



Diffusion of solar PV in Kenya

Optimizing the value proposition for the commercial market

Ebba Lundberg and Hjalmar Åhman

DIVISION OF INNOVATION ENGINEERING | DEPARTMENT OF DESIGN SCIENCES
FACULTY OF ENGINEERING LTH | LUND UNIVERSITY
2023

MASTER THESIS



MIALE
SOLAR
INVENTIONS



Diffusion of solar PV in Kenya

Optimizing the value proposition for the commercial
market

Ebba Lundberg and Hjalmar Åhman



LUND
UNIVERSITY

Diffusion of solar PV in Kenya

Optimizing the value proposition for the commercial market

Copyright © 2023 Ebba Lundberg and Hjalmar Åhman

Published by

Department of Design Sciences
Faculty of Engineering LTH, Lund University
P.O. Box 118, SE-221 00 Lund, Sweden

Subject: Innovation Engineering (INTM01)

Division: Innovation Engineering

Supervisor: Kajsa Ahlgren Ode

Examiner: Lars Bengtsson

Abstract

The effects of climate change are getting evermore severe, especially on the African continent. Actions towards the UN Agenda 2030 for sustainable development are becoming crucial, and one part of this is the energy transition. Africa has some of the world's best conditions for solar PV and hence it is a viable option for electricity production in Kenya.

The aim of this thesis is to understand the challenges and opportunities for this diffusion to happen with regards to sellers and buyers of commercial solar PV. Firstly, this is accomplished through the investigation of what drivers commercial entities have for adopting solar PV captive power as a complement to the national grid. Secondly, by developing a Value Proposition Canvas using Miale Solar Inventions as a case company. Thirdly, through briefly exploring of how to improve and adapt this value proposition while growing as a company.

Cost savings has been identified as the main reason for solar PV adoption while sustainability aspects have been of small importance for businesses. The reliability and price of the national grid has surfaced as the main pains for customers causing them to look for cheaper and more reliable options. There is a good match between what customers want and what Miale offers, and this needs to be maintained in the future. However, other growth issues arose that need to be further explored by the company.

The outcome of the study better equips solar PV companies to understand customers and grow, to further solar power diffusion, and to drive the sustainability efforts to reach the Agenda 2030.

Keywords: solar PV, renewable energy, Kenyan energy market, value proposition, growing organizations

Sammanfattning

Effekterna av klimatförändringar blir allt allvarligare, särskilt på den afrikanska kontinenten. Åtgärder för att uppnå FN:s Agenda 2030 för hållbar utveckling blir allt viktigare, och en del av detta är övergången till förnybar energi. Afrika har några av världens bästa förutsättningar för solceller och det är därför ett möjligt alternativ för elproduktion i Kenya.

Syftet med detta arbete är att förstå utmaningar och möjligheter för spridningen av solceller med avseende på säljare och köpare av kommersiella solcellsanläggningar. För det första uppnås detta genom att undersöka vilka incitament kommersiella företag har för att installera solcellsanläggningar som ett komplement till det nationella elnätet. För det andra genom att utveckla en Value Proposition Canvas med hjälp av Miale Solar Inventions som caseföretag. För det tredje genom att i korthet utforska hur man kan förbättra och anpassa detta värdeerbjudande i samband med företagets tillväxt.

Kostnadsbesparingar har identifierats som huvudskälet till installerandet av solceller, medan hållbarhetsaspekter har haft liten betydelse för företag. Tillförlitligheten och priset på det nationella elnätet har framträtt som de främsta bekymren för kunderna och det får dem att leta efter billigare och mer pålitliga alternativ. Det finns en bra matchning mellan vad kunderna vill ha och vad Miale erbjuder, och detta behöver upprätthållas i framtiden. Dock har andra tillväxtproblem uppdagats som behöver undersökas närmare av företaget.

Resultatet av studien rustar solcells företag bättre för att förstå sina kunder och växa, främja spridningen av solenergi och driva hållbarhetsarbetet för att nå Agenda 2030.

Nyckelord: solceller, förnybar energi, kenyanska elmarknaden, värdeerbjudande, växande organisationer

Acknowledgments

This thesis was conducted at Lund University at the Faculty of Engineering and the department of Design Sciences in collaboration with Miale Solar Inventions, both in Sweden and in Nairobi, Kenya. Both parties involved have contributed immensely with their valuable support and insights, which have been of great significance to the authors. Their assistance and guidance throughout the process are sincerely appreciated.

Firstly, we want to thank Kajsa Ahlgren Ode, our supervisor at the university. You have helped us find a way every time we have been stuck and you have calmed us down every time we have been stressed. Thank you for your relentless efforts for making our thesis a success.

Secondly, we want to thank all the people who have contributed to this thesis in one way or another, talking to us or participating in interviews. We especially want to thank Stephen Adwong'a, for supporting us and facilitating this thesis, Alexej Cederholm, who explained the intricate nature of the Kenyan energy market, and Kasper Skarrie, who made us feel welcome in Kenya.

Thirdly, but most importantly, we were inspired by Hjalmar's mother Erica Åhman who conducted her thesis in Kenya in 1987. She pushed us to find the courage to go on this adventure. In December 2022 she passed away.

Lastly, we would like to express our gratitude to our families and friends for their unwavering encouragement and support, not only throughout the completion of this project but also during our five years of studies in Lund. Your constant presence and belief in us have been instrumental in our success.

Lund, May 2023

Ebba Lundberg & Hjalmar Åhman

Table of contents

List of acronyms and abbreviations	9
1 Introduction	10
1.1 Background	10
1.2 The energy market in Kenya	11
1.3 Miale Solar Inventions	12
1.4 Problem description	13
1.5 Purpose and research questions	14
1.6 Focus and delimitations	14
1.7 Target audience	15
1.8 Thesis outline	16
2 Method	17
2.1 Research approach and method design	17
2.2 Quality of research	24
2.3 Research ethics	24
3 Theoretical frameworks	26
3.1 Business Model Canvas	26
3.2 Value Proposition Canvas	28
3.3 Growing organizations	30
4 Case study	33
4.1 Miale Solar Inventions	33
4.2 Market	39

5 Results	44
5.1 Customer Profile	44
5.2 Value Map	48
5.3 Value Proposition Canvas	50
5.4 Miale's perceived customer profile	55
5.5 Growth challenges	58
6 Discussion	61
6.1 The PV system offer	61
6.2 Value proposition fit	62
6.3 Adapting and improving	63
6.4 Limitations	64
7 Conclusions	66
7.1 Diffusion of solar PV	66
7.2 Future research	67
References	68
Appendix A Interviews	74
A.1 List of interviewees	74
A.2 Interview guides	75
Appendix B Workshops	80
B.1 List of participants	80
B.2 Material	81
Appendix C Customer Profile	85
C.1 Customer profiles	85

List of acronyms and abbreviations

C&I	Commercial and Industrial
EPRA	Energy and Petroleum Regulatory Authority
IPP	Independent Power Producer
KenGen	Kenya Electricity Generation Company Ltd
KES	Kenyan Shilling
KETRACO	Kenya Transmission Company Ltd
LCOE	Levelized cost of electricity
MWp	Mega Watt peak
solar PV	solar photovoltaic

1 Introduction

The introduction includes the background to the underlying problem and a presentation of the case company. The problem will be described, and the purpose and research questions further explained. Lastly, the focus and delimitations will be described as well as the target audience and the structure of the thesis.

1.1 Background

The effects of climate change can be seen in the form of extreme weather, temperature extremes, drought, sea level rise, loss of biodiversity, impacts on ecosystems, and risks to human health, food security, water supply, and human security. This is caused by human activities that have led to an increase in global warming of 1°C above pre-industrial levels. One part of the solution to this man-made problem is the decarbonization of the energy supply (IPCC, 2022).

In Africa, the effects of climate change are more severe than in most parts of the world. With one-fifth of the world's population living on the continent there is an increased water stress, reduced food production, increased frequency of extreme weather and lower economic growth which in turn leads to mass migration and regional instability. The continent's economic growth is also expected to increase the demand for fossil fuels (International Energy Agency, 2022).

According to goal 7 in the *2030 Agenda for Sustainable Development*, adopted by the United Nations (n.d.), there is a need to ensure access to affordable, reliable, sustainable, and modern energy for all. This will create a resilience and protection from climate change and decrease greenhouse gas emissions, as well as create economic opportunities and jobs for millions of people.

To reach the goal of a zero-emission energy supply system there needs to be a strong upscaling of renewables (IPCC, 2022). On the African continent only 1% of the

global installed solar PV¹ capacity can be found and with solar energy being an important part of the required renewables globally there is potential to increase production as Africa has 60% of the best solar resources globally (International Energy Agency, 2022).

Kenya's potential output of solar energy consists of approximately 5 kWh/m²/day. Considering the area of the country, this energy is equivalent to 250 million tons of oil per day. Currently solar power is only contributing with approximately 1% of the country's energy production (George et al., 2019). However, the solar PV market is constantly growing. According to the International Energy Agency (2020a), Kenya had a solar electricity production of 3 GWh in 2010 which has increased to 88 GWh in 2020. The diffusion² of solar PV systems in Kenya will be addressed in this thesis by using Miale Solar Inventions, presented below, as a case company.

1.2 The energy market in Kenya

The total need for energy in the commercial and industrial (C&I) sector in Kenya keeps growing and has increased by 7% from 2010 to 2020. The share of the energy mix that is made up of electricity was 34% by 2020. The electricity produced in Kenya is mostly renewable, with geothermal generating the most electricity, followed by hydropower. As can be seen in Figure 1, only 1% of the electricity generated comes solar power (International Energy Agency, 2020a; International Energy Agency, 2020b; International Renewable Energy Agency, 2022a).

¹Solar PV stand for solar photovoltaic, and this technology absorbs energy from sunlight and converts it into electrical energy through semiconductor materials (Office of Energy Efficiency and Renewable Energy, n.d.).

² Diffusion refers to the spreading of innovation over time (Rogers, 1995).

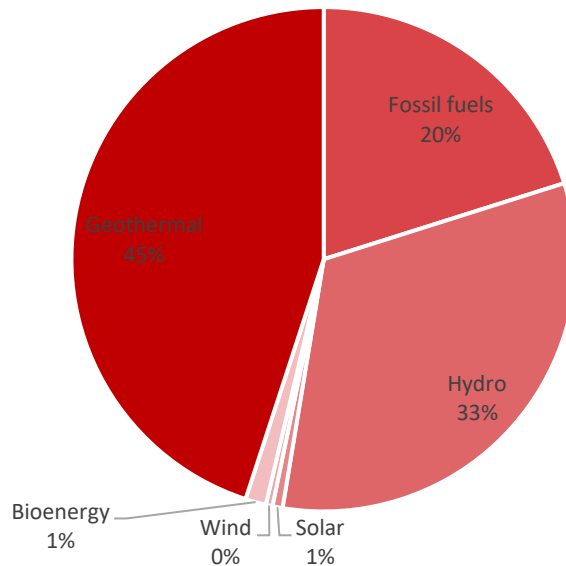


Figure 1. Electricity generation in Kenya (International Renewable Energy Agency, 2022a).

In Kenya, captive power has been increasingly widespread. Captive power refers to producing electricity at a low cost for inhouse consumption, often to decrease the electricity consumed from the grid. The Electricity Sector Association of Kenya (2023) projects the captive solar PV power generation to increase almost five-fold until 2030. There are three major types of captive power in Kenya: solar PV, bio energy and fossil fuels & heat recovery. Together these three types constitute almost 90% of the total captive power. Solar PV is the largest captive power generation type with an installed capacity of 123 MW (Electricity Sector Association of Kenya, 2023).

1.3 Miale Solar Inventions

Miale Solar Inventions Ltd, hereafter also referred to as Miale, is a Swedish founded captive solar power company. It is based in Kenya and run mostly by Kenyans. Their vision is to be a role model for the development of clean energy with positive environmental, social, and economic impact. The company strives to accomplish this through high quality solar PV systems for C&I entities in both rural and urban areas (Miale Solar Inventions, 2023). This vision is closely connected to Sustainable Development Goal 7 that deals with sustainable energy (United Nations, n.d.).

Miale was founded in 2016 and their work primarily focuses on designing solar power solutions, including procuring, installing, and maintaining them for C&I entities. Further, they offer different business and financing models to enable a green energy shift in Kenya and have an ambition to expand to other parts of Africa soon (Miale Solar Inventions, 2023). The case company will be further described in chapter 4.1.

1.4 Problem description

With climate change becoming an increasingly severe problem and energy transition being an important part of the solution (IPCC, 2022), the need to examine and optimize business models for renewable energy becomes apparent. With Africa possessing most of the best solar irradiation resources globally, and with economic growth expected to lead to an increase in the use of fossil fuels there is clearly a challenge that needs to be addressed (International Energy Agency, 2022). Miale's mission of providing clean energy with positive environmental, social, and economic impact can be a part of this solution, but for them to make an impact they need to be economically sustainable and reach as many customers as possible.

There is an eagerness to grow the business to reach more customers, however Miale feels that there might be a discrepancy in what the company offers and what the customer wants. The company perceives a need to get a more developed understanding of what the customer wants, what drives them to buy solar PV, and what they want included in the offer. Miale also perceives a need to understand what needs they already meet and what they need to focus on improving.

There has been extensive research conducted on the technical potential of solar PV in Africa and barriers and challenges with the market in Kenya. Further, there is also research on what policies should be implemented to overcome these barriers. There is some research on how companies can enhance their business models to better align with the needs of customers. However, these studies have primarily been focusing on furthering energy access, such as off-grid solar PV systems, for primarily small-scale end-consumers. The authors wanted to further the research for commercial consumers, specifically how to adapt the value proposition towards such customers.

To transition to sustainable, renewable energy, and use more of irradiation as a resource in Kenya, further diffusion is needed for solar power systems. In the commercial sector, this diffusion is dependent on what business models companies have and what value propositions they offer the market.

1.5 Purpose and research questions

The purpose is to increase the understanding of the commercial solar PV market in Kenya with regards to sellers and buyers of PV systems, in order to further the diffusion. A gap analysis will be conducted between what the customers want and what Miale offers and areas of improvement will be suggested.

The research questions investigated are:

RQ1: What do commercial customers want in a solar PV system offer?

RQ2: How does Miale's current value proposition align with commercial customers' needs?

RQ3: How can Miale adapt for an improved value proposition?

By answering these questions, the thesis will contribute to a better understanding of the Kenyan PV system market and in extension the Kenyan energy market and markets with similar characteristics. It is done by studying one case company in the PV system market, Miale Solar Inventions. The characteristics of Miale's offer will be studied as well as their customers' needs.

Miale will, with this thesis, gain a better oversight of the C&I customer segment, as well as how to satisfy the customer segment demands. This will contribute to them achieving their mission of providing sustainable solar energy solutions and contribute with environmental, social, and economic impact.

1.6 Focus and delimitations

The focus of this thesis will be on the Kenyan solar energy market, however the whole energy market in Kenya will need to be investigated to some extent to fully understand how the market works. As mentioned above, the purpose of the thesis will be reached with the help of one company within the industry, being Miale Solar Inventions.

The thesis will focus on the C&I customer segment, since this makes up the majority of Miale's current customer base. This means that neither domestic solar PV systems nor large solar power plants will be included in the study. The thesis will only examine the market for designing, selling, and installing PV systems for end users. It will not study the market for procuring and producing PV systems.

As mentioned earlier, the aim is not to change external factors that affects the market but to provide tools for Miale and similar companies to achieve their vision. These external factors are for example regulation or policy change and societal or

technological factors. Although, these factors are taken into account when considering the market, no suggestions will be made on how to change these.

The terms energy and electricity are sometimes used interchangeably. However, the term energy includes electrical energy, or electricity. When referring to energy from solar power, this refers to energy in the form of electrical energy.

1.7 Target audience

This thesis has commercial stakeholders in the solar power industry in Kenya as the main target audience, more specifically companies installing solar power systems. The thesis also targets similar economies with similar setups and solar power potential such as other countries in East Africa. Furthermore, the secondary target audience is politicians aiming to design efficient and impactful legislation and regulations that affect this part of the market. Finally, the last target group is researchers and academia interested in the topic or who wish to conduct further studies on the topic.

1.8 Thesis outline

This thesis consists of 7 chapters. They are outlined and briefly described in Table 1.

Table 1. Outline of the chapters and their focus areas.

Chapter	Description
1. Introduction	The chapter introduces the background, the problem, the research questions, and the purpose. The market and the case company are presented as well as the focus and delimitations, the target audience, and the thesis outline.
2. Method	The chapter describes the research approach and method design including the phases: plan, design, prepare, collect, analyze, and share. The chapter also reflects on the quality of the research and the research ethics.
3. Theoretical frameworks	The chapter explains the underlying frameworks of the case study. The Business Model Canvas, the Value Proposition Canvas and theory of growing organizations are described.
4. Case study	The chapter further investigates the case company and the market that the case company acts on.
5. Results	The chapter presents the findings about the customer, the case company, and a gap analysis between the two. The findings on growth challenges are also presented.
6. Discussion	The chapter presents a discussion based on the research questions. Limitations and further research are also described.
7. Conclusion	The last chapter highlights key findings from the thesis.

