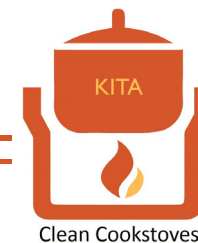


Appendix C - Business Model Canvas



Worldwide nearly three billion people depend on traditional cookstoves or open fires for cooking every single day, although this method of cooking gives a large amount of negative consequences. In Ghana a great majority is still using traditional three stone fires as well, including Ga and Fante kenkey makers in the Ejisu-Juaben district. Ga and Fante kenkey is a staple dish, originating from the Ga and Fante inhabited regions in West-Africa. It takes too much time for households to prepare kenkey for themselves and so a new business emerges: (mainly) women make large quantities of kenkey and sell smaller portions to households in the nearby areas. Therefore traditional three stone fires are used all day long by the kenkey makers, this affects their health, the local livelihood and the environment. To improve the quality of life of this specific target group the Kumasi Institute of Tropical Agriculture (KITA) launched the clean cookstove project in order to develop clean wood fuel cookstoves specifically for the making of Ga and Fante kenkey in the Ejisu-Juaben District in Ghana.

KITA is a premier tropical agricultural college in Ghana. Their mission is to network with global and local institutions to improve the quality of life of people, in this case cookstove users. During the project in 2015, a prototype for the cookstove is developed and tested. For the sales phase, KITA can use this business model to bring the cookstove to the market. This method of creating a business model is especially suitable for KITA, because it is very understandable and relevant, without oversimplifying the complexities of how this enterprise could function in the future (Osterwalder, 2010). Moreover, the canvas focuses on sustainable entrepreneurship, which is a crucial aspect for the mission of KITA.

The Business Model Canvas is written from the perspective of KITA. The timeslot is one year: the pilot year of the sales phase. After one year evaluation of the business model takes place and a new Business Model Canvas for the following years could be constructed. The project is customer-driven and so is the Business Model Canvas. The Customer Segments are located on the right side of the canvas and that is also where the reader should begin with understanding the strategy of KITA.

Customer Segments

This Business plan is customer driven. The cookstove is needed, because the existing cooking equipment does not satisfy the costumers' needs.

In Ghana over 13.000 people die every year due to Household Air Pollution (HAP), more than 21 million people are affected by HAP (Global Alliance For Clean cookstoves, 2015). KITA cannot provide cookstoves for all these people. KITA will operate on a niche market. The customers KITA should focus on are the kenkey makers in the Ejisu-Juaben district. However, other women who cook large amounts of food and sell their food, can be customers for KITA as well.

It is very difficult to determine the size of the customers group. Because the size of the customers group is unknown it would be best to produce the cookstoves on request. The kenkey makers are mostly women, who make a living of selling kenkey. Most of them still cook on a three stone fire. These women who make kenkey on a three stone fire and live in the Ejisu-Juaben District are the costumers KITA needs to reach.

Value Proposition

The new cookstoves will be cheap, energy efficient, safe, healthy and environmentally sustainable. This all sounds convincing enough, but the costumers will not immediately switch from the three stone fire, that they know, to the more expensive cookstove. This is why it is important to make the customers aware of all its advantages.

First of all it is cheap. The cookstove is made of locally available and cheap materials, which makes it a small investment to buy one. Old paint barrels will be recycled and used for the main parts of the stove. With this investment it is possible for the kenkey makers to create more revenues. In this way the cookstove also contributes to the poverty alleviation (London, 2007). The price of the cookstove is very important. It might not be the best cookstove design possible, but it is an innovation with reduced complexity and costs. Such an innovation is known as a Frugal innovation. A Frugal innovation is focussing especially on the poor customers. When these customers are not included the innovation is not responsible (Knorringa, 2014).

The cookstove is also energy efficient; less wood is required to cook the same amount of food. This means that the women will save money, in the case that they buy the wood for cooking, or it will save time, in the case that they collect the wood themselves. In the second case the women can use their time to cook more food or find another way to earn more money.

The energy efficiency is also making it environmentally sustainable, because less wood needs to be burned, so there will be less CO2 emission. Besides this the cookstove is designed in such a way that the fire will burn more efficiently which decreases the emission of harmful smoke.

