have also created a model showing the need for a balanced internal and external organisational learning in order to facilitate business model innovation. Hereby we highlighted the importance of a shared context for internal organisational learning to occur, while suggesting inclusiveness as a critical factor for external organisational learning.
References


UNEP RISØ, (2013). Emissions Reduction Profile Mozambique. UNEP RISØ CENTRE.


Appendices

Appendix I: Correspondence with London (2018):

RE: Organizational Learning and Business Model Innovation in Base-of-the-Pyramid Market Entry.

Ted London <tlondon@umich.edu>
MI 25.04.2018 14:40

Dear Stefan,

Good to hear of your of the focus on your master’s thesis. The paper you are inquiring about was presented at the Academy of Management several years ago. Since then the piece has moved away from organizational learning and, as it stands now, doesn’t incorporate that literature. Even the earlier version to which you refer to probably didn’t explore the organizational learning in sufficient depth. While unfortunately I can’t be more helpful here, I do wish you good luck with the research.

Ted London

From: Stefan Premer [mailto:step644@student.liu.se]
Sent: Wednesday, April 25, 2018 3:06 AM
To: tlondon@umich.edu
Subject: Organizational Learning and Business Model Innovation in Base-of-the-Pyramid Market Entry.

Dear Professor Ted London,

my name is Stefan Premer and I am currently developing my master thesis at Linköping University in Sweden about "Organisational Learning in Business Model Innovation in the BoP".

Hereby I found your article: Organizational Learning and Business Model Innovation in Base-of-the-Pyramid Market Entry. However, neither me or my university can access it.

It is the only so far written article about exactly the topic, so I was wondering if you could help me here?

Kind Regards from springful Sweden,

Stefan Premer
Appendix II: Improved cookstoves and clean cookstoves

<table>
<thead>
<tr>
<th>Key features</th>
<th>Legacy and basic ICS</th>
<th>Intermediate ICS</th>
<th>Advanced ICS</th>
<th>Modern fuel</th>
<th>Renewable fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legacy biomass and coal chimney stoves</td>
<td>Rocket-style designs with focus on highly improved fuel efficiency; includes both portable and built-in models</td>
<td>Fan or natural-draft gasifiers with high fuel and combustion efficiency; often designed for pellets/briquette fuels</td>
<td>Stoves that rely on fossil fuels or electricity; have high fuel efficiency and low emissions</td>
<td>Derive energy from renewable non-woodfuel energy; often used as supplementary stoves</td>
<td></td>
</tr>
<tr>
<td>Basic efficient charcoal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic efficient wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>Tier 0–2</td>
<td>Tier 2–3</td>
<td>Tier 3–4</td>
<td>Tier 4</td>
<td>Tier 3–4</td>
</tr>
<tr>
<td>Emissions¹</td>
<td>Tier 0–1</td>
<td>Tier 1–2</td>
<td>Tier 2–3</td>
<td>Tier 3–4</td>
<td>Tier 3–4</td>
</tr>
<tr>
<td>Overall benefits</td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
<td>High</td>
</tr>
</tbody>
</table>

Overview of Improved and Clean cooking solutions. The World Bank (2014)
Appendix III: Brochures

Folded Brochures and manuals

ACE-1 Brochure opened
ACE-1:

Notícias
A partir de 10 de fevereiro, você pode assinar contrato para o nosso novo fogão Peko Pe. Contate-nos para mais informações. O Peko Pe pode queimar com chama constante por mais de 2,5 horas sem adicionar combustível novo e é perfeito para cozinhar feijoada.

Para expandir nossos negócios, agora oferecemos aos clientes existentes 200 pontos para encontrar um novo cliente de fogão (valor: dois sacos de combustível).

 Fevereiro
A partir de fevereiro, vamos organizar eventos reacordados para compartilhar nossa experiência e dar prêmios aos melhores agentes e embaixadores. A equipe da AMPCM e Pamoja deseja um dia agradável e espera que você aproveite seu novo fogão.

Informações de contato
Para dúvidas por favor ligar:
Nampula: Sonia 84 391 8399, Malena: Zainia 84 587 1142, Ribas: Horciano 84 736 9606, Angochrome/Mamies/Magovalas: Nelson 84 916 5460, Meconta/Monapo: Maria 82 267 3253, Ancinha: Amendo 84 566 6496

Para comprar de combustível
Muhala Expansao: Mashiya 842510982
Mutuwamah Tomazona 826149669
Acompanhe o nosso progresso e mantenham-se atualizados com nosso grupo do Facebook: Pamoja Moçambique

Fogão ultra-limpo
**MORO WAKOROXO**

"Finalmente, posso cozinhar a chima e carregar meu telefone" Luna

**Economizar!**
O fogão de cozinhar ACE-1 é alimentado com Moro Wakoroxo que estão disponíveis em sacos de 15 kg por 120M cada saco. O preço do carvão continuará a subir de forma crescente à medida que a floresta é destruída. Mude o combustível hoje e comece a aproveitar um preço estável da energia moderna.