2 Method

The method includes the research approach and design. This part describes the phases of the thesis process; plan, design, prepare, collect, analyze, and share. Quality of research is evaluated in addition to the research ethics being discussed.

2.1 Research approach and method design

When conducting a thesis, it is important to decide an appropriate research approach, meaning to conduct a study. The method chosen should depend on the purpose of the thesis, according to Höst, Regnell and Runeson (2006). A master thesis generally has one or more out of four types of purposes: descriptive, exploratory, explanatory, and problem solving.

A descriptive study aims to discover and describe how a phenomenon works. An exploratory study aims to get an in-depth understanding of how a phenomenon works. An explanatory study investigates cause and effect and look for explanations. A problem-solving study intends to discover a solution to an identified problem. For this master thesis the type of purpose is partly exploratory and partly problem solving since the aim is to get an in-depth understanding of what customers want and to suggest what the company should do (Höst et al., 2006).

To achieve this purpose a case study is a suitable method according to Blomkvist and Hallin (2015). A case study is when a study focuses on one or a few examples of a phenomenon to understand more about it, which is what this study aims to do. It makes it possible to explore new dimensions and can capture a more detailed perspective than if a smaller sample of data was collected on multiple cases. To be able to generalize the results to as great an extent as possible, the case study must be systematic (Blomkvist & Hallin, 2015).

Another method could be to conduct a quantitative market analysis by collecting data from both current and potential customers. This could be done through a survey and would enable a statistical analysis of the data, it would provide a better generality and potential cross-referencing of data. The authors opted for this method as well by sending a survey to all companies which Miale had been in contact with

over the last three years, but due to a low response rate (2 out of 100) the survey was excluded from the study. See 6.4 for further details.

A single case study can be of two different types; holistic or embedded, according to Yin (2018). A holistic case study examines one entity while an embedded examines several subunits of a larger entity. In this case, since no logical subunits can be identified the holistic single case study was used.

According to Yin (2018), a case study consists of six phases; plan, design, prepare, collect, analyze, and share. In the *plan* phase the research questions are identified, the case or cases to study are selected, and a theoretical framework is set. In the *design* phase the research method is set and what type of data that will be used is decided. During the *prepare* phase there is preparation for the data collection. In the *collect* phase the data is gathered through appropriate methods, and in the *analyze* phase the data is interpreted. In the final phase, the *share* phase, the findings are presented to the appropriate audience (Yin, 2018).

The phases of this study are inspired by Yin's method and can be seen in Figure 2 and will be further explained below, step by step. All the phases are parts of an iterative process but especially prepare, collect and analyze which is why their iterative approach is highlighted in Figure 2.

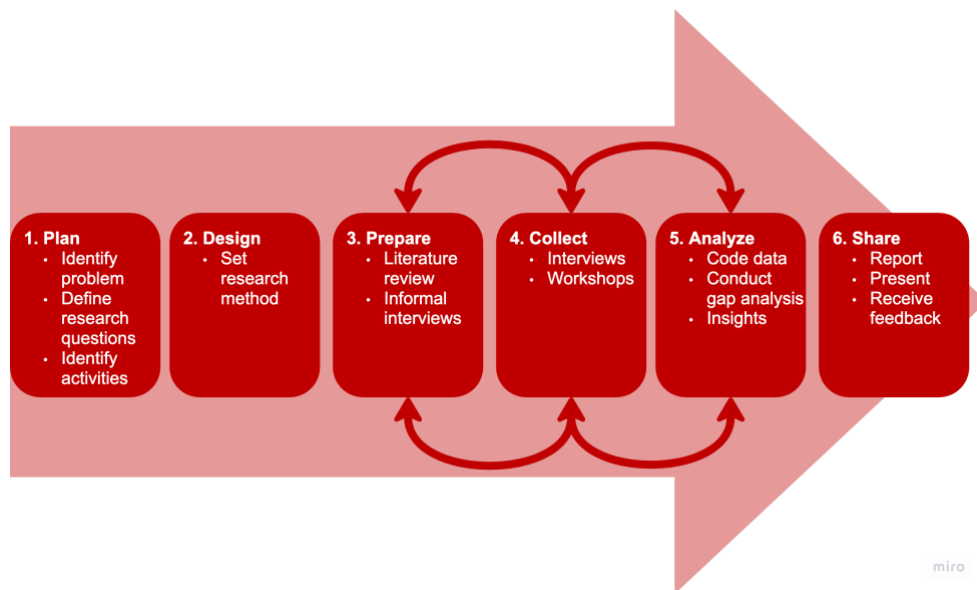


Figure 2. Master thesis' research strategy.

2.1.1 Plan

As both authors have specialized in business and innovation and possess a passion for sustainability and the energy sector, a project incorporating both parts was deemed preferable. Miale Solar Inventions is a solar energy company in a country where the solar resource is abundant. As the company was experiencing problems with getting more customers, the authors found this to be a fitting project.

The overall purpose was discussed and set as well as the problem description. Research questions were defined based on the purpose and problem. These parts were determined mainly together with Stephen Adwong'a, CEO, and Jonas Barman, director at Miale, in addition to Kajsa Ahlgren Ode and Lars Bengtsson, supervisor and examiner at LTH respectively. This part of the process was iterative as more knowledge of the subject as well as the case company was acquired.

As the phases of the thesis were decided on, the activities needed were identified and broken down into smaller parts, and a timeline was set as well as milestones identified (Höst et al., 2006). This too was iterative as the project progressed and new information and conditions were introduced.

2.1.2 Design

As the problem had been identified and the purpose and research questions defined, the research design was set. The case was further specified to be Miale Solar Inventions' value proposition to the C&I customer segment on the Kenyan energy market. To be able to answer the research questions, data needed to be collected about these three parts of the case.

It was decided that the research questions would be best answered by using the Value Proposition Canvas (Osterwalder et al., 2014), further explained under 3.2. The Value Proposition Canvas is a tool used to understand how to create value for a company's customers. This is done by identifying what the intended customer segment wants, needs, and fears. It helps in analyzing what is important to the customer segment as well as understanding what the company offers that satisfies these customer needs. By identifying what the customers want the first research question can be answered, and by identifying what the company offers as well as comparing that with what the customer wants the second question can be answered. By identifying improvement areas to better fulfill and address what the customer needs and wants, the third question can be answered. According to Osterwalder et al. (2014) the value proposition canvas is a good tool to conduct this type of gap analysis.

The Business Model Canvas (Osterwalder & Pigneur, 2010) was also used to gain an overview of how Miale works and how they create value. It is also beneficial with an understanding of the Business Model Canvas in order to understand where the Value Proposition Canvas stems from, see 3.1 for further explanation.

There are two types of data: qualitative and quantitative (Höst et al., 2006). Qualitative data is composed of words, descriptions, perspectives, and nuances. It needs to be analyzed based on sorting and categorizing. Quantitative data is composed of data that can be counted such as numbers, shares, weights etc. This type of data can be analyzed statistically. In this case study the focus is on gathering qualitative data because it provides a way of getting more detailed and contextual understanding (Blomkvist & Hallin, 2015). The data in this case is made up of needs, wants, and offers and this is mainly words and descriptions, so the data gathered is qualitative.

2.1.3 Prepare

With the intention of conducting interviews and workshops in the collection phase, initial understanding of the specified market and market segment was needed. It was also needed in order to better understand what motivates customers to invest in solar power. This was achieved by conducting a literature study as well as having meetings with players in the industry. As the thesis process progressed and more information came to light, a need to return to this step arose.

The literature review was based on a three-step process described by Höst et al. (2006). The first step was to do a broad search, the second to evaluate and choose, and the third to do a deep search, see Figure 3. The broad search started with an initial brainstorming of keywords. These were then searched for on the LUBsearch database and Google Scholar. Some of the initial keywords were Kenya energy market, solar power Kenya and solar PV Kenya. This was to gain an overview of the electricity market in Kenya. Relevant articles were singled out based on the abstract and the list was narrowed down, and relevant information was used. As more knowledge on the subject was gained based on the evaluated and chosen sources, deep searches were conducted on discovered relevant concepts. A deep search means that specific keywords or concepts were followed up. During the duration of the study, more information was gathered in informal meetings and interviews and further literature review were conducted based on new information.

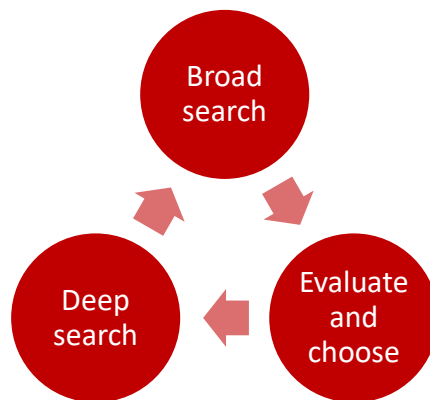


Figure 3. Overview of literature review process.

The literature review also included gathering sources regarding the theoretical framework used, meaning mainly the Value Proposition Canvas. This framework then provided a structure for the collection of data as well as the analysis. See 3.2.

2.1.4 Collect

The collection phase consisted of in person interviews as well as workshops. The in-person interviews took place in and around Nairobi, Kenya. The method of conducting interviews was considered the best way to get an in-depth understanding of customers' needs, wants and fears as well as Miale's perception of the same matter. There are three types of interviews according to Höst et al. (2006). The three types are open directed interview, semi-structured interview, and structured interview. An open directed interview lets the interviewee steer the conversation, and the interviewer asks follow-up questions and makes sure the interviewee stays on subject. A semi-structured interview has a preset of questions, but there is the possibility to change the order and wording based on the situation. A structured interview is an oral survey, where all the questions are preset and there is no room for flexibility (Höst et al., 2006).

Since the purpose of the thesis is exploratory, the semi-structured interview was chosen. This allowed for some flexibility and follow-up questions while still getting answers on the intended topics. The collection process involved several steps, including the development of interview guides, scheduling and conducting interviews, as well as preparing and facilitating workshops.

The aim of the interviews was to gather information about what affected solar investing choices, as well as to gain a deeper understanding of what Miale offered to the market segment. The interviews consisted of a short introduction for the interviewee to understand the purpose and the subject of the interview. Then some

questions were asked to get the interviewee to feel comfortable and get the conversation started. After this the main part of the interview was conducted and lastly a short conclusion. This structure was inspired by Höst et al. (2006).

The main part consisted of questions about solar PV and motives to investing in this, questions about Miale as a supplier when applicable, about financing options and about battery energy storage. The customer interviews and internal interviews were structured in the same way with only minor differences to the wordings to suit the interviewee. These questions were based on an initial literature review as well as informal meetings with stakeholders. The authors brainstormed questions, iterated based on what the literature suggested might be important to customers, and iterated again based on suggestions from Miale.

The interviews were held with Miale's current customers as well as employees at Miale. Early on in the project, the aim was to interview potential and missed customers as well, but due to difficulties in getting these companies to agree to be interviewed, it had to be disregarded. In order to encompass all financing options offered by Miale and include various types of companies within the C&I market, the interviewees within the customer group were carefully selected. These companies include agricultural, water services, and industrial companies. The interviewees working at Miale were chosen based on how much they interact with customers, more interaction was deemed more relevant. A list of these interviewees, as well as the interview guides, can be found in Appendix A.

The data gathering process was iterative and after having conducted the internal interviews, the collected data suggested there might be other challenges for the company than the value proposition. A discussion topic was therefore added to the workshops concerning generic challenges faced in a growing organization. This discussion and challenges were based on Greiner's article "Evolution and Revolution as Organisations Grow" (1998), see section 3.3.

As a last step to the data collection two workshops were conducted with the case company. This happened in two iterations, the first being an in-person workshop with employees and one director, and the second being a smaller version online with two of the company's directors. An early version of the customer profile was shown to the participants and the participants shared their view on Miale's value map. They then shared and discussed the gaps and what stood out for them. A discussion about other challenges also took place as previously mentioned. Participants in the workshops and material can be found in Appendix B.

2.1.5 Analyze

The collected data was analyzed mainly based on the Value Proposition Canvas by Osterwalder et al (2014). The data from the interviews with customers in the C&I segment were coded into themes and divided according to the three different parts of the Customer Profile-side of the Value Proposition Canvas. These three parts are customer jobs, pains, and gains. Similarly, the data from the interviews with employees at Miale as well as the workshops was coded into themes and divided into the three different parts of the Value Proposition-side of the Value Proposition Canvas. These parts are products and services, pain relievers and gain creators. See 3.2 for further elaboration.

After the coding of the interviews and the aggregation of the interviews and workshops, a gap analysis was conducted based on the results. The customer jobs were connected to the products and services, the gains matched with corresponding gain creators and pains connected with pain relievers. If there was no clear match identified between themes in the customer profile and value map it was elaborated on whether it can be addressed by Miale and how important it is.

A perceived customer profile was created based on interviews and workshops with Miale's staff. This perceived customer profile was then compared with the identified customer profile from the interviews with customers.

The data from the workshops regarding growth challenges was also coded into themes and a list of identified improvement areas was created. This was based on discussions held in the workshops.

The coded and analyzed data as well as the literature review served as the basis for the discussion by the authors on what customers want, what Miale offers, and how to improve Miale's offer to the chosen customer segment. A discussion was also conducted around growth challenges for Miale as a company. Conclusions were made based on the data gathered and the discussion.

2.1.6 Share

The last phase of the thesis process is the finalization of the report as well as a presentation. This includes a discussion of the results and conclusions. The report is critically reviewed in order to ensure as high a quality as possible, which is done by peer review as well as reviews from other concerned parties such as supervisor, examiner and company representatives. The report is revised based on this feedback.

2.2 Quality of research

To ensure the quality of the research, three aspects should be considered according to Höst et al. (2006). These three aspects are reliability, validity, and representativeness. They will be analyzed one by one based on the definitions by Höst et al. (2006) and Blomkvist and Hallin (2015).

Reliability of the research refers to the trustworthiness in the data collection and the analysis of the data. The reliability can be ensured by being thorough in the collection of data and the analysis. It is important to study the data in a logical way (Blomkvist & Hallin, 2015; Höst et al., 2006). To assure reliability multiple customers were interviewed with different backgrounds from different industries and several people at Miale were interviewed to obtain different perspectives of the meeting with the client and the offer. The authors reached out to all of Miale's current customers and managed to cover these diversities. To make sure there is reliability the method is clearly explained for the reader to be able to review the thesis. Since the results and analysis are qualitative, these are interpretations by the authors and therefore they are described thoroughly for the reader to be able to make their own interpretations.

The *validity* of the research determines if it studies what it intends to study (Blomkvist & Hallin, 2015; Höst et al., 2006). In this case the goal is to understand the C&I customer segment and the offer Miale has and whether it is a good fit or if there are areas of improvement. To ensure that this is what is being studied the specified customer segment and Miale was interviewed. Efforts were also made to make sure the researchers did not impose their own biases on the data collection or the data analysis.

Representativeness refers to the conclusions that can be drawn from the analysis and the results and that they are general enough to be applicable to a broader context (Höst et al., 2006). In this specific research it is important to consider the limitations of the conclusions since the study examines Miale as the only company. But the aim is for other companies with similar offers to the market segment to learn and grow from the results. The limited number of interviewees, especially in the market segment, decreases the representativeness. The focus on one market segment on one market also affects the general conclusions applicability to other cases.

2.3 Research ethics

When conducting this study, ethics was considered in the sense of the integrity of the studied subjects and the data collected as well as bias in the sense of the

researchers' preconceptions, as suggested by Blomkvist and Hallin (2015). To ensure there has been no bias, all sources have been stated and the method of the study described to keep transparency and make it possible to evaluate the study. Efforts have been made by continuous discussions with the supervisor about the method of data collection, the data collected, and the results deduced.

According to Swedish research standards, there are four requirements regarding integrity (Blomkvist & Hallin, 2015). The first one is the information requirement which states that the subjects in the study must be informed of the purpose of the study. The second one is consent which refers to the subjects' consent in being studied, or in this case interviewed. The third one is confidentiality which means the data collected must be confidential. And the fourth one concerns the use of the material, and it states that the material gathered for this study can only be used for the previously stated purpose. To ensure these four requirements, the interviewees have been informed of the purpose of the thesis and asked for consent. The case company has taken part of the report to make sure no confidential material has been shared and the data collected has been used for the purpose stated.

Another ethical aspect considered in the study was cultural differences. There might be subjects which are considered neutral in the Swedish culture but not in the Kenyan. Or there might be preconceptions that causes communication problems. The authors tried to take this into account and, when conducting interviews, made sure to receive feedback from the Kenyan perspective before finalizing the interview guide.

3 Theoretical frameworks

In this chapter the theoretical models used are introduced and explained. The Business Model Canvas is thoroughly described as well as the Value Proposition Canvas. There is also a section on growing organizations.

3.1 Business Model Canvas

A business model, according to Osterwalder and Pigneur (2010), describes how an organization creates, delivers, and captures value. The Business Model Canvas is a template used to get an overview of a company's business model, see Figure 4. The model is a visual tool, and Osterwalder and Pigneur (2010) argued that this makes it more accessible. It simplifies a complex topic into something easier. The model can be used on an entire company or business units and can be used as a starting point or together with other tools. When interviewed, Osterwalder also argued that a company should not spend too long on a Business Model Canvas but rather get out and try it (Euchner, 2019).