The cookstove is healthier than the open fire, because it produces less smoke. The women and children that are close to where the kenkey maker is cooking will inhale way less toxic particles.

The cookstove is safe, because there is no open fire and the combustion chamber is insulated. This makes it less likely to get burned while using the cookstove.

These values are for a great part coherent. Because the cookstove is energy efficient, it is environmentally sustainable and healthier. The economical values and the social values go hand in hand. This means that shared value is created. The economic value is a part of the social value and the other way around (Kramer, 2011).

Customer Relationships

The relationship with the customers will be a personal short-term relation. The customer can come to KITA to buy the cookstove. The relation between the customer and the seller stops after the cookstove is sold.

Because KITA is a local institute the connection with the local people is made relatively easy. So for as long as the cookstove business is a local business no other partners are needed for the customer relations. However if in a later stadium the cookstove business will expand, KITA could consider collaborating with other local partners to improve the customer relations.

Channels

KITA needs channels to create awareness, promote the cookstove, sell the cookstove, repair the cookstove and evaluate the cookstove performance.

Awareness of the impact of HAP should be communicated to the customers. Handing out folders with information will do this. KITA should distribute these folders to the different villages in the Ejisu-Juaben District; there the local chief can distribute them to the people. These folders are not available yet, they should be designed and printed. The cookstove should be promoted. There will be workshops about how to use the cookstove. During the workshop the advantages of the cookstove will be pointed out. The information folders to create awareness can also promote the cookstove.

The cookstove will be sold from KITA on request. KITA should have a pickup truck available to transfer the cookstove.

Some KITA students will be trained in producing and repairing the cookstove. This will be done with the help of the building plan. The students can earn some money to pay their school fees by doing this.

The cookstove's performances should be evaluated in order to sell a cookstove that serves the customers' needs (Blank, 2013). This can be done by the KITA students that produce the cookstove. The students will evaluate the cookstove's performances and if needed they will improve the design.

Revenue Streams

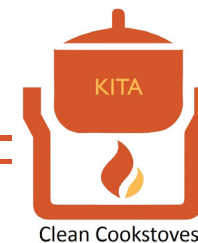
The revenue streams will come from asset sale. KITA will sell the cookstove to the kenkey makers to generate revenues. Because the size of the target group cannot be determined, KITA will produce the cookstoves on request. This way, KITA does not need to bear high investment costs, since all variable costs will be covered immediately by the payment. Furthermore, KITA does not need to store cookstoves if they make them on request, which will make it easier for KITA to set up this business.

Furthermore, KITA will provide workshops to promote the cookstove and to create awareness amongst the kenkey makers. This might be subsidized by the Ghanaian government, which will provide another revenue stream.

For the pricing mechanism, KITA will use a fixed menu pricing strategy. The cookstove will be sold for a list price of 120 GHS (€30), based on the costs of the cookstove and a profit margin. Some of this profit will go to the students who are producing and promoting the cookstove. With this money, these students can pay for their education. If during the pilot year the adoption of the cookstove is too low because the price turns out to be too high, KITA should consider the option of time payments. This way, customers can pay smaller amounts at a time and therefore be able to purchase a cookstove.

Social Revenues

Besides financial revenues, the cookstove will also generate social revenues. Actually, the social and ecological revenues are even more important than the possible profit that KITA can make. The three most important social revenues that we see are improved health, improved efficiency and more income for students.



Improved health

According to the world health organization, yearly 4.3 million people worldwide are dying early of pulmonary affection as a result of their cooking methods (Luttikhuis, 2015). Nowadays, people worldwide cook on traditional three stone fires. Mostly they use wood or coals, but in the Ejisu-Juaben District in Ghana, people use wood. They often cook inside the house. During the combustion of the wood, there is a lot of soot and CO₂ emission, which causes the pulmonary affections.

The cookstove KITA designs, takes this into account and solves these problems. KITA strives for a more complete combustion, which reduces the soot.

Improved efficiency

The fires people are using now, are not efficient at all. The cookstove needs to improve the efficiency, so less wood is needed to generate the same amount of energy. Because there will be a more complete combustion and because the heat will be conducted along the stove, the cookstove will be more efficient. This means the women do not need to spend so much time on gathering firewood anymore, which costs a lot of time now.