**Energia em sua casa!**
**Carregamento do telefone**
Carregue o seu telefone na tomada USB do fogão ACE.

**Iluminação**
Você recebe uma luz que pode ser conectada e usada para iluminar sua casa à noite.

**Você sabia?**
**Save a Terra**
As florestas naturais da África estão a desaparecer devido à produção de carvão vegetal e consumo de lenha.

Lembre-se da sua saúde
O monóxido de carbono inalado de cozinhar com carvão e lenha é prejudicial à sua saúde.

**Economizando tempo**
Economize tempo gasto na recolha de lenha ou no carregamento do seu telefone com o nosso novo fogão. A luz LED forte também fará a compra da bateria, padrão e outros combustíveis ineficientes ou sujos obsoletos. Tempo, você pode usar para o mesmo!

**Cozinha mais limpa**
O ACE tem um tempo de queima de até 35min e mantém sua cozinha limpa e linda sem produzir fumaça!

O fogão vem com uma garantia de 3 anos e tem uma vida útil de mais de 10 anos.

**Tome-se um embaixador**
Você tem um fogão ultra-limpo e gostaria de reduzir ainda mais seus custos de energia e ganhar prêmios como material de cozinha, camisetas entre outros? Encontre um novo cliente que gostaria de comprar um fogão e entre em contato conosco para ganhar pontos que você pode usar para comprar combustível ou fazer pagamentos de fogão.
PekoPe:

Notícias
A partir de 10 de fevereiro, você pode assinar contrato para o nosso novo fogão Peko Pe. Contacte-nos para mais informações. O Peko Pe pode queimar com chama constante por mais de 2,5 horas sem adicionar combustível novo e é portátil para cozinhar fogão.

Para expandir nossos negócios, agora oferecemos aos clientes existentes 200 pontos para encontrar um novo cliente de fogão (valor: dois sacos de combustível).

Fevereiro
A partir de fevereiro, vamos organizar eventos recorrentes para compartilhar nossa experiência e dar prêmios aos melhoresagentes e embaixadores. A equipe da AMPCM e Pamoja deseja um dia agradável e espera que você aproveite seu novo fogão.

Informações de contato
Para dúvidas por favor ligue:
Nampula: Sonia 84 391 8399, Matlama: Zaine 84 587 1142, Ribane: Herculanio 84 736 9808, Xangoche/Moma/Mogovolas: Niason 84 916 5450, Macoma/Monapo: Maria 82 287 3254, Anchiolo: Armando 84 565 6496
Acompanhe o nosso progresso e mantenha-se atualizado com nosso grupo do Facebook: Pamoja Moçambique

Fogão ultra-limpo
MORO
WAKOROXO

“Finalmente eu posso cozinhar meus feijões sem ter que cuidar do fogo a cada 30 minutos”

Economiçar!
O fogão de cozinhar Peko Pe é alimentado com Moro Wakoroxo que estão disponíveis em sacos de 15 kg por 120 Mt cada saco. O preço do comboio continuará a subir de forma crescente à medida que a floresta está destruída. Mude o combustível hoje e comece a aproveitar um preço estável da energia moderna.

Economizando tempo
Poupe tempo gasto na recolha de lenha com o nosso novo fogão. O Peko Pe funciona com combustível de biomassa que é conveniente de usar e prontamente disponível.

Cozinha com Moro Wakoroxo
Peko Pe é alimentado com conchos de cau de Anchiolo que são produzidos como um resíduo de cestinhas de cau. O combustível queima como um gás limpo que é livre de fumo e mantém sua cozinha limpa e bonita.

Cozinha mais limpa
Peko Pe tem um tempo de queima constante de até 2,5 horas para que você não tenha que cuidar do fogo durante a longa cozedura.

Tempo que você pode usar para si mesmo!
O fogão vem com uma garantia de 3 anos e tem uma vida útil de mais de 30 anos.

Você sabia?
Salve a Terra
As florestas naturais da África estão a desaparecer devido à produção de carvão vegetal e consumo de lenhas.

Lembre-se de sua saúde
O monóxido de carbono inalado de cozinhar com carvão e lenha é prejudicial à sua saúde.

Torne-se um embaixador
Você tem um fogão ultra-limpo e gostaria de reduzir ainda mais seus custos de energia e ganhar prêmios como materal de cozinha, camisetas entre outros?
Encontre um novo cliente que gostaria de comprar um fogão e entre em contato conosco para ganhar pontos que você pode usar para comprar combustível ou fazer pagamentos de fogão.
ACE Pellet

Notícias
A partir de 10 de fevereiro, você pode assinar contrato para o nosso novo fogão Peko Pe. Contacte-nos para mais informações. O Peko Pe pode queimar com chama constante por mais de 2,5 horas sem adicionar combustível novo e é perfeito para cozinhar feijão.