The Business Model Canvas has some limitations, as any model trying to explain reality. The model is a simplified version of a complex reality, as stated by Osterwalder in an interview, and competition is not considered (Euchner, 2019). The end-customer is not necessarily taken into account, and the market with its environment as well as legal frameworks are not considered. With the model it is also hard to understand the vision of the company (Becker & Bröcker, 2021). However, Becker and Bröcker (2021) also stated that it is a simple, quick, and clear documentation of a business model.

The canvas is divided into nine parts, or building blocks, that cover the company's offerings, customer interface, organizational structure, and financial viability (Osterwalder & Pigneur, 2010). The following descriptions are based on Osterwalder and Pigneur's (2010) framework.

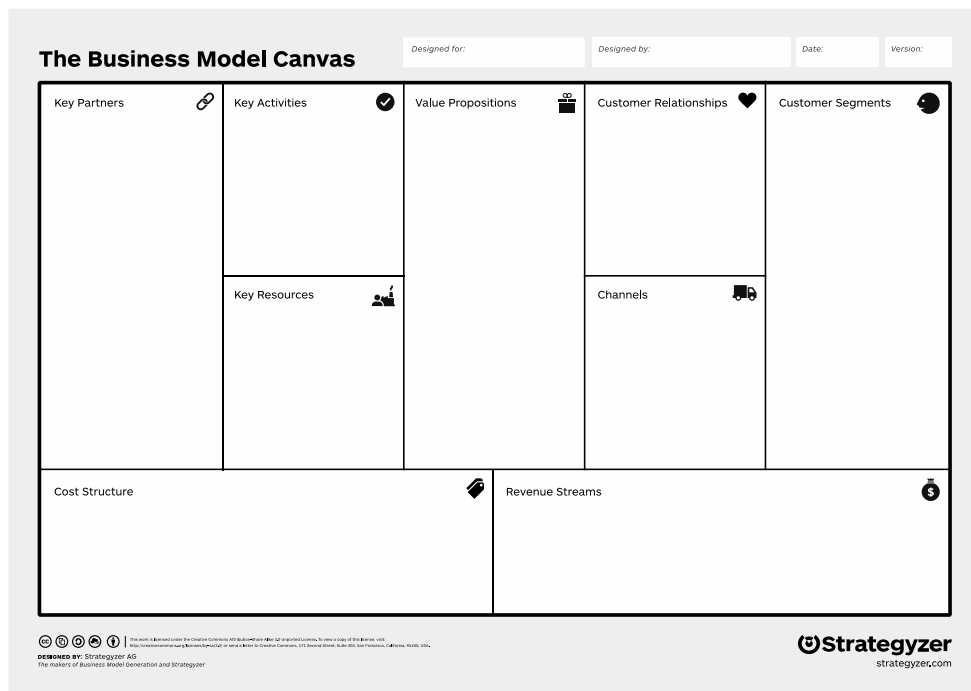


Figure 4. The Business Model Canvas (Strategyzer, n.d.a).

One building block is *Customer Segments*. This defines who the company is trying to reach and to serve. It describes the groups of people or organizations the company is trying to create value for, what needs they have, and what behaviors they have. When a strong understanding of the customer needs has been gained, a business model can be designed around this.

Another building block is the *Value Propositions* that describes the products or services the company offers to the chosen customer segment. These can be combined into bundles to fit the needs or solve the problems of the customer. It is about the value delivered to the customer.

The next building block is *Channels*, and this describes the communication method the company has with its customer segments. It describes how the company reaches the intended customers through sales, distribution, and communication.

Customer Relationships is another building block. It refers to the types of relationships the company has with the customers. Relationships can come in different shapes and can be personal or automated based on the fit with the customer segment, meaning what the customer segment wants.

Another building block is the *Revenue Streams*. This describes the most important revenue generations created by the company. It answers questions about what

different revenue streams contribute to the overall revenues, how customers are paying, and how much.

The next building block is *Key Resources*, and this describes the most important assets needed to make the business model work. These are physical, financial, intellectual, or human resources that allow the company to create and offer value to their customers.

Key Activities is another block that describes the most important activities the company must perform for the business to operate successfully. These activities can be production related, problem solving related, or they can be platform or networks related. This depends on what company it is and what the business model is.

The next building block is *Key Partners*. This refers to the network of partners and suppliers that make the business model work. These can be of different characteristics depending on the type and motivation of the partnership. Some examples of types are strategic alliances, cooperation, joint ventures, and buyer-supplier relationships.

The last block is *Cost Structure*, and this describes all the costs a company has related to the business model. Costs should be minimized no matter what business model is chosen but there are two main types of cost structures: cost-driven and value-driven. The building block should describe fixed costs, variable costs, economies of scale and economies of scope.

3.2 Value Proposition Canvas

A Business Model Canvas is used to visualize how to create value for a business while a Value Proposition Canvas is a tool to create value for customers according to Osterwalder et al. (2014). The Value Proposition Canvas focuses on the building blocks customer segment and value proposition from the Business Model Canvas. It is used to understand how to create value or how value already is being created for the customer segment and to highlight what can be improved (Osterwalder et al., 2014; Strategyzer, 2017).

There are limitations with this model and some mistakes are easy to make. According to Garner (2015) one common mistake is that people struggle to differ between pains, gains, and customer jobs. Another mistake is mixing several customer segments into one canvas. Different customer segments will have nuances to their jobs, pains, and gains. However, if these mistakes are avoided, it is a valuable tool.

The Value Proposition Canvas is made up of two sides, where one is the *Customer Profile* and the other is the *Value Map*, also called *Value Proposition*, see Figure 5.

The goal is to achieve fit between the two different sides (Osterwalder et al., 2014; Strategyzer, 2017). The following descriptions are based on the theory by Osterwalder et al. (2014) and Strategyzer (2017).

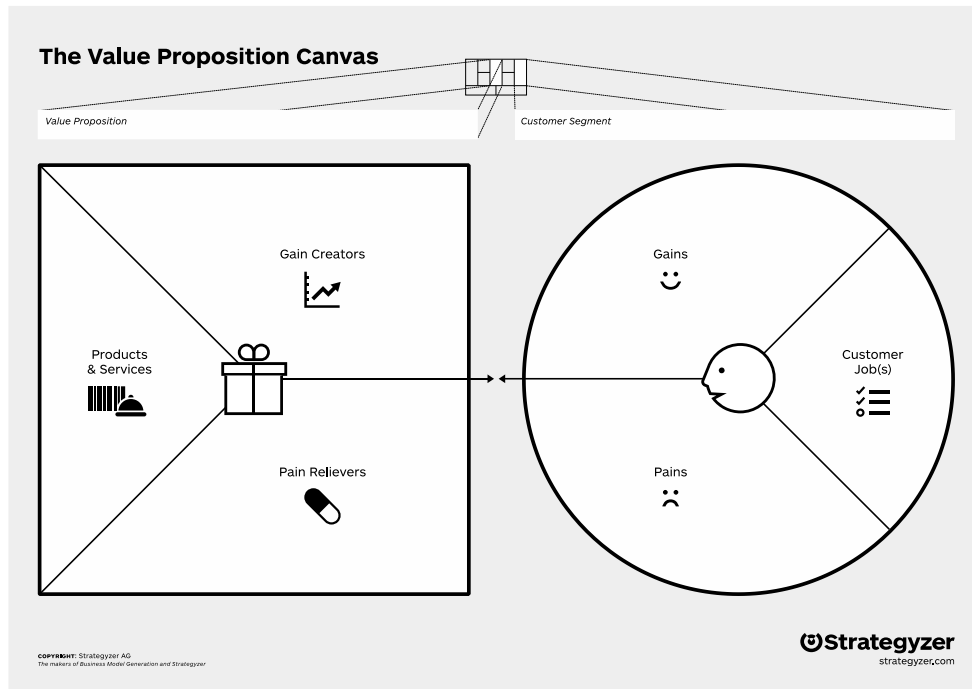


Figure 5. The Value Proposition Canvas (Strategyzer, n.d.b).

The *Customer Profile* describes the chosen customer segment by detailing three parts: *Customer Jobs*, *Pains*, and *Gains*. The customer profile is used to visualize and understand what is important to the customer segment. When creating a *Customer Profile* one customer segment at a time is profiled and the purpose is to understand what the customer needs, wants, and worries about.

The *Customer Jobs* describes what the customers are trying to get done. These jobs can be functional, social, emotional, or supporting jobs. Functional jobs are specific tasks or specific problems that the customer needs to solve. Social jobs are related to how customers want to be perceived by others. Emotional jobs are feelings the customer is trying to achieve. Supporting jobs can be jobs related to buying value, cocreating value or transfer of value.

Customer *Pains* describe what risks the customer sees, what annoys them before, during or after getting a job done, or prevents them from getting a job done. Pains include undesired outcomes, problems, and characteristics, it includes obstacles, and it includes risks. Pains can also be functional, social, or emotional.

The customer *Gains* describes what benefits or outcomes the customer wants. These could be required gains that are absolutely necessary for the product or service to work. These could also be expected gains, and the solution could work without them, but they are expected. Then there are gains that are desired, which are nice to have. Lastly, there are unexpected gains that go beyond the required, expected, and desired gains that the customer did not know they wanted.

In contrast to the Customer Profile the *Value Map* is a visualization that describes the features of a specific value proposition in a structured and detailed way. It is divided into three parts: *Products and Services*, *Gain Creators*, and *Pain Relievers*. The Value Map is used to address the Customer Profile or identify what is addressed and what is not. Not all customer pains and gains need to be addressed since some are more important than others.

Products and Services are what is offered to the customer. It is the bundle of products and services that help the customers complete their jobs or help them satisfy needs. These products and services can be tangible goods, intangible products, digital products, or financial products.

The second part is *Pain Relievers*. These describe how products and services help mitigate customer pains. They outline how to eliminate or reduce their undesired outcomes, problems, obstacles, or risks. It is important to focus on the pains that are most important to the customer to create the most value for them.

Gain Creators address the gains the customers get from products and services. They describe how to produce outcomes or benefits that customers require, expect, desire or are surprised by. It is vital to differentiate between what is essential to the customer and what is only nice to have. Again, this is to create the most value for the customers.

3.3 Growing organizations

The Harvard Business Review article *Evolution and Revolution as Organisations Grow* by Greiner (1998), which was first published in 1972, is a classic in academia in the area of organizational growth. Greiner (1998) presented a model for understanding challenges for companies in different stages of their growth. The model consists of consecutive stages of evolution and revolution. In the evolution phase the company grows at a steady pace and at some point, there arises a need for more dramatic changes to enable further growth called revolution. During this time of crisis some companies fall short and ceases to exist.

Since the publication of *Evolution and Revolution as Organisations Grow*, there have been multiple articles published regarding organizations' life cycle. There has

been criticism raised claiming Greiner's model is not fully suited for small enterprises, by for example Adriani et al. (2014). However, several models published since have been based on Greiner's theories (Churchill & Lewis, 1983; Scott & Bruce, 1987). They all acknowledge the importance of Greiner's (1998) model and use it as the blueprint for expanding their own theories and models.

THE FIVE PHASES OF GROWTH

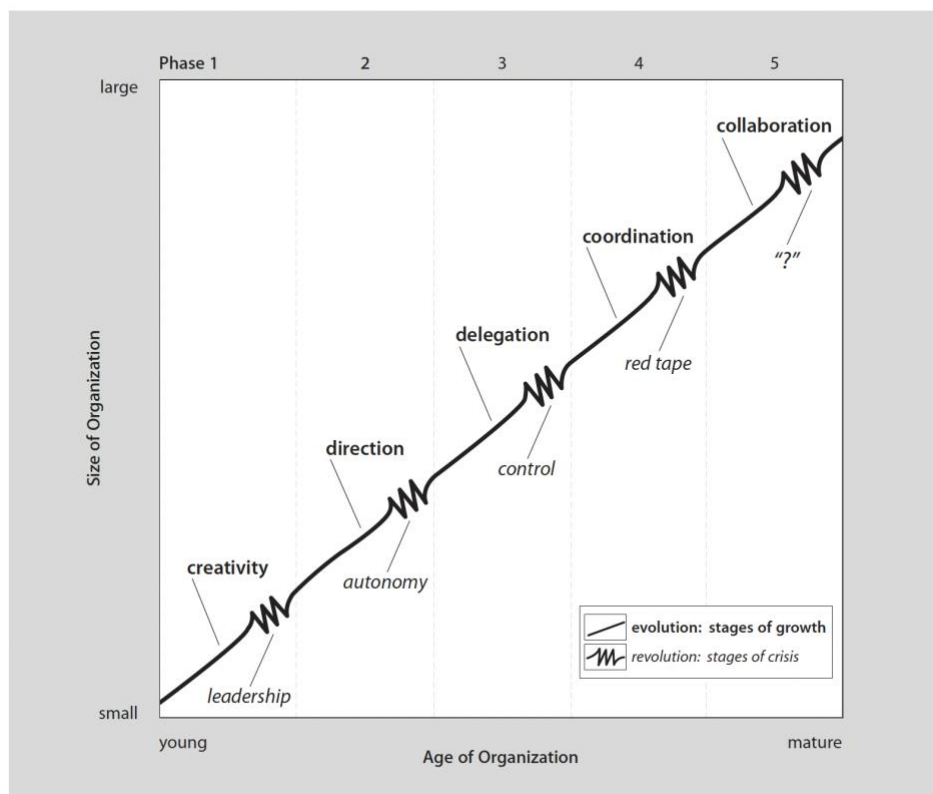


Figure 6. The five phases of growth (Greiner, 1998).

The following descriptions are based on Greiner's theory and model that can be seen in Figure 6 (Greiner, 1998).

The first phase, *creativity*, is the birth stage of an organization where individualistic and creative activities are essential for the company to take off. This period ends in a stage of crisis, the *leadership* revolution, where the informal managerial practices become unfit for purpose and a strong manager is necessary.

With a strong manager in place, the organization can move into the *direction* phase of evolution. A functional organization is often created as business units become

more specialized. More formal monitoring systems and procedures are adopted. Eventually, the *autonomy* crisis is faced as the need for delegation grows larger.

The *delegation* segment puts emphasis on the responsibility of the managers of different business units. Top-level management shifts focus to acquiring outside companies and expertise to grow the company. Eventually the crisis of *control* emerges where top management seeks to regain control of the different business units.

A *coordination* stage comes next when separated business units get merged into different groups. New administrative personnel are hired to continuously evaluate the different business units where the primary key performance indicator is return on investment. Some functions in the company are centralized, such as technical functions. These changes make the staff lose confidence in each other resulting in the *red tape* revolution. It is characterized by the organization having become too large and complex to be managed in the formal way.

The last of the five phases is the *collaboration* phase. Problem solving rather than formal processes is now the focus. Matrix organizations, real-time reporting, education of staff with frequent conferences addressing major issues and financial rewards for team performances are examples of areas which are further developed.

4 Case study

In this chapter the case company will be presented in depth including an introductory description, their business model canvas, a description of their clients, financing options, and Miale's work process. The Kenyan market the case company acts on will be described including Kenya's energy vision, electricity grid players, electricity costs, legislation, grid reliability, and the case company's competition.

4.1 Miale Solar Inventions

The information regarding Miale in this section has been gathered through interviews and informal meetings with Miale's portfolio development manager Kevin Ooro, the CEO Stephen Adwong'a and the chair of the board of directors Jonas Barman.

4.1.1 Company description

Miale initially had a different business plan than it currently does. The aim was to become an Independent Power Producer (IPP) and build large scale solar power plants. However, they encountered numerous challenges related to corruption, which ultimately led to a change in the business model. With their current mission they gained their first customer and first employee in 2020. They have been growing quickly since then and are now 22 employees consisting of engineers, technicians, purchaser, accountants, and a CEO. They have been in the start-up phase and are currently moving into becoming a scale-up. To date, Miale has 19 finished projects

with 1,8 MWp³ installed capacity which is equivalent to more than 3600 installed solar panels. Their current goal is to grow their installed capacity to 6 MWp in 2023.

4.1.2 Business Model Canvas for Miale

To get a better understanding of Miale's business, an overview is given with the help of a Business Model Canvas (Osterwalder & Pigneur, 2010), see Figure 7. This Business Model Canvas was created by the authors based on information gathered in informal meetings and is considered background information. The different building blocks are described as follows:

- *Customer segment* - The customer segment Miale is targeting are C&I companies with a steady and predictable energy consumption.
- *Value proposition* - They are offering this customer segment a value proposition of solar energy. This provides reliable and sustainable energy and makes it possible for companies to cut electricity costs. They are offering several financing options as well as a long-term service agreement.
- *Channels* - The channels they are mainly using are direct contact and a website.
- *Customer relationships* - The relationships are mostly personal where there is regular contact. Most customer contact is handled by the CEO.
- *Key activities* - The key activities for the company are lead generation, an initial feasibility study, the designing of PV systems, procurement of quality components, construction, and installation as well as the after-sales services in the form of service and maintenance.
- *Key resources* - The key resources are the CEO of the company, the highly skilled engineers and technicians, the stock they keep and equity. The CEO is a key resource because of the small size of the company and the responsibility he takes on.
- *Key partners* - Key partners to the company are the components supplier, angel investors, European experts, and I&M Bank. The European experts are important to ensure quality installations. For an explanation of the I&M Bank partnership, see 4.1.4.