More income for students

The KITA students will be able to produce and promote the cookstove and earn some money with this. With this money they could pay for (a part of) their education and thus KITA could also provide education for those who actually cannot afford it.

Ecological Revenues

The cookstove will also create ecological revenues. However, the social and ecological revenues are coherent and thus shared value is being created (Kramer, 2011). The most important ecological revenues that we see are that there is less CO₂ emission and less wood needed.

Less CO₂ emission

Because the cookstove will be more efficient, there will be less CO₂ emission, which contributes to the environment. The decrease of harmful smoke is as well a social as an ecological revenue.

Less wood needed

Because of the increased efficiency of the cookstove, also less wood will be needed. Besides the social revenue of women spending less time on gathering wood, it can also be seen as an ecological revenue, since there will be less need to cut wood. The women could just use the loose twigs and gather those, instead of cutting wood as fuel.

Key Activities

The Key Activities are focused on creating shared value, which involves creating economic and social value by addressing the needs and challenges of society (Porter, 2011). According to the concept of shared value, societal needs define markets. With this in mind a set of Key Activities involved in creating, producing, selling, delivering and supporting the cookstove and other services could be configured. The demand for products and services that meet societal needs is rapidly growing and that requires customer-driven behaviour. Just like the entire business model, the Key Activities are customer-driven as well. In developing countries, like Ghana, communities are not always being recognised as viable markets, but it is there where the needs are huge and where large amounts of new customers come from. Meeting needs in underserved markets often requires new products, such as the cookstove, and so societal value can be created. Therefore Key Activities should be formulated to operate successfully (Osterwalder, 2010). Just like the Key Resources these actions are required to create and offer a value proposition, reach markets, maintain customer relationships and earn revenues.

The Key Activities can be categorized in two types of action: related to production and related to problem solving.

Activities related to production

During the sales phase the prototype of the cookstove is viable enough to produce. Yet it is important to innovate and improve the design in order to create maximum value. To do so it is important to choose an approach that could save time and costs. During the pilot year it would be more efficient if KITA bases its product process on customer-driven development. For the pilot year at least a minimum viable cookstove is necessary and then the cookstove can be improved in short, repeated cycles based

on the feedback of customers, the kenkey makers and other people who cook large amounts of food. KITA could use the 'get out of the building' approach to test the business model: potential users, purchasers and partners are being asked for feedback on all elements of the business model and the prototype itself and their input can directly be used in the innovation and improvement cycle of the cookstove. The needs of the customers and the customer insights play a central role in the innovation and improvement process. Working closely with the customer can result into high-impact solutions.

In brief, there are Key Activities related to the production process and to the innovation process in order to realize the Value Proposition. KITA controls the production process and takes the responsibility. KITA students can take part in the project as an extracurricular activity, learn more about setting up a business and at the same time earn money by helping the welder to produce the cookstoves. Other activities, such as production planning, quality and cost control, maintenance and replacement of the machines and selection of the right production capacity, are also managed by KITA. Furthermore for innovation research KITA could collaborate with other parties who are working on clean cookstoves initiatives to share knowledge and experience. Another option is to hire an expert to gain advice on the research program. These activities are particularly important during the pilot year, but need to be continued in the following years. KITA could also attend conferences about cookstoves in order to gain more expertise.

Activities related to problem solving

For KITA it is essential to convince customers of the necessity of clean cookstoves. The target group is very often not aware of the health and environmental dangers and the change clean cookstoves can make to improve their quality of life. Therefore a marketing strategy is needed in order to motivate customers to embrace the products and services that create societal benefits for them, like cooking in a healthy way and an environmentally friendly cookstove (Porter, 2011). The outcome of the interviews with the target group was that they would be willing to buy the cookstove for a price of 120 GHS (€30,-). If the adoption of the cookstoves is too low, KITA could choose to give the customer the option of time payments. To stimulate the adoption of the cookstove KITA could make use of its status as a local institute and that could be very helpful if KITA needs to gain confidence of the customers. This includes problem solving

activities, such as knowledge management and continuous training of the staff and educators. KITA should make customers aware of the importance of clean cookstoves by giving workshops and distributing instruction manuals about how to use the cookstove. Students of KITA also play an important role in these activities as they can choose to do an extracurricular activity about the building method of the cookstove and be a part of the business. That is how they will gain more experience in business and they can earn some money at the same time.