Para expandir nosso negócio, agora oferecemos aos clientes existentes 200 pontos para encontrar um novo cliente de fogão (valor: dois sacos de combustível).

Eventos
A partir de fevereiro, vamos organizar eventos recorrentes para compartilhar nossa experiência e dar prêmios aos melhores agentes e embaladores. A equipe da AMPCM e Pamoja desejamos um dia agradável e espero que você aproveite seu novo fogão.

Informação de contato
Para dúvidas por favor ligue:
Nampula: Sonia 84 391 6399.
Filomena 84 454 2125
Anchião: Armando 84 565 6496

Compra de Moro Wakoroxo
Muhela Expanse: Mushya 84 251 0632
Mutauanca: Tomazina 82 814 3889
Anchião: Armando 84 565 6496

Acompanhe o nosso progresso e mantenham-se atualizados com nosso grupo do Facebook: Pamoja Mozambique

Pamoja
CLEANTECH

Economizar!
O fogão de cozinhar ACE é alimentado com Moro Wakoroxo que estão disponíveis em sacos de 25 kg por $20 cada saco. O preço do carvão continuará a subir de forma crescente a medida que a floresta é destruída. Mude o combustível hoje e comece a aproveitar um preço estável da energia moderna.

Energia em sua casa!
Carregamento
Iluminação
Carregue o seu telefone na tomada USB do fogão ACE. Você recebe uma luz que pode ser conectada e usada para iluminar sua casa à noite.

Você sabia?
Salve a Terra
Lembre-se de sua saúde
As florestas naturais da África estão a desaparecer devido à produção de carvão vegetal e consumo de lenha.
O monóxido de carbono liberado ao cozinhar com carvão e lenha é prejudicial à sua saúde.

Economizando tempo
Economize tempo gastando na reciclagem de lenha ou no carregamento do seu telefone com o nosso novo fogão. A luz LED forte também fará o comércio de bateria, petróleo e outros combustíveis ineficientes e seus produtos.
Tempo, você pode usar para si mesmo!

Cozinha mais limpa
O ACE tem um tempo de queima de até 45min e mantém sua cozinha limpa e linda sem produzir fumaça.
O fogão vem com uma garantia de 2 anos e tem uma vida útil de mais de 10 anos.

Torne-se um embalador
Você tem um fogão ultra-limpo e gostaria de reduzir ainda mais seus custos de energia e ganhar prêmios como material de cozinhar, camisetas entre outros?
Encontre um novo cliente que gostaria de comprar um fogão e entre em contato conosco para ganhar pontos que você pode usar para comprar combustível ou fazer pagamentos do fogão.
Appendix IV: Manuals

Finished Product Manuals
Como funciona:

- O ventilador sopra o ar na câmara através de furos tanto no fundo como no topo, isso libera o fogo para aumentar a temperatura do combustível até atingir aproximadamente 500°C. Essas condições fazem com que o combustível gasifique.
- Os gases combustíveis queimam até o topo, encontrando mais oxigênio dos furos secundários e queimam completamente.
- O fogo produzirá tanto quanto 55% de energia, e a temperatura externa não fica quente o suficiente para causar lesões mesmo após o uso contínuo.
- Antes de usar o fogão pela primeira vez e sempre que a bateria está fraca e a luz do ventilador puxar, conectar o cabo do painel solar ao fogo e deixar o painel solar no sol durante 6 horas contínuas.
- Carregar o fogo usando o painel solar diretamente para uso diário.
- Quando carregado completamente, a bateria acende o ventilador por mais de 20 horas de circuito. A bateria também pode ser usada para carregar um dispositivo móvel ou executar iluminação LED. Para ter luz, conectar a lâmpada na porta USB do fogão.
- O vento perturba o fogo e causa fumaça, não usar fogão em lugares protegidos do vento e com boa ventilação.

Não fazer:

- Não desligar o ventilador antes que o combustível seja consumido e as chamas caírem. Isso causará fumaça.
- Não demarcar piloto diretamente em chamas ou sem enchimento prévio com combustível.
- Não colocar o fogo na água ou demarcar água na câmara ardente.
- Não deixar o alimento ferver na câmara de combustão.
- Não mover o fogo enquanto queimando.
- Não abrir a base de manutenção do fogão. Sempre deixar a manutenção do fogão do pessoal certificado. Se aberto, a garantia não é mais válida.