³ MWp is Mega Watt peak and refers to the maximum theoretical installed generation capacity at optimal conditions.

- *Revenue streams* - The company's primary revenue streams consist of three financing options: direct purchase, leasing, and power purchase agreement. Additionally, they generate revenue by providing service agreements. See 4.1.4 for a closer description of the financing options.
- *Cost structure* - The main costs the company incurs are procurement, construction, and installation costs. Labor is a minor cost for Miale.

The Business Model Canvas

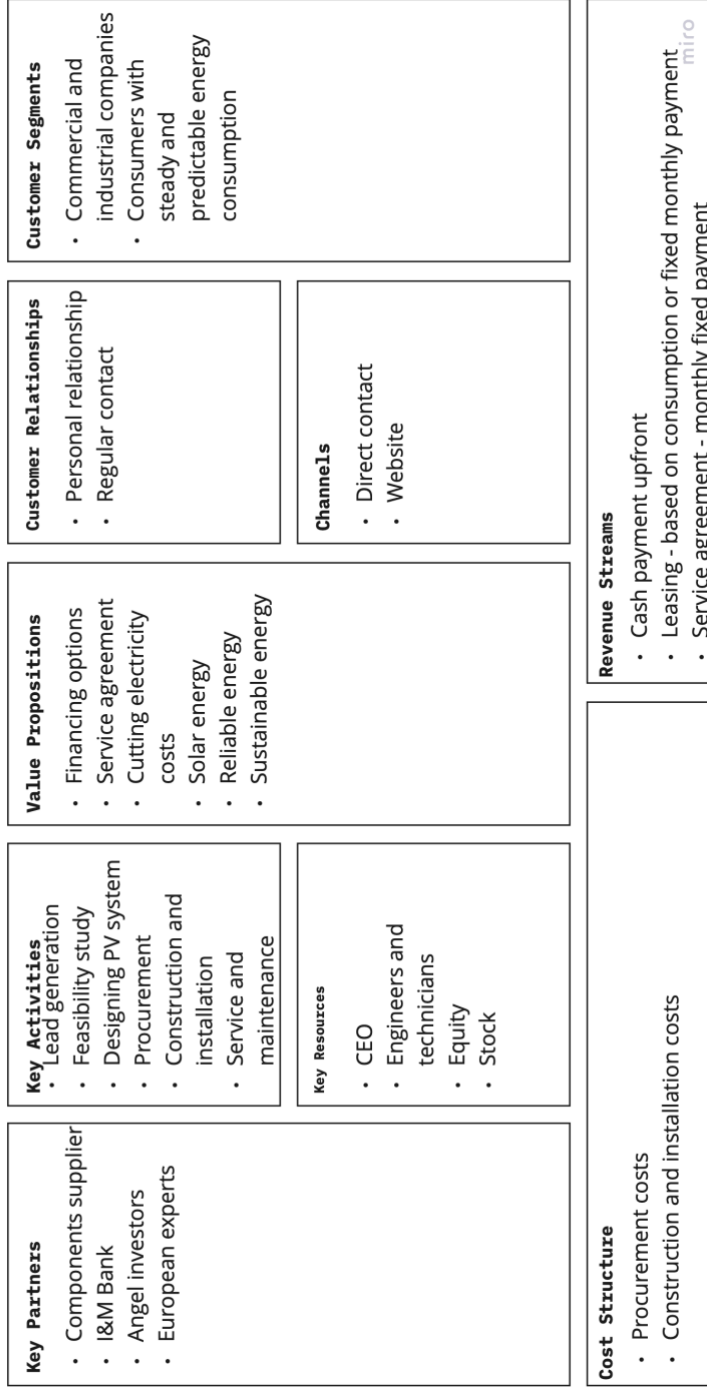


Figure 7. Miale's business model canvas.

4.1.3 Customers

In March 2023, Miale had 13 clients with an average of 134 kWp in installed capacity per client. Most customers are active in agriculture which primarily uses solar PV for water pumping. In fact, the agricultural customers, together with water and sanitation customers, are primarily using the electricity produced to drive water pumps. Water pumping therefore makes up 75% of the total installed capacity. As a point of reference, according to the World Bank (2021) the agriculture, forestry and fishing made up 22,43% of the Kenyan GDP in 2021 making it one of the largest industries. Most of Miale's customers who are connected to the grid only get a portion of their energy supply from the solar panels, and the rest they buy from the grid.

4.1.4 Financing options

Up until now, Miale has offered three different financing options to their clients: power purchase agreement, lease to own, and direct purchase. In the power purchase agreement, the client has no upfront payment but commits to leasing the solar PV system and the payment is based on the actual electricity consumption. With the second financing option, there aren't any upfront costs either, but it is a fixed monthly fee. At the end of the tenure for both option one and two, the ownership of the solar PV system is transferred from Miale to the client. Finally, for direct purchase all is paid up front and ownership is transferred from day one. Hence, all three options end with the customer owning the PV system.

What has made power purchase agreement and lease to own possible has been angel investors from Sweden as well as equity from the company's owners. However, this is in the process of changing. Miale has entered into an agreement with I&M, a local Kenyan bank. The bank offers beneficial financing terms for impact investments such as solar power installations. Although not all terms were disclosed to the authors, the understanding was that I&M provided a lower interest rate than the other financing options Miale offers. The asset transfer would also be immediate. The difference would affect customers who prefer a monthly payment and would result in the customers paying the bank every month instead of Miale. See Figure 8. Miale's current and future financing options. Figure 8 for an overview of all financing options.

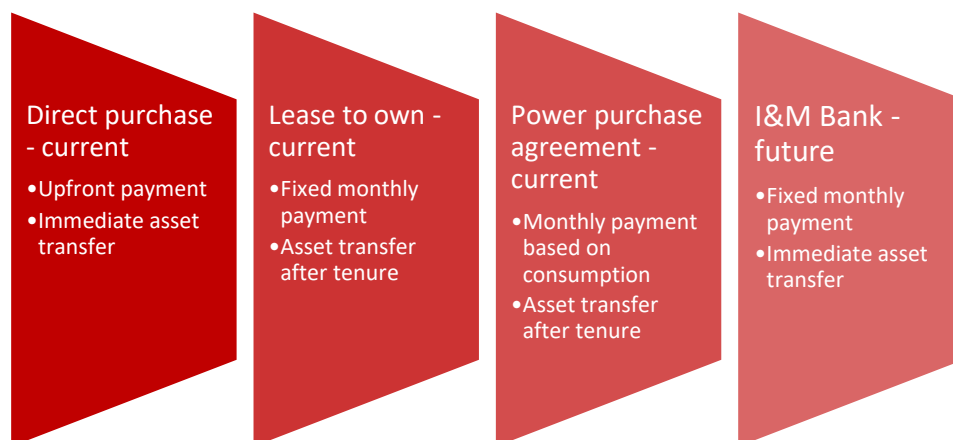


Figure 8. Miale's current and future financing options.

4.1.5 The Miale process

The Miale process can be split into six steps: lead generation, feasibility study, financing and contract signing, execution, maintenance, and asset transfer, see Figure 9. All steps currently involve the CEO. Lead generation is when Miale finds a potential customer which happens through the sales team, referrals, or agents. This is their initial contact with the customer where they try to sell their idea. The next step is a feasibility study, where Miale comes up with a proposal for the potential client depending on the technical and financial feasibility. Then comes the financing and contract signing, where it is decided what kind of financing the customer will have and the contract is signed.

After everything is signed, Miale goes into the execution phase. They design the system for the client, they procure the materials and parts needed, and import what they need. They schedule the work and then they implement and install the solar PV system. The last step in the execution phase is to get the panels up and running and commissioning them so the customer can start utilizing them.

The last steps of the process are maintenance and asset transfer. Miale sets up a maintenance agreement that lasts for 20 years, with preventive maintenance every 6 months. After the financing ends, if it is a power purchase agreement or a lease to own setup, the ownership of the solar PV system is transferred to the customer. After the 20 years of maintenance, a new maintenance agreement is drawn up between the customer and Miale.



Figure 9. Miale's process from lead generation to asset transfer.

4.2 Market

In order to gain a better understanding of the case company and the motivations of its customers, the Kenyan market is investigated and described.

4.2.1 Kenya's energy vision

The Kenyan government has adopted a long-term development plan to transform the country, called Vision 2030 (Kenya Vision 2030, 2022). According to the plan the energy sector is a key enabler for development. The goal is to accelerate development of renewable energy sources including solar. This is in line with UN's sustainable development goal 7 (United Nations, n.d.). Currently, there have been limited initiatives to promote solar adoption in the commercial sector (Kenya Vision 2030, 2022). However, there is a possibility that more projects will be undertaken in the future.

There is also a National Energy Policy written by the Ministry of Energy (2018) where the objective is to "ensure affordable, competitive, sustainable and reliable supply of energy". In this policy the government acknowledges the potential of solar power. However, they also highlight the high upfront capital cost for power plant construction and equipment, lack of policy, lack of standards and regulations as well as a high risk of theft. They also recognize a lack of awareness of the potential, opportunities and economic benefits that could be gained by installing solar power (Ministry of Energy, 2018). Awareness of these issues might lead to political action and legislation in the future.

4.2.2 Electricity grid players

The grid electricity market in Kenya is characterized by four major players:

- Kenya Electricity Generation Company PLC (KenGen)
- Kenya Power (formerly named KPLC, Kenya Power and Lighting Company)

- Kenya Transmission Company Ltd (KETRACO)
- Energy and Petroleum Regulatory Authority (EPRA)

KenGen is the main electricity producer, KETRACO is the transmission system operator (TSO), Kenya Power is responsible for the last mile connectivity, and EPRA, among other tasks, sets the electricity prices. Both Kenya Power and KenGen are public companies, where the Kenyan state owns 50.1% and 70% of the companies respectively (Kenya Power, n.d.b; Kenya Electricity Generation Company PLC, n.d.b; Kenya Transmission Company Limited, n.d.; Energy & Petroleum Regulatory Authority, 2019). In 2020, 71% of the population had access to electricity according to the International Renewable Energy Agency (2022a).

The electricity generated by KenGen is mainly coming from geothermal and hydropower, 42% and 43% of KenGen's total production respectively (Kenya Electricity Generation Company PLC, n.d.a). There is an estimated potential of more than 10 000 MW for geothermal in Kenya according to the Ministry of Energy (2018). Hydropower is also a good alternative for the baseload, and there is potential for growth in Kenya, estimated at 9 000 MW (Ministry of Energy, 2018). Although hydropower is heavily influenced by climate and weather changes and are therefore hard to rely on (Takase et al., 2021).

Thus, Kenya's electricity production is predominantly derived from renewable sources. However, during peak demand hours, the electricity sources connected to the grid are not generating enough energy. To meet the demand, fossil fuels are used to supply the remaining energy generation, leading to increased pollution and increased grid prices (Kwame, 2020).

4.2.3 Cost of electricity

According to Kenyan law, EPRA sets the electricity prices to all end users. They do so through a system of tariffs based on the entity's monthly consumption. The tariff consists of eight different parts, where consumption is the majority but fuel cost surcharge, forex adjustment, inflation adjustment and different governmental surcharges are all part of the electricity tariff. For commercial consumers, there are different rates for peak and off-peak consumption, where peak is more expensive. Furthermore, for large commercial consumers there is a demand charge based on their maximum consumption during a month (Kenya Power, n.d.a; Energy & Petroleum Regulatory Authority, 2023).

A major challenge for solar PV, suggested by George et al. (2019) is the high initial investment. Despite the upfront investment, solar PV is becoming increasingly

competitive and the world average LCOE⁴ of solar PV has decreased from 0.417 USD/kWh in 2010 to 0.048 USD/kWh in 2021, which is 11% less than the cheapest fossil-based option (International Renewable Energy Agency, 2022b). In December 2021, the grid electricity prices in Kenya were the third highest in all of Africa at 0.21 USD/kWh, only surpassed by Cap Verde and Rwanda (Statista, 2023).

One factor for the high prices is the KES (Kenyan Shilling) to USD exchange rate which has increased by more than 30% from 101 KES/USD first of April 2019 to 132 KES/USD the 31 of March 2023 (Central Bank of Kenya, 2023). This affects Kenya Power's costs as the financing for investments generally is made in USD or EUR (Kenya Power, 2022). The power purchase agreements from KenGen and IPPs to Kenya Power are also predominately in USD according to Mutua (2022). It was also found by the Presidential taskforce that the high cost of electricity is associated with the forex adjustments in the power purchase agreements (Ngumi et al., 2021).

Another factor for the high electricity prices are the IPP contracts. In addition to KenGen, there are IPPs who supply Kenya Power with electricity. The remuneration is however skewed where the IPPs supply 25% of the power to Kenya Power but they account for 47% of the cost of electricity for Kenya Power (Ngumi et al., 2021).

4.2.4 Legislation

The legislative landscape of the market affects the players acting on it. According to Boamah (2019) Corruption in the electricity market in Kenya is a growing issue as the need for electricity grows. To address the issue there has been several changes to policy over the years by division of duties between Kenya Power, KenGen, KETRACO, and EPRA. A reoccurring theme is to end the monopoly of Kenya Power and its major issues with corruption (Danflow, 2023; Odhiambo, 2022; Kamau, 2021; Ngumi et al., 2021). Another obstacle is that the current legislation only allows for up to 1 MW minigrids and leaves all other electricity supply for end users to Kenya Power (Energy & Petroleum Regulatory Authority, 2019).

Consumers wanting to install solar PV systems cannot install a larger capacity than their own maximum consumption. However, under certain circumstances this is

⁴ Levelized cost of electricity (LCOE) is a measurement of one unit of electricity based on the lifetime of the technology and is a way to compare different technologies, that are otherwise hard to compare (Corporate Finance Institute, 2023).

subject to change with what is called net-metering. This will allow for consumers to become so called prosumers (producers and consumers) and install up to 1 MW in production capacity to the grid. The 2019 Energy Act made net-metering possible but has not been enforced yet. However, the 2022 regulation draft from EPRA initially caps the number of facilities with net-metering in Kenya to 100 (Energy & Petroleum Regulatory Authority, 2022).

A challenge for companies in Kenya is the ever-changing regulations and incentives. An example is the VAT exemption on solar PV products which was introduced, then revoked, reinstated, and then revoked again multiple times (Africa Clean Energy, 2021; Njuguna, 2021). Acting on an ever-changing market makes investment decisions difficult and unpredictable for companies which contributes to slowing down the movement towards a more sustainable future.

4.2.5 Grid reliability

In Kenya, a major problem companies face is power outages. According to the World Bank (2018), 83% of Kenyan companies experience power outages monthly which can be compared to global average of 50%. The average number of outages are 3,61 per month lasting 8,5 hours on average (Energy & Petroleum Regulatory Authority, 2023).

The Kenyan transmission and distribution network is getting increasingly outdated and unreliable. The transmission system is particularly constrained during peak hours (Ministry of Energy, 2018). It creates issues for companies in need of affordable, clean, and reliable energy. According to the most recent survey conducted on enterprises in Kenya by the World Bank (2018), the power outages cause the companies' annual sales to decrease with 5,1% on average and 66% of the asked Kenyan companies had backup generators. The electricity produced by the generators, such as diesel-powered generators, is much more expensive than grid energy (Takase et al., 2021).

During power outages, most grid tied solar PV systems shut themselves off if they are not connected to a battery storage. The reasons for this are many, among them are how an inverter works, global technical standards, and safety regulation. Regardless of the reason, this renders the solar PV panels inoperative during power outages (Ansari, 2021).

There are ambitious plans set out by the Kenyan government in the Vision 2030 and major efforts made to overcome the reliability issues and ensure the grid is fit for purpose. The rapid electricity demand is however making the efforts costly and there is a demand for increased financing. A recent example of this effort is the first privately owned transmission line that is being constructed in Kenya through a

Private Public Partnership (PPP) (Ambani, 2023). With a more reliable grid, the need for backup generators could decrease.

4.2.6 Competitors to Miale

There are several Engineering, Procurement and Construction (EPC) companies offering high-quality customized solar PV systems to the C&I market in Kenya. Some of these players are active in multiple East African countries. Equator Energy is the largest players with more than 120 projects and 52 MWp in installed capacity. They offer a 20-year lease with a monthly fee based on the actual consumption of electricity (Equator Energy, n.d.). Ofgen has more than 30 completed projects in with a total of 14 MWp installed capacity. Their purchasing offers include outright purchase and leasing with either a fixed amount or variable based on actual consumption. Ofgen also offers only service agreements for solar systems (Ofgen, n.d.). Sustainable Power Solution or SPS have completed 175 projects with 75 MWp in total installed capacity. They offer the same payment models as Ofgen (SPS, n.d.). Finally, Tropical Power is a more similar sized competitor to Miale with 5 completed projects of 3 MWp in installed capacity (Tropical Power, n.d.).