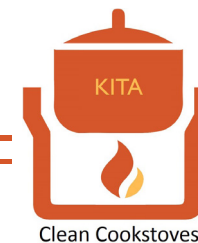
Key Resources

The key resources can be subdivided in three categories: physical, human and financial resources. The resources can be leased or owned by KITA or acquired from the key partners. Below the categories with the belonging resources are described.

Physical Resources

The resources of this category are required to facilitate the production of the cookstove. The cookstove is made out of metal and that means all tools for metalworking are required. A welder is also needed to construct the cookstove, or at least students of KITA need to learn how to weld so they can do that part of the construction. In the beginning it will be cheaper to make use of the welder's place and lease all his tools instead of purchasing them. All the materials are available in the nearby villages and for every cookstove 1,5 barrel, paint, iron rod and a grid is needed. A vehicle is probably necessary as well to distribute the cookstoves, but in the starting phase public transport can also be used to bring the cookstoves to customers. The costs of public transport are very low in Ghana.

KITA can function as the middle of the distribution network of the cookstoves in the Ejisu-Juaben District. Potential customers can visit KITA and can attend a workshop on how to use the cookstove. KITA could also choose to visit villages in the district to provide customers with information and make them aware of the necessity of clean cookstoves. To create awareness and educate people on how to use or repair the cookstove, instruction manuals should be published and therefore a press or at least a printer is required. KITA can use the printer in the nearby villages or eventually purchase an own printer.



Human Resources

This category of Key Resources contains one of the most important resources for KITA to make this business model work. People are particularly prominent in this business model, because it is a knowledge-intensive and creative industry. Besides, local expertise is essential for uncovering local solutions (Brown, et al., 2010). The cookstove could be applicable for this unique cultural context, but will not necessarily work outside this specific situation.

KITA heavily relies on human resources, because the design of the cookstove should be constantly improved to make the cookstove as reliable, efficient, healthy and cheap as possible. Knowledge is necessary to be able to criticise and improve the design and the production process. Knowledge is also required to convince the customer of the importance and profits of clean cookstoves and therefore people from KITA should be educated about the cookstove. An NGO can play a crucial role in improving and innovating the design and could also provide KITA with information. Otherwise KITA can attend conferences about cookstoves or hire an expert. This report will also be helpful with providing information that can be used to create awareness. A building manual of the second prototype is also available to explain to the welder and all students how to build the cookstove. The welder and a few KITA students are already familiar with the building manual and should be able to explain this to others.

Financial Resources

KITA depends on financial resources to make the production and sales phase possible in the starting phase. Therefore KITA can use the money that is left from the internship as seed capital.

Funding would also be an option to get money to invest more in the physical and human resources. Eventually there will no extra financial resources be necessary, because KITA can use the revenues of the sold cookstoves to pay the production costs for new cookstoves.

Key Partners

Key Partners could be extremely helpful for KITA. Co-Creation with Key Partners can help to create a clear strategy to achieve maximum added value and raise commitment within the organisation. Besides optimizing the business model, reducing risks and acquiring resources are also essential aspects of partnerships (Osterwalder, 2010).

KITA has the ability to create alliances with different partners, which can be distinguished in three different types of partnerships. During the research, design and sales phase of the project new partnerships can be forged and added to the business model canvas. So in general there are three motivations for creating partnerships:

- Optimization and economy of scale
- Reduction of risk and uncertainty
- Acquisition of particular resources and activities

Below the partners of KITA are listed with information about the motivation, the associated Key Resources and Key Activities, the relationship and specific agreements, if there are any.

KITA Students

The KITA students can participate in this project for their educational program and will get a unique experience by exploring how a business works. They have a lot of practical knowledge about the customer segments and the customer's needs. KITA students are also familiar with the surroundings, the Ghanaian culture, the process of Ga and Fante kenkey making, etcetera. They can be very capable in making research or questionnaires possible, creating new partnerships and evaluating if the cookstove would meet the needs of the target group. The KITA students can also earn money by helping to produce or sell the cookstove and by creating awareness.