Outros problemas:

- Se a chama extinguir antes de consumir o combustível, reestabelecer a chama com um bastão enquanto o ventilador estej desligado ou a velocidade mínima.
- Se o ventilador ficar preso devido a resíduos de cinzas ou canaletas, lavar o fogo de cabeça para baixo quando frio e seco, ligar o ventilador e baixar a parte inferior do fogão suavemente com a mão até que as destacas oleares e o ventilador consiga o soporar.

Componentes do Fogão:

1. Permutador de gás liquefeito
2. Câmera e chapa
3. Tubulos reflexivos de 25 cm
4. Nível para controle do nível
5. Tampa de acesso

Instruções do uso - Pagina 1:

1. Preparar uma mistura de Mero Walcroco e petróleo em um balde pequeno com tampa e deixar a casca molhar bem.
2. Encher a câmara com Mero Walcroco até um máximo de 1 cm abaixo dos fundos da armadura. Adicionar pouca casca molhada de petróleo em casa para acender facilmente.
3. Acender a casca molhada com fósforo e deixar a chama estabilizar por 3-10 segundos.
4. Iniciar o ventilador no mínimo e aumentar a velocidade do ventilador até que a combustão estava bem desenvolvida.

Instruções do uso - Pagina 2:

5. Quando a combustão está bem desenvolvida, o fogo está pronto para cozinhar.
6. Colocar a panela e começar a cozinhar. Ajustar a velocidade do ventilador de acordo com as necessidades de calor. Deixar o ventilador em funcionamento até as chamas morrerem.
7. Quando as chamas morrerem, todo o combustível é consumido. Desligar o ventilador e esvaziar o conteúdo em um recipiente de metal. Cubrir bem com tampa.

Para continuar a cozinhar, prosseguir com o procedimento abaixo:
8. Iniciar o ventilador ao máximo durante 2min para esfriar a câmara de combustão.
9. Desligar o ventilador. Seguir os passos como mostrado no procedimento nº 1 a 7

Serviço de cliente: 94 391 0399
Facebook: @PamojaMocambique
Como funciona

- Devido ao rascunho induzido pelo calor, pequenas quantidades de ar é aspirado para a câmara de combustão através dos furos de ar primários na parte inferior do fogão.
- Isso leva o fogo para aumentar a temperatura do combustível até atingir aproximadamente 500°C. Essas condições fazem com que o combustível gasificante.
- Os gases combustíveis queimam até o topo, encontrando mais oxigênio dos furos secundários e queimam completamente.
- O vento perturba o fogo e causa fumaça, só pode usar o fogo em lugares protegidos do vento, e com boa ventilação.
- Quando todo o combustível é consumido, bio-cavalo permanece no fundo do fogão.
- Bio-cavalo é um excelente condicionador de solo e pode ser usado para melhorar sua colheita.

Não fazer

- Não fechar o regulador do ar primário antes que o combustível seja consumido e as chamas caírem. Isso causará fumo.
- Não derramar petróleo diretamente nas chamas ou sem enchimento prévio com combustível.
- Não colocar o fogão na água ou derramar água na câmara de combustão.
- Não deixar o alimento ferver na câmara de combustão.
- Não carregar o fogão enquanto queima.
- Não fechar o regulador de ar abaixo do ponto de uma chama estável. Se a chama se tornar instável, aumentar o fluxo de ar imediatamente.

Outros problemas

- Se a flama extingue antes de consumir o combustível, acender um pedaço de papel ou cartão e introduzir na câmara para reacender a chama.

Componentes do Fogão

Instrução - Pagina 1

1. Remover a tampa do fogão e abrir. Se o fogão estiver quente, use um pano de madeira para abrir.
2. Abrir o regulador de ar primário completamente.
3. Encher a câmara com basto até um máximo de 2 cm abaixo do topo da câmara ardente.
4. Adicionar em cima um pouco da mistura de Moco Wakaroba molhado em petróleo bem distribuído na câmara para acender facilmente.

Instrução - Pagina 2

5. Acender o topo com fósforo em vários lugares e deixar a chama estabilizar por 5-10 segundos. Colocar da neve a tampa de fogão e deixar o fogo se desenvolver por 4-5 minutos.
6. Quando a combustão está bem desenvolvida, o fogão está pronto para cozinhar. Colocar a panela e começar a cozinhar. Ajustar o regulador de ar primário de acordo com seus requisitos de calor.
7. Quando as chamas morrem, todo o combustível é consumido. Fechar o regulador de ar primário e esvaziar o cavalo em um recipiente de metal. Cubra bem com tampa.
8. Para continuar a cozinhar, prosseguir os mesmos passos de em cima.
ACE Pellet:

Como funciona

- O ventilador sopra o ar na câmara através do forno tanto no fundo como no topo. Isso leva o fogo para aumentar a temperatura do combustível até atingir aproximadamente 500°C. Essas condições fazem com que o combustível gasifique.
- Os gases combustíveis quentes flutuam até o topo, encontrando mais oxigênio dos forno secundários e queimam completamente.
- O fogão produzirá tanto quanto 5kW de energia, e a temperatura externa não exceder o suficiente para causar lesão mesmo após o uso continuado.
- Antes de usar o fogão pela primeira vez e sempre quando a bateria e trava e a luz do ventilador piscam, conectar o cabo do painel solar ao fogão e deixar o painel solar na sole durante pelo menos 6 horas contínuas.
- Carregar o fogão usando o painel solar diariamente para uso diário.
- Quando carregado completamente, a bateria acende a ventoinha por mais de 20 horas de oxigênio. A bateria também pode ser usada para carregar um dispositivo móvel ou executar iluminação LED. Para ter luz, conectar a bateria na porta USB do fogão.
- O vorto produzido pelo fogo causa turvação, o uso fogão em lugares protegidos do vento, e com boa ventilação.

Não fazer

- Não desligar a ventoinha antes que o combustível seja consumido e as chamas caírem. Isso causará fumaça.
- Não demorar muito tempo demorar em chamas ou sem enchimento prévio com combustível.
- Não colocar o fogão na água ou demorar água na câmara ardente.
- Não deixar o alimento ferver na câmara de combustão.
- Não mover o fogão enquanto queimando.
- Não abrir a bateria de manutenção do fogão. Sempre deixar a manutenção do fogão do passado certificado. Se aberto, a garantia não é mais válida.

Outros problemas

- Se a chama estiver antes de consumir o combustível, reiniciar a chama com um feitor onde o ventilador esteve desligado ou a velocidade mínima. Se o ventilador ficar preso devido a residuós de óleo ou óleo, levantar o fogão de cabeça para baixo quando frio e vazio, ligar o ventilador e bater a parte inferior do fogão sucessivamente com a mão até que os detritos caírem e o ventilador comece a soprar.

Fogão de cozinhar ultra-limpo
Manual do usuário

Componentes do Fogão

- Nódulo de água removível
- Câmera ardente
- Grilho de gás removível
- Fora da câmara elétrico
- Porta USB para carregar ou ouvir
- Unidade de ventilação
- Ventilador

Dimensões: 30 x 30 x 35 cm
Peso: 4,6 Kg
Combustível: Moro Walusoro

Consumo de combustível:
Ventilador max: 750 gramas em 50 minutos.
Ventilador min: 750 gramas em 100 minutos.
Bateria: LifePO4 6.4 V / 5 Ah

Instruções do uso - Pagina 1

1. Preparar uma mistura de Moro Walusoro e petróleo em um balde pequeno com tampas e delícias e a caixa molhar bem.

2. Encher a câmara com Moro Walusoro até um máximo de 1 cm abaixo dos fusos de ar secundário. Adicionando pouco casca molhada de petróleo em cima para acender facilmente.

3. Acender o a casca molhada com fósforo e dobrar a chama estabilizar por 5-10 segundos.

4. Iniciar o ventilador no mínimo e aumentar a velocidade do ventilador até que o combustível esteja bem desenvolvido.

Instruções do uso - Pagina 2

5. Quando a combustão está bem desenvolvida, o fogão está pronto para cozinhar.


7. Quando as chamas morrem, todo o combustível é consumido. Desligar o ventilador e esfriar o canto em um recipiente de metal. Cubra bem com tampa.

Para continuar a cozinhar, prossegui o procedimento abaixo:

8. Inserir o ventilador ao máximo durante 2min para esfriar a câmara de combustão.
9. Desligar o ventilador. Seguir os passos como mostrado no procedimento nº 1 a 7

Serviço do cliente:
Dona: 84 301 8099
Facebook: @PamsojaMocambique
mms@pamsojaMocambique
Appendix V: Interview Guidelines

Project Manager Interview questions:

1. The current status of the project:
   a) What is the amount of implemented stoves?
   b) What is the current business model?
   c) What is the geographical coverage?
   d) Who are the current users?
2. What is your role in the project and what are your responsibilities?
3. The organisation:
   a) Who are the other people involved? How many are involved?
   b) Are there other involved organisations, stakeholders? What are their roles?
   c) How is the project financed?
4. Context and background:
   a) Why did you chose Northern Mozambique for the project?
   b) What is different / unique about the context in Mozambique?
   c) Any obstacles within this context?
5. Competition:
   a) Are there any other clean cookstove organisations in the area?
   b) What other fuels are available on the market? Prices?
6. Type of stove and the fuel:
   a) Why did you choose the ACE-1 and Peko Pe?
   b) When is the new ACE Pellet coming? What is the price difference and the difference in functionality?
   c) What are the costs of the fuel and how is it available?
   d) What is the current distribution strategy for the stoves and fuel?
7. Users and marketing:
   a) What is the target audience? (Segmentation: Geo vs socioeconomic)
   b) How do people access the stoves? Are there agents?
   c) How do customers pay and finance the product?
Employee Interview questions