4.2.7 Business models in resource scarce environments

There are a variety of business models for renewable energy in resource scarce regions, such as Kenya. Mukoro et al. (2022) has through a systematic literature review investigated business models for renewable energy in Africa. Some of the existing business models found include product-oriented (pay-as-you-go), use-oriented (lease and rent) and results-oriented (pay-per-service-unit) (Mukoro, et al., 2022).

However, existing research has mainly focused on energy access through small-scale decentralized off-grid solutions. This refers solar PV mini-grids, solar home systems, and pico systems. Mukoro et al. (2022) mainly focus on underserved markets while this thesis focuses on on-grid markets. There are factors that might be applicable to business models for the commercial sector as well such as high interest rates on loans, unfavorable tariffs, financing challenges, lack of enabling policies, and market immaturity (Mukoro, et al., 2022).

5 Results

The chapter presents the findings from the interviews and workshops in the form of a customer profile, a value map, and a concatenated value proposition canvas. A gap analysis between the customer profile and the value map is conducted. It also presents what Miale perceives as the customer profile as well as results from workshop discussions on growth challenges.

5.1 Customer Profile

The Customer Profile for Miale's customers is displayed in Figure 10. Customer jobs, pains, and gains will be further described below and are based on interviews with Miale's customers. For a detailed customer profile for each interviewed customer see Appendix C.

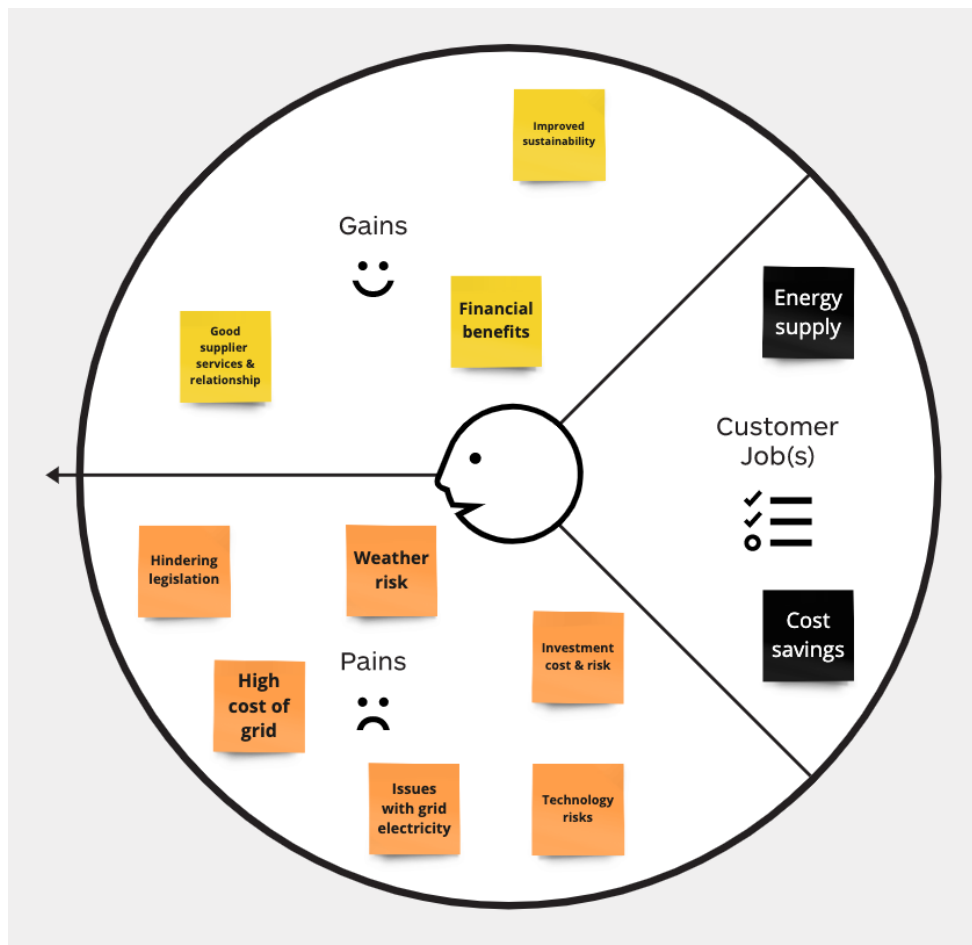


Figure 10. Customer profile for Miale's customers.

5.1.1 Customer jobs

The customer jobs that the C&I segment are trying to get done are primarily functional jobs. However, these are not always easy to differentiate between. The most important customer job is functional, and it is to provide *energy supply*. The energy supply is used to power various machines such as water pump or industrial machines as well as keeping offices lit and computers running, depending on the customer. For some customers the energy is used for medical appliances and in this case it is critical. This is what is expected and required and if this is not achieved, then the customer will turn elsewhere to get their energy supply.

Another important and mainly functional job is *cost savings*. There is always a need and a want to cut costs and with the increasing electricity prices, this job becomes more and more crucial to any business. With the changing electricity prices, the customer job also becomes an emotional job.

5.1.2 Pains

One important issue for companies in the C&I segment is to keep production running. *Issues with grid electricity* is therefore a major pain which includes power outages, production stops and fluctuating grid energy. Power outages is a major problem for anyone responsible for production or pumping water. When there is no grid energy, production stops. Even if there is a diesel generator, parts of the production might remain interrupted until the grid energy comes back. Thus, the fluctuating grid energy makes it hard to rely on the grid and not have any back up power. It can also cause damage to sensitive machines when there are electricity spikes.

Another pain, directly connected to solar panels is *weather risk*. In general, Kenya is a dry and therefore dusty country, and thus getting dust, sand or dirt on the panels creates a problem for many companies. If the panels are mounted on the ground, this is relatively easy to fix for the customer, but if they are mounted on the roof, it is a more major issue. The weather can also impede the panels from working at full capacity.

There are several customer pains related to costs, both related to current energy solutions and related to solar PV systems. The *high cost of the grid* is a major worry for many companies. The cost of having a back-up power source is also high, both installing and maintaining the diesel generator and the fuel is expensive. For off-grid customers, one option to access electricity is by installing a grid connection, although this is a costly endeavor.

Related to solar PV systems, there is a high *investment cost & risk*. Customers fear the high initial investment cost for the system and potential batteries, especially since many companies cannot afford upfront payments. There is also a concern for the upheld value of the PV system over time. For companies who conduct business in KES but pay for the solar in USD, there is also a worry for currency fluctuations. The perception of solar energy as an investment risk is closely linked to the substantial commitment it entails. This concern is further heightened by fears of suppliers lacking sufficient experience or misunderstanding the customer's consumption needs.

There are several *technology risks* that are associated with solar PV, justified or not. One concern is for the actual lifetime of a PV system, another is getting bad quality

panels, and also there exists a fear of the short lifetime of batteries. For off-grid companies, the fear of solar companies not maintaining an adequate stock of spare parts is a genuine concern. In addition to this, companies have a lack of understanding for the technology used and fear of untested technology.

Companies also see *hindering legislation* as a risk, particularly concerning the production of surplus solar electricity beyond current consumption. Since it is not allowed to sell this back to the grid, the solar PV system adjusts the output, resulting in decreased efficiency.

5.1.3 Gains

There are multiple benefits and outcomes the customers want. The most important gain, that is highly required, is *financial benefits*. Without this gain, companies would not investigate solar PV systems. One benefit regarding financial benefits are the cost savings that take place after the asset transfer. The asset transfer relates to the ownership of the solar PV system, and this is a gain companies appreciate. They want to feel like they are gaining an asset at the end of the tenure. Customers also appreciate positive effects on their cash flow, such as spread-out payments and gaining a lower interest rate than a bank would give them.

The customer gain *improved sustainability* has several parts to it. Most companies appreciate the environmental benefits that come with solar power and like the way it makes them appear outwards. Although, it is a gain that is nice to have but not required. Even though this is the case, some companies have sustainability goals they want to further and some companies have clients whom they can improve their relationship with through going solar. The environmental aspect also presents sustainability marketing opportunities that companies consider a gain.

Having *good supplier services & relationship* is also important to many companies. For example, they want the solar power to be installed fast and seamlessly. This gain is not required but appreciated and expected. Another aspect that is also very important is service of the system and supplier involvement. Companies want to feel that the solar PV system supplier stays involved in their product after the installation and possibly after asset transfer. Another gain that is nice to have is the inevitable transfer of knowledge regarding solar energy. However, this is not an overly important gain. To monitor the generation of energy is also appreciated, and unexpected for most customers. It gives them a feeling of control and independence.

5.2 Value Map

Miale's Value Map can be found in Figure 11. Products and services, pain relievers, and gain creators will be further described below and are based on interviews and workshops with Miale's employees.

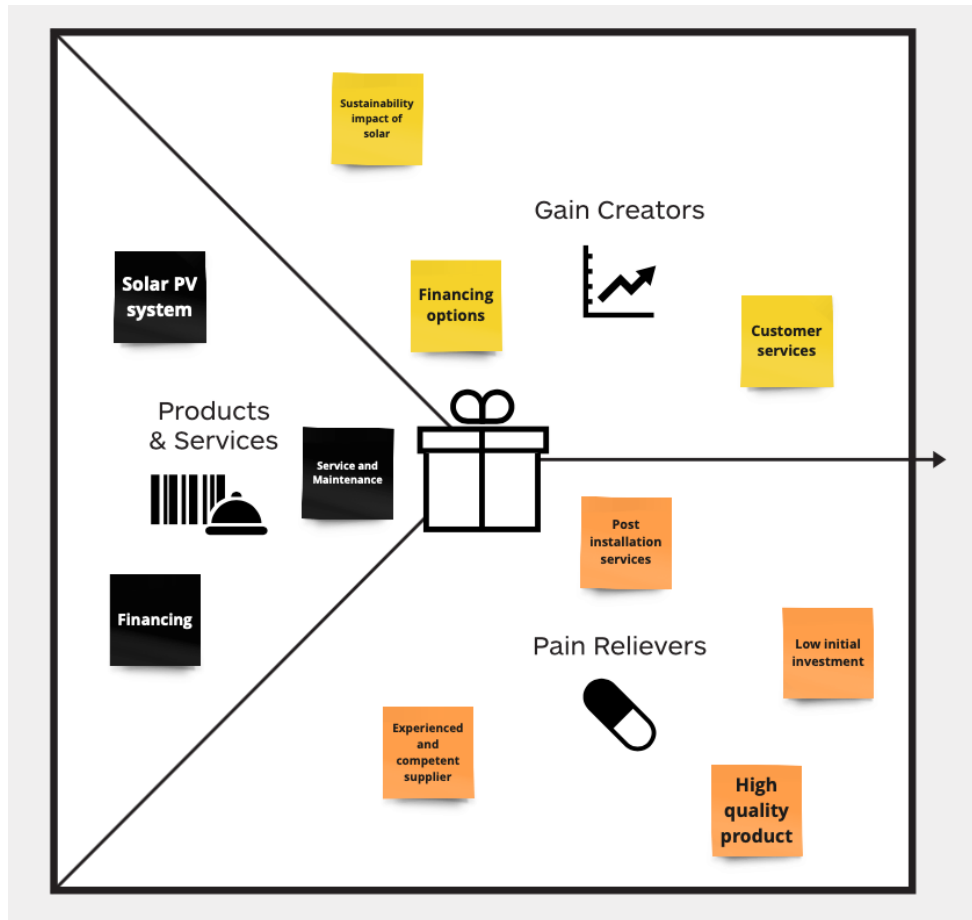


Figure 11. Miale's Value Map.

5.2.1 Products & Services

What is offered to the customer is at the core, a *solar PV system*. Ultimately this is what helps them satisfy needs and complete their jobs. This is done with the tangible products: solar panels, inverters, batteries as well as a monitoring system. In this

offer, an energy audit is included as well as a feasibility study when designing the system. This makes it possible to tailor the system to the customer's specific needs. The parts are procured and installed by Miale.

All of this is enabled with different options for *financing* which Miale offers to their customers. Through the financing, Miale is more than just a solar PV supplier and their beneficial financing is what sets them apart on the market. This is also tailored to the customer's needs and financial conditions.

The after-sales *service and maintenance* are also an important part of satisfying the needs of the customers over time. This makes sure there is an ongoing relationship between Miale and the customer which enables Miale to quickly address any issues with the system. This also ensures that Miale takes responsibility for their product over a long period of time.

5.2.2 Pain Relievers

Miale can help relieve pains by offering a *high quality product*. This way the customers do not have to worry about technological risks quite as much and can trust that the investment is valuable to the company. This can mitigate worries and undesired outcomes.

An important pain reliever is the *low initial investment* offered by Miale. By having several financing options with monthly payments instead of an upfront amount, the initial investment can be kept low.

Another pain reliever revolves around Miale as an *experienced and competent supplier*. They employ skilled technicians who are licensed and educated in installing solar PV systems. It ensures quality in the installations and mitigate risks of costly mistakes. The company also retain competent experts who designs the tailored PV systems. The initial measurements of consumption are thoroughly taken, and every step of the design process is carefully tailored to the customers needs, to eliminate risks. Miale also has experience in the form of European experts on the board of directors with a long history in the energy industry and with solar PV. This helps ensure that customers receive high quality installations.

There were also pain relievers regarding the *post installation services* offered after commissioning, such as maintenance and washing of solar panels. These include both regular and irregular services. Miale prides itself on being accessible and available when the customer needs it.

5.2.3 Gain Creators

Since cost is very important to all companies, several gain creators related to *financing options* have been identified. One gain creator is payment plans that Miale offers to their customers, enabling them to achieve a low initial investment. Miale is also in a position to offer their customers payment flexibility when negotiating the contracts and if unforeseen circumstances occur. Miale can also offer relatively low interest rates compared to other players on the market which is a desired benefit. The customer get more predictable energy prices with Miale than they would from the electricity grid over a longer period of time. Furthermore, the ownership of the solar PV system is offered to the customer either upfront or at the end of the tenure.

Customer services, such as in-time delivery is something identified as a gain creator which is not required but expected. It makes it possible for the customers to know when they can expect their cost savings to start. Miale is also a technical supplier which is a desired gain creator as it enables the high quality of the designing and installation of the solar PV system. The long duration of the service agreements offered to the customers are also appreciated. It entails that Miale will stay responsible and supportive with regards to their product for a considerable amount of time. They will also be available and accessible when required.

Lastly, the *sustainability impact of solar* is also included in Miale's offer. It can make a company look better towards their customers and compared to its competitors. Further, solar in itself is considered environmentally friendly compared to many alternatives.

5.3 Value Proposition Canvas

An overview of the whole Value Proposition Canvas with identified themes can be found in Figure 12. In the following sections the different themes of the customer profile are paired together with the themes of the value map. A green line indicates that one theme is fully addressed by the value map, while a yellow line indicates partial fulfilment. Themes not covered are highlighted with a red circle.

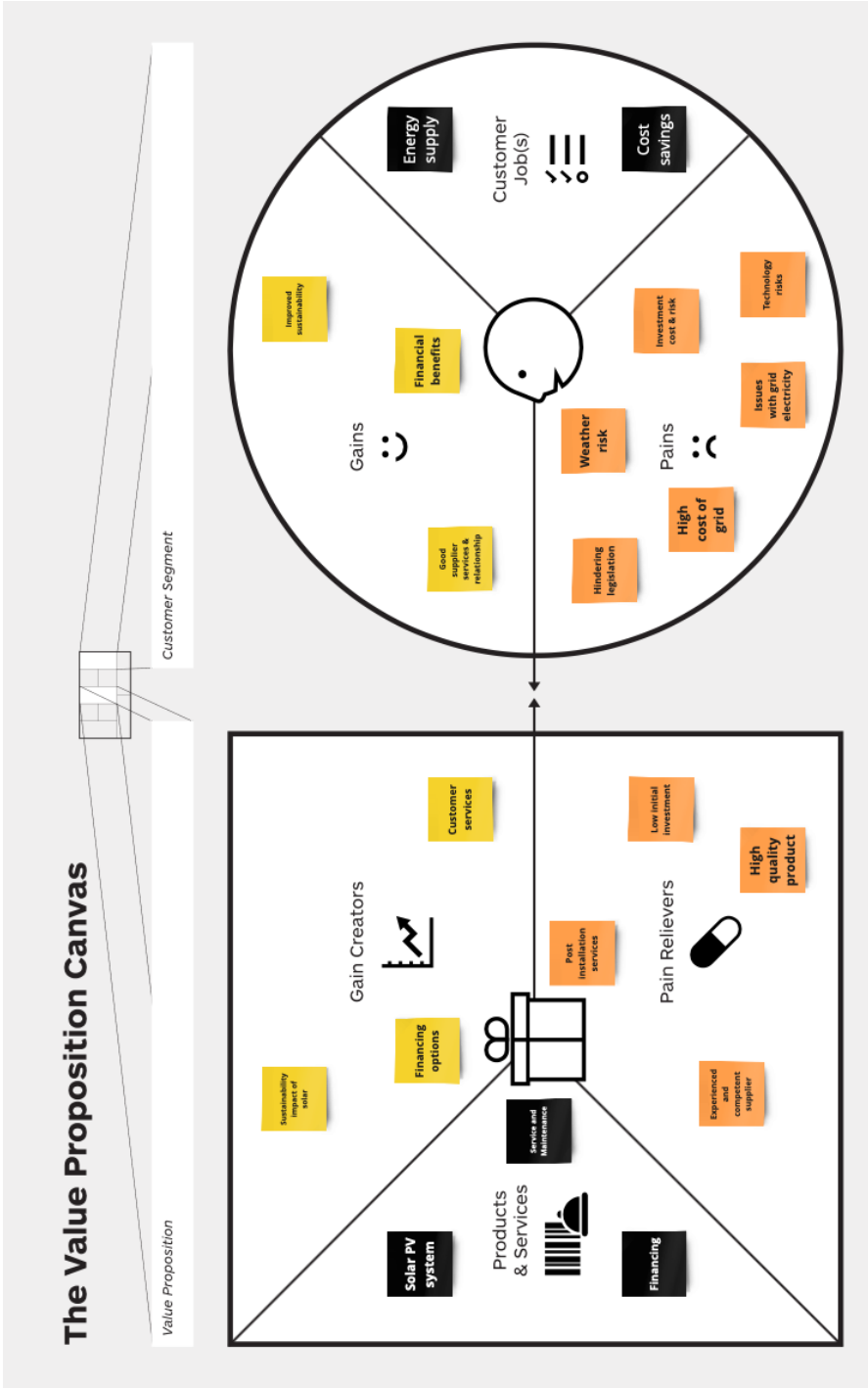


Figure 12. Miale's Value Proposition Canvas.