The welder

The cookstove is made out of metal, which means that a welder is needed to construct the cookstove. The welder is located in Anwomaso, which is only a few kilometres away from KITA. His expertise and tools are necessary to construct the cookstove and he could also teach KITA students how to weld, so that they can help with the construction of the cookstove. For KITA it can be useful to make a deal with a welder and get a good price out of it when the students help constructing the cookstove.

Local stores for resources

KITA needs resources in order to make the business model work. These resources could be obtained from local stores, so they could also benefit from the cookstove business. Using local stores is probably cheaper and more sustainable as well, because there are less transportation costs. Another advantage is that customers perhaps embrace the

product sooner when it is made of local resources, because customers are then often familiar with these materials. Resources that could be bought from local stores are the materials for the cookstove for example. These stores are all located in Domeabra and Anwomaso. Near Oduom is a local store with a printer for producing the instruction manuals.

Organizations with initiatives on developing clean cookstoves

For KITA it could be useful to collaborate with other organizations that are also developing clean cookstoves. They could be used as a reference for research and innovation related activities. It could also reduce costs and time, because mistakes and failures are prevented. Other organizations could also profit from KITA and that makes the partnership interesting for both parties. There is also a competitive risk, but KITA as a non-profit organization is more interested in solving the problem than making a profit. If KITA could collaborate with this kind of partner on obtaining resources or activities, a special agreement is necessary.

Cost Structure

Next to customer-driven, the business model is also cost-driven. It is very important to keep the costs as low as possible, because the customers are poor and cannot afford an expensive cookstove. However, the business model is not completely cost-driven, the value creation is of course also of importance. We can split the costs in fixed and variable costs.

Fixed costs

The fixed costs are the costs that remain the same despite the volume of cookstoves produced. These include:

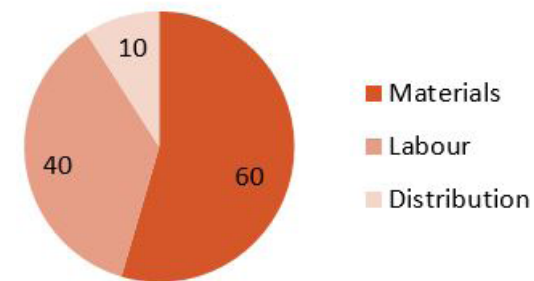
- Investment in materials to produce prototypes
- Investment in a vehicle to transport and distribute the cookstove
- Marketing costs to promote the cookstove
- Costs to organize workshops to create awareness (these costs will probably be covered by the government via subsidies)

Variable costs

The variable costs vary proportionally with the volume of cookstoves produced. These include:

- Materials to produce the cookstove
- Distribution costs (fuel for the truck or a taxi)
- Labour costs to pay the welder

The variable costs are estimated as you can see in the figure. These costs are in Ghana Cedi, we expect to produce the cookstove for 110 GHS (€27,50) per cookstove.



Social Costs

For this business, we can define two social costs that might occur. The students will have less spare time if they would work on the cookstove and the working environment of the welder at the moment is very bad.

Less spare time for the students

If the students would work on the cookstove, they have less spare time. This would mean they have less time to study or to practise hobbies. However, it is a great advantage that students get the opportunity to earn some money with this side job though it would cost them spare time. Besides, it is not obligatory; students can choose to offer their spare time for this job.

Working environment of the welder

The working environment of the welder at the moment is very bad. Employees barely use any protection if they are welding, such as eye protection. For the welder, the



cookstove business probably would not have that much impact since he is welding under these conditions anyway. However, for the students who are going to weld the cookstove, this may affect their health. KITA could consider purchasing welding goggles for their students.

Ecological Costs

In the design of the cookstove, we used wood ash as an insulator. We have to keep in mind that we should not burn any wood to get the ash, because that would not contribute to the sustainability of the cookstove. The wood ash that is used as insulation should be residual material and it should come from wood that is already burned. We should not burn wood only to have the ash.