Sonia:

1. What are your roles and responsibilities?
2. What is your background / What did you do before?
3. What is the current status of the project?
4. What reactions have you received from people that you have talked to about the project?
5. How do you sell the stoves?
6. How are the stoves distributed to the buyers?
7. How is the payment done?
8. What’s the current situation with the sales agents?
9. How do you select which areas to focus on?
10. What are the alternative cooking stoves used?
11. How do you get new information about the project?
12. What do you think about the cookstove project?
13. What are some of the challenges you have faced so far?
14. Do you use the stove at home?
15. How do you feel about it?

Filomena:

1. What are your roles and responsibilities?
2. What did you do before you started working here? Background?
3. What is the current status of the project?
4. How do you sell the stoves?
5. How are the stoves distributed to the buyers?
6. How is the payment done?
7. What’s the current situation with the sales agents?
8. How do you select which areas to focus on?
9. What are the alternative cooking stoves used?
10. How do you get new information about the project?
11. What do you think about the cookstove project?
12. What are some of the challenges you have faced so far?
13. Do you use the stove at home?
14. How do you feel about it?

Sales Agent Interview questions

1. What is your responsibility?
2. How do you feel about the stove?
3. How did you become an agent?
4. How do you approach people to tell them about the stove?
5. What are the main arguments you use to convince people to buy the stove?
6. What are some of the reactions you have received from people?
7. What do people say about the fuel?
8. Do you use the stove at home?

**User Interview questions**

1. What motivated you to buy the stove? = Why did you buy the stove?
2. What stove did you use before you bought the ACE 1?
3. Are you still using the old stove? (Why?)
4. How do you use the stove?
5. How often do you use the stove?
6. What are the common dishes you cook?
7. How long is your average cooking time?
8. Have your cooking habits changed since acquiring the new stove?
9. How are you financing the payment for the stove?
10. Where do you access fuel for the stove? How often?
11. In your experience using the stove, how do you feel about it?
12. How many people are in the family?
13. What do you do for a living?
Appendix VI: Coding Themes

1. First Order Theme: Learning in the organisation

<table>
<thead>
<tr>
<th>Second Order Theme</th>
<th>Empirical Examples</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of understanding of local managers</td>
<td>Failure to understand importance of brochures &amp; manuals</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Continued private use of charcoal by local managers</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Failure to understand the importance of preparation and time keeping</td>
<td>Observation Sales Presentation in Nacavala</td>
</tr>
<tr>
<td></td>
<td>Lack of understanding how to design a sales team</td>
<td>Observation OMM Workshop</td>
</tr>
<tr>
<td></td>
<td>Wrong expression of guarantee period by Filomenla</td>
<td>Observation First Contact Meeting Namaita + Sales Presentation in Nacavala</td>
</tr>
<tr>
<td></td>
<td>Wrong understanding of purpose of relationship event</td>
<td>Observation Customer Relations Event</td>
</tr>
<tr>
<td></td>
<td>Wrong explanation how to light the cockstove</td>
<td>Observation Sales Presentation in Nacavala</td>
</tr>
<tr>
<td></td>
<td>Information overload of potential sales agent</td>
<td>Observation First Contact Meeting Namaita</td>
</tr>
<tr>
<td>Second Order Theme</td>
<td>Empirical Examples</td>
<td>Source</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Lack of understanding of customers</td>
<td>Lack of understanding dangers of indoor smoke</td>
<td>Observation Customer Relations Event</td>
</tr>
<tr>
<td></td>
<td>Expression of need for learning how to handle the cookstove</td>
<td>User Interviews</td>
</tr>
<tr>
<td></td>
<td>Wrong usage of cookstove</td>
<td>User Interviews</td>
</tr>
<tr>
<td></td>
<td>Difference in knowledge level among customers</td>
<td>User Interviews</td>
</tr>
<tr>
<td></td>
<td>Direct conversations among team members</td>
<td>Daily observations</td>
</tr>
<tr>
<td>Means of knowledge transfer</td>
<td>Transfer of knowledge through user manuals</td>
<td>User Interviews + Interview Sales Agent</td>
</tr>
<tr>
<td></td>
<td>Direct conversations with other leaders</td>
<td>Interview Sales Agent</td>
</tr>
<tr>
<td></td>
<td>Reaction to fuel slogan „Moro Wakoroxo“ in local language</td>
<td>Daily observation</td>
</tr>
<tr>
<td></td>
<td>Creation relationship to customers by AMPCM President Helena</td>
<td>Observation Customer Relations Event</td>
</tr>
<tr>
<td>Shared context for transferring knowledge</td>
<td>Armando’s communication skills in presentations</td>
<td>Observation Sales Presentation in Nacavala + Customer Relations Event</td>
</tr>
<tr>
<td></td>
<td>Olof explains difficulty of explaining the usage of cookstoves</td>
<td>Observation First Contact Meeting Namaita</td>
</tr>
</tbody>
</table>
2. First Order Theme: Learning from the environment