5.3.1 Customer jobs and Products & services

The customer jobs identified are paired with the corresponding products and services in Figure 13.

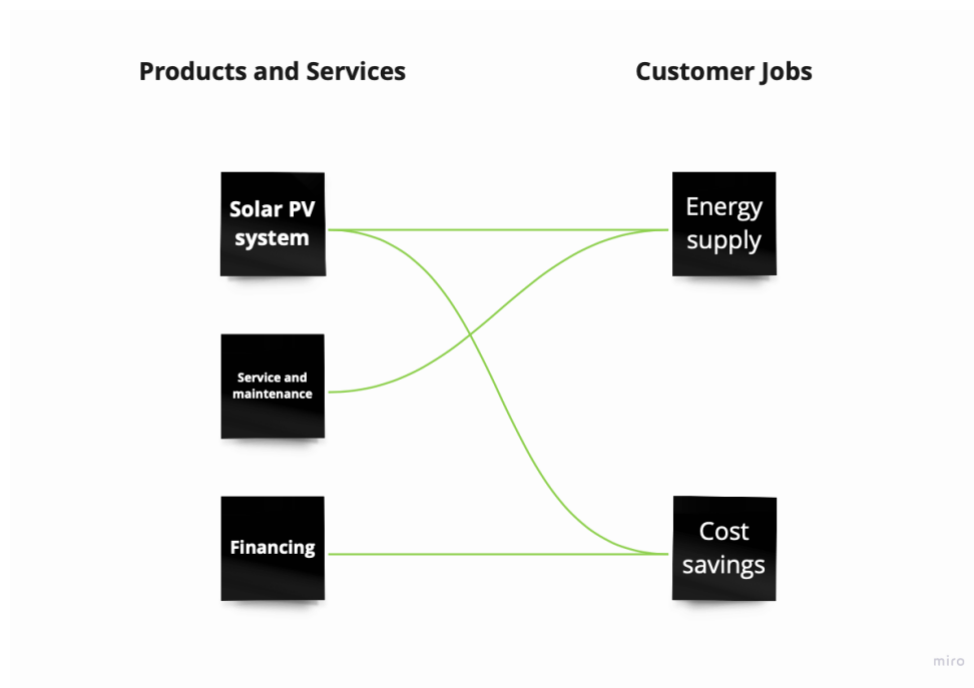


Figure 13. Matching Customer jobs with Miale's Products & Services

The *energy supply* is met by the product *solar PV system* and the *service and maintenance*. The solar PV system generates energy in the form of electricity and the service and maintenance makes sure this lasts over time when issues might arise or when cleanings are due. *Cost savings* is in its turn addressed by *financing* and the *solar PV system* itself. The financing options Miale offers makes it possible for companies to save money over time while the PV system makes the company less reliant on grid energy and creating cost savings.

5.3.2 Gains and Gain creators

The Gains identified are paired with the corresponding Gain Creators in Figure 14.

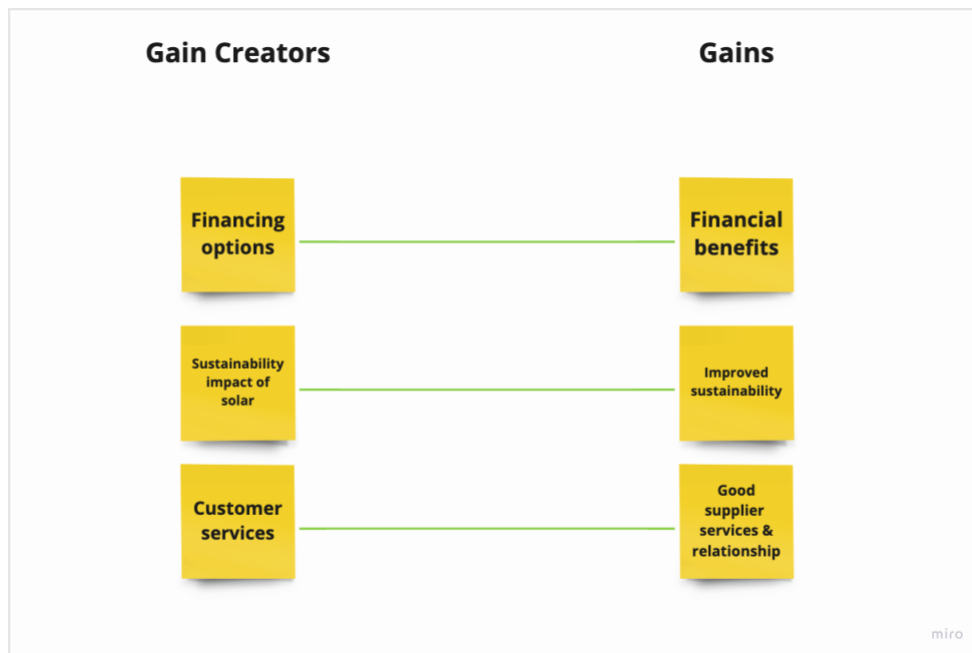


Figure 14. Matching Gains with Miale's Gain Creators.

The gain *financial benefits* are made possible by the *financing options* that Miale offers. The asset transfer makes it possible for the customer to get the ownership of the solar as well as creating cost savings after this asset transfer. The low interest rates, the low initial investment, the payment plans, and the payment flexibility are all part of inducing the desired financial benefits. Another financial benefit is that Miale's solution also offers predictable energy prices.

Improved sustainability matches with *the sustainability impact of solar*. Solar energy offers notable environmental benefits compared to other energy sources, primarily due to its renewable nature. Thus, it helps companies reach their own sustainability goals as well as those of their customers. It also creates a sustainability marketing opportunity.

The *customer services* create the gain *good supplier services and relationship*. A fast and seamless installation takes place as well as in-time delivery. A long-term service agreement and excellent customer service play a crucial role in ensuring the sustained quality of the system over time. Also, it makes sure Miale as a supplier stays involved with their product and the customer can trust Miale to stay responsible and available when needed. Further, a close partnership enables for inevitable knowledge transfer about solar.

5.3.3 Pains and Pain Relievers

The Pains identified are paired with the corresponding Pain Relievers in Figure 15.

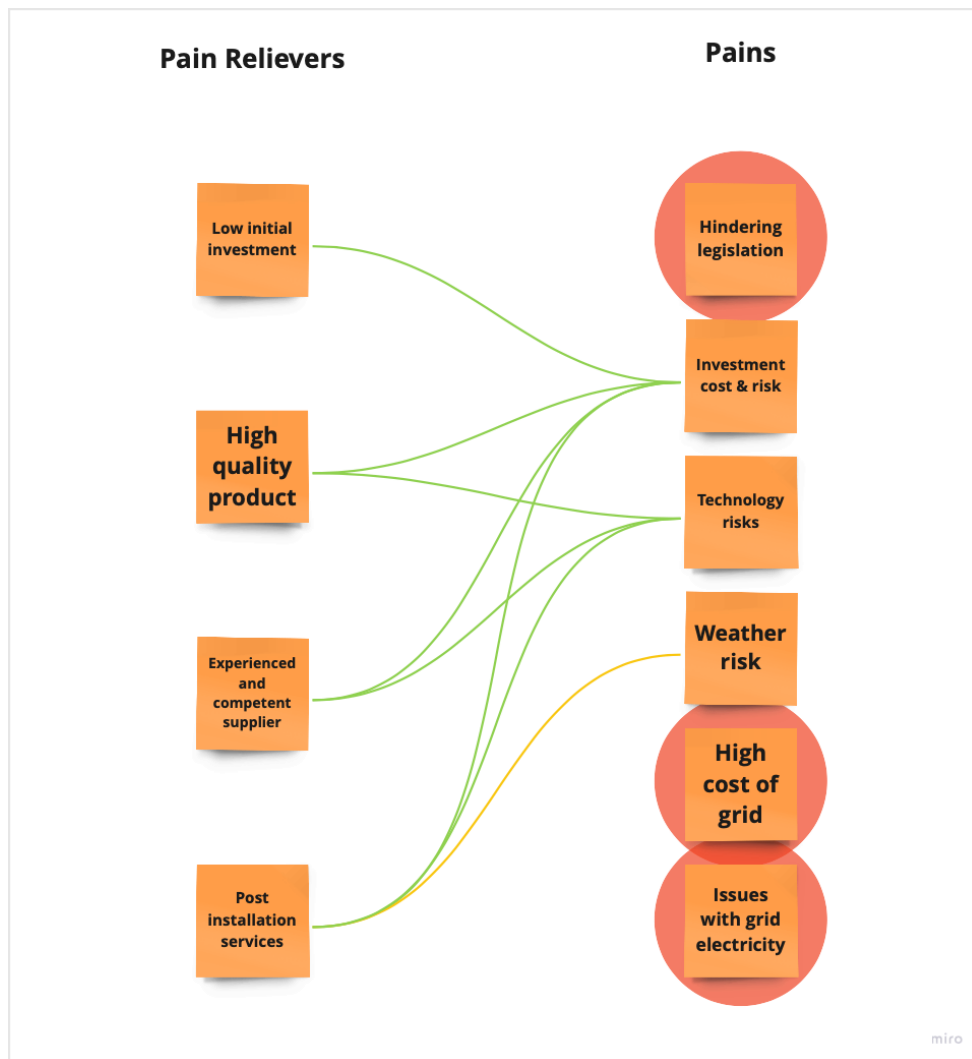


Figure 15. Matching Pains with Miale's Pain Relievers.

The customer pain *investment cost & risk* is addressed by Miale offering a *low initial investment* through their financing options. The *high quality product* also helps mitigate this pain since the risk is lowered by sustaining the high quality. Miale's expertise as an *experienced and competent supplier* significantly contribute to

minimizing investment costs and risks. With Miale's experienced professionals designing high-quality, customized systems, the likelihood of errors or mistakes is significantly reduced. The *post installation services* also mitigate this pain as Miale will take care of the system after installations to minimize the risks of something unexpected happening and some unexpected costs arising.

Technology risks are attended to by Miale's a *high quality product*. As an *experienced and competent supplier*, Miale will design the system tailored to the needs as well as providing high quality installations. This keeps technology risks as low as possible. The *post installation services* also help mitigate worries regarding technology risks since Miale will be there to attend to any problems that might occur.

The pain *weather risk* can partially be counteracted by *post installation services*. Miale offers washing of panels when needed which counteracts the dusty panels, and there is an energy monitoring system that enables customers to check if the weather is causing any reduction in generation. However, no one can control the weather. This is therefore a customer pain inherent in solar power and can never be fully addressed.

The three remaining pains in Figure 15, *high cost of grid*, *issues with grid electricity* and *hindering legislation* are currently not solved by Miale. All three of these pains are regarding the grid and are not pains Miale can directly address.

5.4 Miale's perceived customer profile

From the interviews with Miale employees, a customer profile was determined based on their perception. In Table 2 a gap analysis between the identified customer profile from the customer interviews and the customer profile perceived by Miale is presented. Discrepancies are highlighted with bold text.

Table 2. Gap analysis of identified customer profile and perceived customer profile.

Identified	Perceived by Miale
Customer jobs	
Energy supply	Energy supply
Cost savings	Cost savings
Gains	
Financial benefits	
Lower interest rate than bank	Low interest rate
Spreading out payments	Spreading out payments
Ownership of solar	Ownership of solar
Cost savings after asset transfer	Increasing property value

Good supplier services and relationships	
Fast installation	
Seamless installation	
Knowledge transfer about solar	
Energy generation monitoring	
Service of system	
Supplier involvement	
	European experts
Improved sustainability	
Environmental benefits	Environmental benefits
Reaching environmental goals	Environmental goals
Improving own customer relationships	Attracting investment
Sustainability marketing opportunity	
Other	
	Fight against the monopoly
Pains	
Issues with grid electricity	
Power outages	Power outages
Fluctuating grid energy	Fluctuating grid energy
Cost of diesel generator	Cost of generator
Cost of generator fuel	Cost of fuel for generator
Production stops	
	Pollution from generator
	Noise from generator
	Diesel generator reliance
	Unpredictable grid energy price
Investment cost & risk	
High initial investment cost	High initial investment cost
High cost of batteries	High cost of batteries
Risk of misunderstanding consumption need	Load assessment
Investment risk	
Fear of low supplier experience	
Risk of decrease of PV system value	
Currency fluctuations	
High cost of grid	
High cost of grid energy	High cost of grid energy
Investment cost of new grid – when customer is off grid	Investment cost of new grid
Technology risks	
Worry for lifetime of PV system	Lifetime of PV system
Possible technology risks	Technology risks
Fear of untested technology	Fear of untested technology

Fear of bad quality of panels	
Fear of not having spare parts	
Lack of technology understanding	
Short lifetime of batteries	Lifetime of batteries
Hindering legislation	
Producing too much solar – cannot sell to the grid	
Weather risk	
Weather risk	Weather risk
Dusty panels	

As can be seen in Table 2, the two customer jobs were correctly identified.

When it comes to customer gains some were correctly identified but some were not. Regarding *financial benefits*, it was not perceived by Miaie that cost savings after asset transfer was something the customer considered a gain. Miaie also highlights increasing property value as a gain which the customers did not. This might be due to the fact that if a customer chooses a monthly payment, Miaie still owns the asset and therefore it does not affect property value. This might be a misunderstanding from Miaie’s side.

Good supplier services and relationships is a gain where there is a complete gap between the identified customer profile and Miaie’s perceived one. The customers appreciate a fast and seamless installation, knowledge transfer about solar, energy generation monitoring, service of the system and supplier involvement but Miaie only highlighted European experts.

Miaie seems to have a good understanding of the gain *improved sustainability* as they knew about all factors except the sustainable marketing opportunity that the customers appreciate.

Miaie also believes some customers invest in solar energy because they want to *fight against the monopoly* endorsed by the state on grid energy. The monopoly refers to the government’s monopoly of electricity grid, both when it comes to connectivity and prices. Miaie believes this is something customers want and appreciate and therefore consider it a gain rather than a pain. This is however not mentioned by customers and should therefore not be seen as a factor to consider. It might also be hard for customers to enclose this to the authors in an interview, but in general, the interviewees did not seem to have a problem with being honest about their opinions on the government.

Multiple customer pains were accurately recognized by Miaie, nonetheless there were many discrepancies. For *issues with grid electricity*, production stops is one such gap which clients have shared but Miaie is unaware of. However, it is closely linked with power outages which was identified by both Miaie and the customers. For some clients, *Constant Energy*, can even be considered a customer job, see

Appendix C. *Miale* has put emphasis on different generator related pains which clients have not mentioned such as pollution and noise from the generator as well as reliance on the generator. However, it can be assumed that this is a pain for the customers although not specifically mentioned. Further, the customers do not mention the unpredictable grid energy prices.

Investment cost and risk is a partial match. *Miale* has missed the importance of the investment risk, the risk of decreased value of the PV system, currency fluctuations and a fear of limited experience in the supplier. However, when it comes to the pain *high cost of grid* *Miale* has the full picture.

There are some aspects of *technology risks* which *Miale* misses, namely a fear of bad quality of panels and lack of technology understanding. For customers who are off grid, the *fear of not having spare parts* is substantial but omitted by *Miale*.

Miale also does not acknowledge the current *hindering legislation* as a pain which if changed could benefit customers' solar investments in the future. Finally, *weather risk* is put forward both by *Miale* and its clients but specifically dust on the panels reducing production is only mentioned by *Miale's* clients.