<table>
<thead>
<tr>
<th>Second Order Theme</th>
<th>Empirical Examples</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question of paying VAT</td>
<td>Daily observations</td>
<td></td>
</tr>
<tr>
<td>Procurement: Producing locally or importing</td>
<td>Daily observations</td>
<td></td>
</tr>
<tr>
<td>Absence of business plan</td>
<td>Observation Meeting IKURU</td>
<td></td>
</tr>
<tr>
<td>Question of which CRM platform</td>
<td>Interview Project Manager</td>
<td></td>
</tr>
<tr>
<td>Partnership with Cashew producer platform from InCaju</td>
<td>Observation Meeting Technoserve</td>
<td></td>
</tr>
<tr>
<td>Question of future fuel palletization</td>
<td>Daily observations</td>
<td></td>
</tr>
<tr>
<td>Partnership with local organisation AMPCP</td>
<td>Interview Project Manager</td>
<td></td>
</tr>
<tr>
<td>Addressing uncertain business environment through close feedback loop</td>
<td>Interview Project Manager</td>
<td></td>
</tr>
<tr>
<td>Uncertainty with business environment</td>
<td>Observation Meeting Miombo</td>
<td></td>
</tr>
<tr>
<td>Uncertainty with burning and smoke development of Peko Pe</td>
<td>Interviews Employees</td>
<td></td>
</tr>
<tr>
<td>Expression of uncertainty in current phase and instability in the organisation</td>
<td>User Interviews</td>
<td></td>
</tr>
<tr>
<td>Customer expression of unstable stove functionality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

101
<table>
<thead>
<tr>
<th>Second Order Theme</th>
<th>Empirical Examples</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning from customers and local conditions</td>
<td>Need for manuals in own language</td>
<td>Interview Sales Agent</td>
</tr>
<tr>
<td></td>
<td>Importance of having low flame for simmering (flame too strong)</td>
<td>User Interviews</td>
</tr>
<tr>
<td></td>
<td>Receiving knowledge through sales questionnaire</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Previous work experience in local context from Filomenia</td>
<td>Interview Employees</td>
</tr>
<tr>
<td></td>
<td>Increase of fuel use by customers requires time</td>
<td>Daily Observations</td>
</tr>
<tr>
<td>Learning from facilitators and partner organisations</td>
<td>Learning from good practices from ACE and their market</td>
<td>Interview Project Manager</td>
</tr>
<tr>
<td></td>
<td>Learning from Miombos mistakes in their failing business in Zambia</td>
<td>Observation Meeting Miombo</td>
</tr>
<tr>
<td>Second Order Theme</td>
<td>Empirical Examples</td>
<td>Source</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Try and error: Experiential learning</td>
<td>Experimenting with ACE Pellet prototype for order decision</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Experimenting with Peko Pe due to smoke problems with cashew fuel</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Experimenting with sales and marketing channels (Payments and relationship event)</td>
<td>Daily observations</td>
</tr>
<tr>
<td></td>
<td>Try and error with distribution channels such as Women Organisation and Credit Cooperative</td>
<td>Daily Observations + Interview Project Manager</td>
</tr>
<tr>
<td></td>
<td>Experimenting with distribution areas rural and urban</td>
<td>Daily observations + Secondary Data</td>
</tr>
<tr>
<td></td>
<td>Experimenting with accessing customers through village leaders</td>
<td>Daily Observations + Interview Project Manager</td>
</tr>
<tr>
<td></td>
<td>Experimenting with organisational form and hybrid model with AMPCM</td>
<td>Interview Project Manager</td>
</tr>
<tr>
<td></td>
<td>Experimenting with financial risk through instalments and pre-payments</td>
<td>Interview Project Manager</td>
</tr>
<tr>
<td></td>
<td>Experimenting with facilitators: Trying of partnerships with IKURU and Mozacaju</td>
<td>Daily observations</td>
</tr>
</tbody>
</table>
APPENDIX VII: ACE AND PEKO PE TECHNICAL DESCRIPTION

ACE 1 Stove

ACE 1 Technical Specifications

- LED light 100 Lumen
- Removable steel stove top
- Burning chamber 30mm refractory ceramic tiles
- Stainless steel body
- Powder coated steel base (available in a variety of colours)
- DC port for LED
- Control knob
- USB port
- Charging port

ACE 1 Performance Overview

- Smokeless burning of any solid biomass
- 4x more efficient than an open fire
- Solar powered LED light
- USB port for phone charging
- Lightweight and durable
- 8-12 year lifespan

Laboratory Testing

The ACE 1 has been laboratory tested by Colorado State University (2014) and Covar (2016). In these tests the ACE 1 consistently achieved INAA ISO tier 3-4 standards on emissions and efficiency, and received a 'best' rating for safety with a score of 97 out of 100.

This places the ACE 1 as the cleanest, safest and most efficient multi-fuel cookstove in the market.

Field Testing

The ACE 1 has also been tested extensively under real world conditions. In a field test conducted by Berkeley Air Monitoring Group, the ACE 1 reduced woodfuel used by at least 32% compared to traditional stoves in Cambodia, and it is estimated that every 25,000 stoves distributed averts 40 deaths and adds 1,295 years of healthy life (aDALYs) from reduced cooksmoke exposure.

In a longitudinal study conducted by Liverpool School of Tropical Medicine in Malawi, the ACE 1 reduced the incidence of cooking related burns among children by 40%.

Econometric Analysis

The independent British think tank Chatham House has conducted an industry-wide analysis of commercially available cookstoves comparing various models in terms of annualised costs. This study rated stoves based on their costs over time: the upfront cost of the stove divided over its useable lifespan, as well as the cost of the fuel needed to run it over that time. The ACE 1 is considered the most cost-effective advanced cookstove, and is even price competitive with much cheaper improved cookstoves due to its long lifespan and high efficiency.

www.africancleanenergy.com
### Performance and technical specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature of the flame</td>
<td>600 – 700 °C (below a pot)</td>
</tr>
<tr>
<td>Temperature of pyrolysis</td>
<td>450 – 500 °C (top of biomass)</td>
</tr>
<tr>
<td>Temperature regulation</td>
<td>30 % - 100 %</td>
</tr>
<tr>
<td>Thermal efficiency</td>
<td>~ 36 % thermal efficiency (Tier 3, WBT)</td>
</tr>
<tr>
<td>Reduced emissions of CO, PM</td>
<td>~ 90 % compared to open fire (Tier 3 - 4, WBT)</td>
</tr>
<tr>
<td>Reduced fuel consumption</td>
<td>With wood pellets 50 % compared to trad. charcoal stoves</td>
</tr>
<tr>
<td>Preferred fuel type/duration of gasification</td>
<td>Wood chips, size 1-2 inch / approx. 1-1 ½ hour Pellets /approx. 2-3 hour</td>
</tr>
<tr>
<td>Preferred moisture in fuel</td>
<td>&lt; 10 % (will work with moisture up to 20%)</td>
</tr>
<tr>
<td>Physical dimensions, imprints</td>
<td></td>
</tr>
<tr>
<td>• volume of fuel chamber: 3.97 liter</td>
<td></td>
</tr>
<tr>
<td>• Max volume of fuel: 5.34 liter</td>
<td></td>
</tr>
<tr>
<td>• Height: 30 cm, 31.5 with top lid</td>
<td></td>
</tr>
<tr>
<td>• Width: 24 cm diameter on cylinder, 35 cm with handles, legs</td>
<td></td>
</tr>
<tr>
<td>• Weight: 3.1 kg</td>
<td></td>
</tr>
<tr>
<td>• Imprints: Peko Pe logo</td>
<td></td>
</tr>
<tr>
<td>• Imprints: Stove serial number</td>
<td></td>
</tr>
</tbody>
</table>

### Standard delivery

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Mild steel, painted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy 10 years</td>
<td>Life expectancy 2-3 years</td>
</tr>
<tr>
<td>Stainless steel, 0,7 mm, AISI 304 or similar</td>
<td>Mild steel, scrap steel, 0,8 mm</td>
</tr>
<tr>
<td>Optional: Extra support legs</td>
<td>Heat resistant paint, black matt</td>
</tr>
</tbody>
</table>

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2054 Holter  
Norway

Phone: +47 95216167  
Org.nr. 938 939 044 NO  
Bank: 6012.06.17889

miombo@miombo.no
Working at the AMPCM offices
User Interview at the office
Filomena cooking in the office
Burning PekoPe stove
Fuel Delivery at the office
The cashew shells fuel
Meeting with the women representatives at OMM
Sonia demonstrating how to light the ACE-1 stove at the OMM workshop
Stove and Fuel delivery in Nacavala
Meeting with a prospective sales agent in Namaita
Charging the ACE 1 stove with the solar panel
Participants at the customer relations even in Anchilo
Olof addressing the group of men at the customer relations event
Serving food at the customer relations event
Brenda is serving food at the customer relations event in Anchilo
Conducting user interviews at the event
Sales Agent receives a smartphone as a reward
Cooking with the stoves at the customer relations event
Folding brochures and user manuals at the office