5.5 Growth challenges

As has been shown in the previous section 5.3, there appears to be quite a good match between the Customer Profile and the Value Map. However, the rapid growth of the organization surfaced as a struggle. The growth challenges are neither addressed in the value proposition canvas nor the business model canvas. To investigate this theme, the workshops were therefore extended with a segment on more general growth challenges based on Greiner's article *Evolution and Revolution as Organizations Grow* from 1998.

The participants individually gave their input to where on Greiner's graph, see Figure 16, *Miale* currently is. One of the participants argued for the *direction* phase, two in the *autonomy* crisis, three for the *delegation*, and lastly one for *coordination*. Two of the more senior participants, the CEO and one director, both believed *Miale* to be in the *delegation* phase. The two other directors claimed the *autonomy* crisis and the three remaining employees all chose different phases.

THE FIVE PHASES OF GROWTH

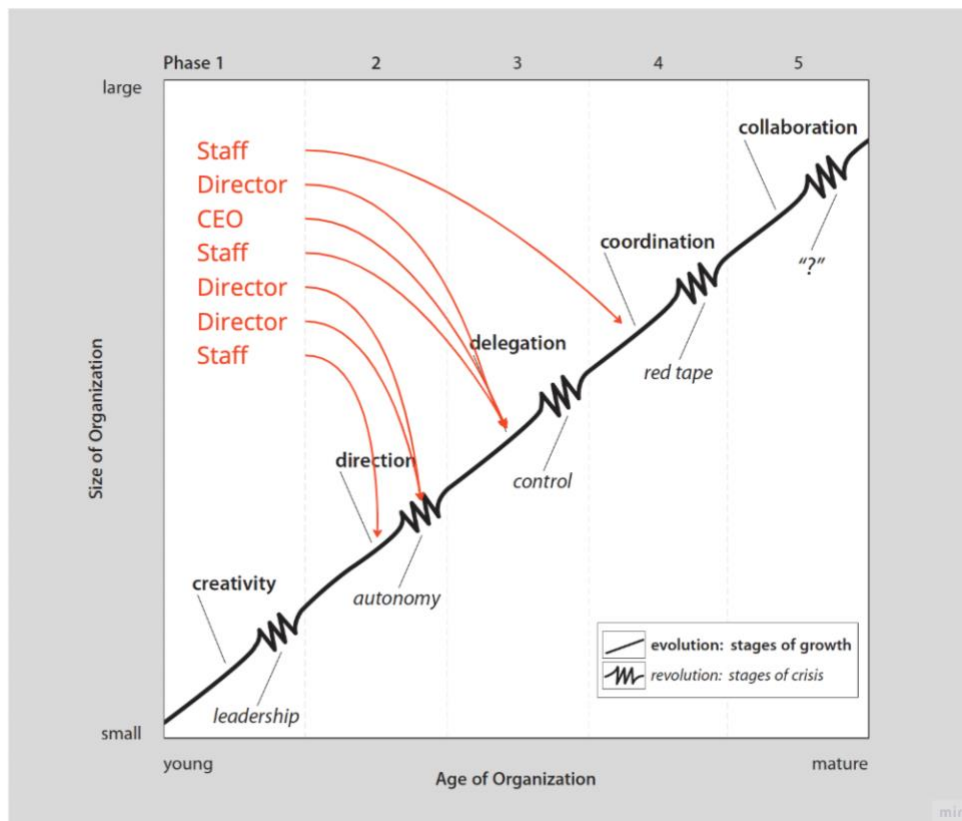


Figure 16. Workshop participants placement of Miale on Greiner's (1998) graph.

Based on the different placements, a discussion evolved with several ideas on why the participants had different views. They agreed that the engineering and implementation teams were those who had the most mature organizations and are in the *delegation* phase. However, they concluded the other parts of the company rather are in the *direction* phase.

For the other parts of the organization to move to the *delegation* phase, the need for support when delegation increased was brought up. It was also countered by the importance of taking ownership when tasks have been delegated. A frustration for when responsibilities are given and revoked back and forth was also raised. There was a common understanding that freedom is required for the organization to grow. Making mistakes must be acceptable if lessons are learned from the mistakes.

Miale is growing quite rapidly, both in terms of number of projects and in number of employees. When they try to manage the expansion, the company feels like they

get stuck in solving operational challenges and do not have time for strategic aspects. During the workshop, it was discussed how time can be made for strategic work. It was pointed out that clear delegation with mandate and reporting can free up time for senior staff when they do not have to get involved in every decision. Finally, the company culture was briefly touched upon and its importance for creating a sense of belonging to motivate the employees.

After the discussion, the participants were tasked with giving their recommendation on issues to be addressed to accelerate the company's growth. The workshop participants have different backgrounds and hence different point of views. The recommendations are found in Table 3.

Table 3. Themes for improvement, suggested by workshop participants.

Themes for improvement
Need for mutual understanding and trust
Defining structure in the company to induce more trust
Capability must be built in the business divisions
Micromanagement is an issue, both locally but also from the Swedish board
The board of directors must be strategic and not operational
Strategic work must get more priority over operative in the local business
Sales must become independent of the CEO

The Swedish directors also expressed that they do not wish to get involved in the operative work of Miale in Nairobi. However, they have felt a need to review the work to maintain a high quality towards customers.

In concluding the workshops, all participants eventually agreed that Miale is undergoing the autonomy crisis. There are some general ideas highlighted in the workshops for Miale's future growth journey. These are found in Table 4. They are all correlated to what Greiner (1998) presents in his article regarding moving from the direction stage to the delegation stage through the autonomy crisis.

Table 4. Summary of general themes for improvement.

General themes for improvement
1. Developing structure to induce mutual trust. Including: processes, mandate, reporting, evaluation, and follow-up.
2. Building independent and capable business units.
3. Dedicate time for strategically important work.
4. Get everyone involved in the growth journey.

6 Discussion

This chapter consist of a discussion based on the three research questions. Firstly, it is discussed what customers want, then Miale's offer compared to this, and lastly how Miale can adapt and improve further. Limitations is also described, and further research is suggested.

6.1 The PV system offer

The first research question was *What do commercial customers want in a solar PV system offer?* From the results in 5.1, it can be concluded that the most important customer jobs are cost savings and energy supply. This is perhaps not surprising. The customer gains are financial benefits, good supplier services and relationship and improved sustainability. The pains were connected to weather, risks and costs related to technology and investment, and legislation as well as pains regarding the grid electricity.

That sustainability had little to no significance in the decision-making process was surprising. That solar is considered a more environmentally friendly option than the grid is also a bit unexpected, since most of the grid energy comes from renewable energy sources (Kenya Electricity Generation Company PLC, n.d.a). However, at peak demand fossil fuels are used and solar also generates the most energy at this point, so there is some substance to the sustainable image (Kwame, 2020).

Customers' motivation for exploring solar is clearly connected to the current grid situation, as it is expensive and unreliable, see 4.2 for some reasons (Ministry of Energy, 2018; World Bank, 2018; Statista, 2023; Kenya Power, 2022; Ngumi et al., 2021). This is reflected in all three parts of the customer profile. It is important to realize that these motivations might change in the future depending on the grid situation. The Kenyan government might improve the grid and increase its reliability (Ambani, 2023; Kenya Vision 2030, 2022; Ministry of Energy, 2018). There might also be changes in legislation, in the monopoly situation, or concerning corruption (Kenya Vision 2030, 2022; Ministry of Energy, 2018; Boamah, 2019; Danflow, 2023; Odhiambo, 2022; Kamau, 2021; Ngumi et al., 2021; Africa Clean Energy, 2021; Energy & Petroleum Regulatory Authority, 2019; Energy & Petroleum

Regulatory Authority, 2022). This could affect customers willingness to invest in solar and should be continuously monitored.

The investment cost and risk as well as the technology risk are closely connected to the gain regarding supplier services and relationship. This is likely due to a limited understanding of solar energy which creates worries about investment and technology. Therefore, a close relationship with the supplier is needed as the customer needs to rely on the supplier for knowledge and risk mitigation.

The financing is mentioned in all three parts of the customer profile. This is partly due to the fact that costs are essential to a company and to the investment decision of going solar. The financing is both a service, and a gain creator, and a pain reliever. It is hard to differentiate between the different aspects of the financing and categorize them. It also depends on the specific customer. For certain customers, some aspects are absolutely required while for others the same aspect is nice to have.

6.2 Value proposition fit

The second research question was *How does Miale's current value proposition align with commercial customers' needs?* The results, see 5.3, show an overall good fit between what customers want and what Miale offers. This does not mean Miale can be static now, but rather that they need to keep maintaining and evaluating this fit. According to Osterwalder et al. (2014) a company should monitor and improve constantly, as conditions keep changing. When exploring the market, there turned out to be several competitors offering similar solutions as Miale, see 4.2.6. It is therefore vital to maintain a fit between the offer and the customers' needs and wants.

The most important customer job is cost savings and solar power provides an effective solution to reduce a company's overall energy expenses, consider for example the LCOE of solar PV (International Renewable Energy Agency, 2022b). Furthermore, since peak hours are more expensive, solar energy is an excellent choice because it generates the most electricity during these hours. Additionally, the peak demand charge to Kenya Power can be reduced through the use of solar power (Kenya Power, n.d.a; Energy & Petroleum Regulatory Authority, 2023). There are several other factors that make solar a good option when it comes to cost savings.

The financing Miale offers is key to their offer, however this is changing as highlighted in 4.1.4. One key difference with the new offer is that the ownership of the solar system is transferred to the customer from day one. For some customers this is appreciated, while others preferred that Miale owned the system because it reduced their risk, see section 5.1. The transferred ownership also decreases Miale's

incentives to deliver top tier service and maintenance which could decrease the close relationship appreciated by the customers. To summarize, Miale should closely monitor, as encouraged by Osterwalder et al (2014), how the new financing option affects customers in order to, as Osterwalder et al (2014) puts it, ensure long term success.

A gap can be found, although, between pains and pain relievers, see Figure 15. Even though there is a gap, Osterwalder et al. (2014) states that not all jobs, pains, and gains need to be addressed. The weather risk is addressed as well as possible, while the cost of the grid, grid issues and legislation are not. While most of these cannot be directly addressed by Miale, they should be aware of them since they affect customers willingness to invest in solar.

Miale could possibly relieve the pain of the issues with grid electricity, however it is not enough to only have a solar PV system since it is not operational during power outages (Ansari, 2021). Although, batteries are a possible option if they can store enough energy. With this solution at least part of the operation of a company could be upheld during a power outage. However, batteries are considered expensive and there is a cost analysis needed to know if it is worth it financially.

6.3 Adapting and improving

The third research question was *How can Miale adapt for an improved value proposition?* As found in the results, there are two main aspects with room for improvement. Firstly, improve the understanding for customers to emphasize the correct offerings and, secondly, developing the organization to be fit for purpose.

As highlighted in the result in section 5.3, there is a good match between the value map and customer profile. However, as found in Table 2, there are several gaps in the detailed themes between the identified customer profile and the one perceived by Miale. Even though there is an overall match, the detailed drivers for customers are crucial to know. This enables pushing for what is important in your communication with the customer, which is something Osterwalder et al. (2014) highlights. There is therefore room for improvement to get Miale's perceived customer profile aligned with reality.

One surprising aspect from the results in section 5.4 is how Miale's value proposition can be such a good match when they seem to lack the detailed knowledge of what the customers desire. The answer could lie in the key resource, namely the CEO, who has detailed knowledge of and close relationships to all customers. There is a need to share this knowledge to other employees. The whole

Miale process, as presented in 4.1.5, cannot be reliant on the CEO if the company is to keep growing.

An aspect in both the Business Model Canvas and the Value Proposition Canvas that is missing is how companies structure their business and decision-making process to deliver value to their customers, which is why Greiner's (1998) theory was used.

Delegation has surfaced as one key challenge for Miale and the themes presented in Table 4 are all closely correlated to the theory in Greiner's (1998) article on the autonomy revolution and delegation phase. The findings indicate that more senior staff members need to let go of certain decision-making processes and responsibilities, while lower-level staff members need to step up and take ownership which is also suggested by Greiner (1998). By implementing these changes, capable business units can operate more independently, just as Greiner (1998) proposed, enhancing their capacity and capability to drive the growth journey.

Currently, there has not been a need identified to divide customers into different segments. However, as the number of customers grow and with the different needs of clients, see Appendix C, the need for specializing the different business units based on the customers' needs might arise. Delegating through a market-oriented organization with independent business units could enable for better meeting different customers' needs.

The Swedish boards involvement in the operative work could be explained by the difficulties for top-level management to give up responsibilities, as Greiner (1998) claimed. It might also be explained by the differences in culture and education between Sweden and Kenya but the authors have not investigated this further.

6.4 Limitations

As introduced in section 2.2, to ensure quality and academic excellence, the thesis has been conducted based on the three pillars *reliability*, *validity*, and *representativeness*. Some key limitations of the study will be discussed here.

In the data gathering, it was aimed to have a variety of different interview subjects with different sizes, locations, and industries. However, due to the challenges of securing interviews during a limited time span in Kenya, the interviewees were primarily current customers of Miale, rather than potential or missed customers. They were also mainly situated near Nairobi. If the sample would be customers situated in other parts of the country, perhaps the grid situation would be different, or motivations would be slightly more diverse.

The limited sample reduces the reliability of the customer profile. If the customer profile is inaccurate, then the representativeness and the validity of the conclusion drawn will also be reduced. There was a strong but unsuccessful push for interviewing customers interested in investing in solar PV systems but who had not yet done so, as well as customers who had decided not to invest in solar. If this would have been accomplished, more general conclusions could have been drawn in the thesis. Regarding the value map, all relevant representatives for Miale have been interviewed so the reliability is high.

Early in the data gathering of the thesis there was a survey created and sent to a wider sample of potential and current customers. However, due to a very low response rate (2 responses) the survey was removed from the study. The benefit of having conducted a survey would have been to have a better generality and a potential of cross-referencing data. The qualitative data could have been confirmed by quantitative data.

As foreigners in a new country, there are cultural aspects and social codes to be considered. This is something to be aware of when conducting interviews in Kenya as Swedish interviewers. Regardless of the best efforts of the design of the study, there is a risk of getting skewed data which could reduce the reliability of the study.

7 Conclusions

In the final chapter, the most important findings are highlighted regarding the customers motivations, what Miale offers to the customer, and what improvements opportunities Miale has. It is also concluded what this thesis has contributed to.

7.1 Diffusion of solar PV

To conclude, the primary motivation for customers to explore the solar option is the situation with the nation grid, both in costs and reliability. Changes in the national grid may have a major impact on this motivation and should therefore be monitored closely. The primary customer job for solar PV in the C&I market is cost savings, which is why it can be seen influencing all parts of the customer profile. Therefore, financing needs to be part of the value proposition. It is also worth noting the relative unimportance of sustainability in the decision-making process. Lastly, the importance of worries and investment risks must be highlighted. This must be addressed and mitigated through a show of internal competence and services to reassure the customers throughout the lifetime of the PV system.

Generally, there is a good fit between what Miale offers and what their clients want. However, it is important to keep monitoring to maintain the fit, especially if the offer is changed, as it is with the new financing option. Some of the clients' pains are not addressed, and are not possible to address, and others are indirectly addressed. It is valuable for Miale to keep those pains in mind when dealing with their customers.

To improve the value proposition, Miale has to align their organizations view of what customers want to reality. This makes sure they communicate what is important to the customers. Another challenge is the reliance on the CEO, and this must be addressed if Miale wants to be able to keep growing. Purposeful and efficient delegation as well as increased responsibility and accountability needs to be prioritized.

This knowledge provides a better understanding of the challenges and opportunities with diffusion of solar PV systems. It enables solar companies as well as Miale to achieve their mission of providing sustainable solar energy solutions and contribute

with environmental, social, and economic impact. It makes it possible to further the diffusion of solar power and to take steps towards the UN's goal of affordable and clean energy. Lastly, it advances the energy transition to combat climate change.

7.2 Future research

In a rapidly growing market with both high demand and high potential there are many areas which are interesting to investigate. When carrying out this thesis, several topics have been identified as especially interesting.

Firstly, it would be of interest to monitor how climate change and its effect in the future impacts companies' willingness to invest in solar power. It would be interesting to see if sustainability becomes more important in the decision-making process in the future.

In the process of carrying out this thesis, a gap in the literature was identified (Mukoro, et al., 2022). Hence, it would be interesting to further investigate different types of business models for solar PV to C&I customers in the region.

The current legislation only allows for 1 MW minigrids but if that changes then there is a great potential for establishing minigrids in industrial regions. There might be economies of scale to be gained by collaboration between different companies resulting in lower energy cost and more value gained.

As most of the solar panels installed by Miale are used to power water pumps it would be an interesting area to further explore. The water utility and the farming industry combined with the diffusion of solar PV has many interesting angles for future research.

It could also be interesting to investigate how much corruption affects start-ups and what this does to a non-corrupt company. Perhaps corruption only affects large scale power plants. Since the regulation on licenses concern small companies too, there could be an effect.

Lastly, it might also be intriguing to further explore growth challenges, especially on the Kenyan market. There are many cultural elements to consider that might not be reflected in the western-centered literature. There are also corruption and knowledge aspects, that are more typical for a Kenyan market, that could have an impact on a company's growth.

References

- Adriani, M., Suryadi, K., Samadhi, T. A. & Siswato, J., 2014. *Theoretical model of knowledge management in SMEs life cycle: (A literature study)*. Bandung, Indonesia, 2014 2nd International Conference on Technology, Informatics, Management, Engineering & Environment.
- Africa Clean Energy, 2021. *Imposition Of VAT On Solar Products Defeats The Intended Purpose*. [Online]
Available at: <https://www.ace-taf.org/imposition-of-vat-on-solar-products-defeats-the-intended-purpose/>
[Accessed 27 April 2023].
- Ambani, B., 2023. Kenya to get first privately-owned electricity transmission line. *The East African*, 17 February.
- Ansari, Y., 2021. *Payperwatt*. [Online]
Available at: <https://www.payperwatt.com/post/3-ways-to-use-grid-tied-solar-during-power-outage>
[Accessed 16 May 2023].
- Becker, M. & Bröcker, J.-O., 2021. *Business Model Canvas - Overview of the main advantages and disadvantages*, Hamburg: ZBW - Leibniz Information Centre for Economics.
- Blomkvist, P. & Hallin, A., 2015. *Metod för teknologer: Examensarbete enligt 4-fasmodellen*. 1:3 ed. Lund: Studentlitteratur AB.
- Boamah, F. W. A., 2019. 'Kenya powerless' – Corruption in electricity as 'problem-solving' in Kenya's periphery, Bergen: U4 Anti-corruption Resource Centre.
- Central Bank of Kenya, 2023. *Key CBK Indicative Exchange Rates*, Nairobi: Central Bank of Kenya.
- Churchill, N. C. & Lewis, V. L., 1983. The five stages of small business growth. *Harvard Business Review*, Volume May.
- Corporate Finance Institute, 2023. *Levelized Cost of Energy (LCOE)*. [Online]
Available at: <https://corporatefinanceinstitute.com/resources/valuation/levelized-cost-of-energy-lcoe/>
[Accessed 11 5 2023].

- Danflow, L., 2023. End Kenya power monopoly, Kabogo tells Ruto. *The Star*, 5 March.
- Electricity Sector Association of Kenya, 2023. *Transforming the Electricity Sector*, Nairobi: Electricity Sector Association of Kenya.
- Energy & Petroleum Regulatory Authority, 2019. *The Energy Act*, Nairobi: Energy & Petroleum Regulatory Authority.
- Energy & Petroleum Regulatory Authority, 2022. *The Energy (Net-Metering) Regulation*, Nairobi: Energy & Petroleum Regulatory Authority.
- Energy & Petroleum Regulatory Authority, 2023. *Biannual Energy and Petroleum Statistics Report 2022/2023*, Nairobi: Energy & Petroleum Regulatory Authority.
- Equator Energy, n.d. *Homepage*. [Online]
Available at: <https://www.equatorenergy.net/>
[Accessed 25 April 2023].
- Euchner, J., 2019. Business Model Innovation: An interview with Alex Osterwalder. *Research-Technology Management*, July-August(62:4), pp. 12-18.
- Garner, B., 2015. *5 Common Mistakes to Avoid When Using the Value Proposition Canvas*, [Online] Available at:
<https://www.strategyzer.com/blog/posts/2015/2/19/5-common-mistakes-to-avoid-when-using-the-value-proposition-canvas> [Accessed 2 June 2023].
- George, A. et al., 2019. Review of solar energy development in Kenya: Opportunities and challenges. *Renewable Energy Focus*, 29(June 2019), pp. 123-140.
- Greiner, L. E., 1998. Evolution and Revolution as Organisations Grow. *Harvard Business Review*, Issue May-June.
- Höst, M., Regnell, B. & Runeson, P., 2006. *Att genomföra examensarbete*. 1:5 ed. Lund: Studentlitteratur AB.
- International Energy Agency, 2020a. *Kenya*. [Online]
Available at: <https://www.iea.org/countries/kenya>
[Accessed 22 March 2023].
- International Energy Agency, 2020b. *Climate impacts on African Hydropower*, Paris: International Energy Agency.
- International Energy Agency, 2022. *Africa Energy Outlook 2022*, s.l.: IEA Publications.

- International Renewable Energy Agency, 2022a. *Energy Profile Kenya*. [Online]
Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Statistics/Statistical_Profiles/Africa/Kenya_Africa_RE_SP.pdf
[Accessed 22 March 2023].
- International Renewable Energy Agency, 2022b. *Renewable Power Generation Costs in 2021*. Abu Dhabi: International Renewable Energy Agency
- IPCC, 2022. *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Cambridge: Cambridge University Press.
- Kamau, J., 2021. Forensic audit to examine rot at Kenya Power. *Nation*, 2 October.
- Kenya Electricity Generation Company PLC, n.d.a. *Home page*. [Online]
Available at: <https://www.kengen.co.ke/index.php>
[Accessed 21 April 2023].
- Kenya Electricity Generation Company PLC, n.d.b. *Who we are*. [Online]
Available at: <https://www.kengen.co.ke/index.php/our-company/who-we-are.html>
[Accessed 21 April 2023].
- Kenya Power, 2022. *Annual report*, Nairobi: Kenya Power.
- Kenya Power, n.d.a. *Know your bill*. [Online]
Available at: <https://kplc.co.ke/knowyourbill/>
[Accessed 20 April 2023].
- Kenya Power, n.d.b. *Who we are*. [Online]
Available at: <https://kplc.co.ke/content/item/14/about-kenya-power>
[Accessed 21 April 2023].
- Kenya Transmission Company Limited, n.d. *Our organisation*. [Online]
Available at: <https://www.ketraco.co.ke/about-us/our-organization>
[Accessed 21 April 2023].
- Kenya Vision 2030, 2022. *Kenya Vision 2030 flagship programmes and projects progress report (FY 2020/2021)*, s.l.: Republic of Kenya.
- Kwame, V., 2020. *Africa Sustainability Matters*. [Online]
Available at: [https://africasustainabilitymatters.com/an-inside-look-at-kenyas-thermal-power-plants/#:~:text=The%20thermal%20power%20plant%20consists,\(HFO\)%20to%20generate%20electricity.&text=It's%20the%20largest%20fossil%20fuelled,effect](https://africasustainabilitymatters.com/an-inside-look-at-kenyas-thermal-power-plants/#:~:text=The%20thermal%20power%20plant%20consists,(HFO)%20to%20generate%20electricity.&text=It's%20the%20largest%20fossil%20fuelled,effect)

ive%20capacity%20of%20115%20MW.
[Accessed 11 May 2023].

Miale Solar Inventions, 2023. *Miale Solar*. [Online]
Available at: <https://mialesolar.com/>
[Accessed 23 March 2023].

Ministry of Energy, 2018. *National Energy Policy*, s.l.: Republic of Kenya.

Mukoro, V., Sharmina, M., Gallego-Schmid, A. 2022. A review of business models for access to affordable and clean energy in Africa: Do they deliver social, economic, and environmental value?. *Energy Research & Social Science*. Volume 88 (2022).

Mutua, J., 2022. Experts push for local currency negotiated power purchase plans. *Business Daily Africa*, 20 June.

Ngumi, J. et al., 2021. *Report of the Taskforce on the Review of Power Purchase Agreements*, Nairobi: Republic of Kenya.

Njuguna, H. B., 2021. VAT exemptions on solar key to universal electrification by 2022. *Business Daily Africa*, 15 June.

Odhiambo, A., 2022. Kenya Power monopoly nearing end as ministry splits supply role. *Nation*, 30 July.

Office of Energy Efficiency and Renewable Energy, n.d. *Photovoltaics*. [Online]
Available at: <https://www.energy.gov/eere/solar/photovoltaics>
[Accessed 11 5 2021].

Ofgen, n.d. *Services*. [Online]
Available at: <https://ofgen.africa/services/>
[Accessed 25 April 2023].

Osterwalder, A. & Pigneur, Y., 2010. *Business Model Generation: A handbook for visionaries, game changers, and challengers*. Hoboken, New Jersey: John Wiley & Sons, Inc..

Osterwalder, A. et al., 2014. *Value Proposition Design : How to Create Products and Services Customers Want*. Hoboken: John Wiley & Sons, Incorporated.

Rogers, E. M., 1995. *Diffusion of Innovations*. 4th Edition ed. New York: The Free Press.

- Scott, M. & Bruce, R., 1987. Five stages of growth in small business. *Long Range Planning*, 20(3), pp. 45-52.
- SPS, n.d. *Homepage*. [Online]
Available at: <https://sps.africa/>
[Accessed 25 April 2023].
- Statista, 2023. *Household electricity prices in Africa as of December 2021*. [Online]
Available at: <https://www.statista.com/statistics/1277594/household-electricity-prices-in-africa-by-country/#:~:text=As%20of%20December%202021%2C%20one.for%20electricity%20in%20the%20continent.>
[Accessed 22 May 2023].
- Strategyzer, 2017. *Strategyzer's Value Proposition Canvas Explained [video file]*. [Online]
Available at: <https://www.youtube.com/watch?v=ReM1uqmVfP0>
[Accessed 10 May 2023].
- Strategyzer, n.d.a. *The Business Model Canvas*. [Online]
Available at: <https://www.strategyzer.com/canvas/business-model-canvas>
[Accessed 20 April 2023].
- Strategyzer, n.d.b. *The Value Proposition Canvas*. [Online]
Available at: <https://www.strategyzer.com/canvas/value-proposition-canvas>
[Accessed 20 April 2023].
- Takase, M., Kipkoech, R. & Essandoh, P. K., 2021. A comprehensive review of energy scenario and sustainable energy in Kenya. *Fuel Communications*, Volume 7.
- Tropical Power, n.d. *Homepage*. [Online]
Available at: <https://www.tropicalpower.com/>
[Accessed 25 April 2023].
- United Nations, n.d. *SDG 7 on affordable and clean energy*. [Online]
Available at: <https://sdgs.un.org/topics/energy?page=0%2C0>
[Accessed 22 March 2023].
- World Bank, 2018. *Enterprise survey Kenya*, Washington: World Bank.
- World Bank, 2021. *World Development Indicators*, Washington: World Bank.
- Yin, R. K., 2018. *Case Study Research and Applications: Design and Methods*. 6th Edition ed. Los Angeles: SAGE Publications, Inc..

Appendix A Interviews

Appendix A consists of the full list of interviewees and interview guides used for customers and internal interviews with employees.

A.1 List of interviewees

The list of interviewed people, both customers and employees, can be found in Table 5.

Table 5. List of interviewed people.

Title	Name	Company
Customers		
Project Engineer	Francis Mwangi	Cylinder Works Ltd.
Technical Manager	Justus Biwot	East Africa Spectre Ltd.
Owner	Alistair Toad	Haywood Farm Ltd.
Principal	Harrison Makamu	Kenswed Org.
Technical Manager	Felix Mwarema	Naivasha Water and Sanitation Company Ltd.
Plant Manager	Thomas Kalerwa	Signode Kenya Ltd.
General Manager	Johan Remeeus	Van den Berg Kenya Ltd.
Miale employees		
Design Engineer	George Munyalo	
Accountant	Jemmimah Muli	
Director	Sebastian Trygg	
Director	Jonas Barman	
Portfolio Development Manager	Kevin Ooro	
CEO	Stephen Adwong'a	

A.2 Interview guides

A.2.1 Interview guide for customer

Filtering questions (to be checked beforehand)

- What industry are you in?
- Do you have solar PV?
 - How many PV systems do you have?
 - Are you connected to the grid?
- Do you have energy storage?
- Can you affect investment decisions?
- Who is your PV supplier?

Introduction

- Thank the interviewee for participating.
- Presentation of interviewers and interviewees.
- Present who will be taking notes and who will be asking questions.
- Explain how the information will be used and the purpose of the report.
- Explain that they can be anonymous towards Miale and in the report if they want to and that we will ask again at the end of the interview.

Comfort questions

- Tell us a bit about your professional background and your current role.
- Tell us a bit about your company.

Main part

Solar PV

- Why did you install solar PV?
 - What were the problems you faced before installing solar?
 - What energy source did you use before?
 - What were the benefits with the installation?
 - The benefits for you?
 - General benefits?
 - What were your thoughts when you considered installing?

- What risks did you see with installing solar PV?
 - What made you hesitate?
- Has solar PV met your expectations?
 - Why?
 - Why not?
 - How does solar PV make everyday life easier for you?
 - Was there something that kept you up at night that solar PV solved?

Miale Solar

- Why did you choose to buy from Miale?
 - What did you think about Miale as a supplier?
 - What did you think about what they sell?
 - Did you consider other suppliers?
 - Why?
 - Why not?
- Why do you keep choosing Miale?
 - Did you consider other suppliers?
- What do you think Miale is good at?
- What do you think Miale could improve?
 - Is there anything they could do to impress you?
- Did Miale meet your expectations?
 - Why?
 - Why not?

Financing

- You had [insert financing terms here], right?
- Why did you choose this type of financing?
 - What benefits do you see with this type of financing?
 - What challenges do you see?
 - What risks do you see?
- Is there any other financing option you would have liked to have?

Battery energy storage

- If battery energy storage, what was the purpose of the energy storage?
 - What were the problems you faced before installing battery storage?
 - What energy source did you use before?

- What were the benefits with the installation?
 - The benefits for you?
 - General benefits?
- What were your thoughts when you considered installing?
- What risks did you see with installing battery storage?
 - What made you hesitate?
- Has battery storage met your expectations?
 - Why?
 - Why not?
 - How does battery storage make everyday life easier for you?
 - Was there something that kept you up at night that it solved?
- If not battery energy storage, why not?
 - What benefits do you see with it?
 - What challenges do you see with it?
 - What risks do you see?

Conclusion

- Do you have anything else to add?
- Do you have any questions for us?
- Explain how the information will be used and the purpose of the report.
- Ask if we can get back to the person with additional questions we might have.
- Ask if the name of the interviewee can be used in the report.

A.2.2 Interview guide for employee

Filtering questions (to be checked beforehand)

- Do you have contact with customers?

Introduction

- Thank the interviewee for participating.
- Explain how the information will be used and the purpose of the report.
- Present who will be taking notes and who will be asking questions.
- Explain that they can be anonymous in the report if they want to and that we will ask again at the end of the interview.

Comfort questions

- Tell us a bit about your professional background and your current role.
 - What is your title?
 - What do you do at Miale?
 - What are your tasks?
- What is your contact with customers like?

Main part

Solar PV

- Why do you think companies consider installing solar PV?
 - What are the problems they are trying to solve?
 - What are the benefits they are trying to gain?
- What risks do you think they see with installing solar PV?
 - What makes them hesitate?

Miale Solar

- What is Miale's offer? What does Miale sell?
 - Products?
 - Financing?
 - Services?
- Why do you think customers choose Miale?
 - What do you think their opinion is of you as a supplier?
 - What do you think their opinion is about what you sell?
- Do you think Miale meets the customers' expectations?
 - Why?
 - Why not?
- Why do you think some customers keep choosing Miale? Why are they coming back?
- Why do you think some reject Miales' offer?
 - Why do they choose to not go solar?
 - Why do they choose competitors?

Financing

- Do you have any insights into Miale's financing options?
- Why do you think customers choose outright purchase?
 - What benefits do you think they see with this type of financing?
 - What challenges do you think they see?
 - What risks do you think they see?

- Why do you think customers choose lease to own?
 - What benefits do you think they see with this type of financing?
 - What challenges do you think they see?
 - What risks do you think they see?
- Why do you think customers choose PPA (power purchase agreement) to own?
 - What benefits do you think they see with this type of financing?
 - What challenges do you think they see?
 - What risks do you think they see?
- What do you think they will think about the new financing option?
 - About the terms? (8% interest over 7 years via I&M. If the bank approves.)
 - About the ownership? (Before from Miaie to customer, now from bank to customer)
 - About the new process?

Battery energy storage

- Why do you think customers choose to have a battery?
 - What do you think they use the energy storage for?
 - What are the problems they faced before installing battery storage?
 - Do they usually have a generator?
 - Do they usually replace the generator with batteries, or do they keep it?
 - What are the benefits they are trying to gain?
 - What risks do you think they see?
 - What makes them hesitate?
- Why do you think customers choose not to have a battery?
 - What challenges do you think they see?
 - What risks do you think they see?
 - What benefits do you think they see?

Conclusion

- Do you have anything else to add?
- Do you have any questions for us?
- Explain how the information will be used and the purpose of the report.
- Ask if the name of the interviewee can be used in the report.

Appendix B Workshops

Appendix B consist of the full list of participants in the two workshops as well as the material used during the workshops.

B.1 List of participants

The list of participating employees from Miale can be found in Table 6.

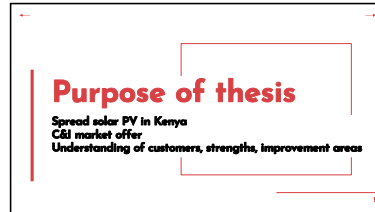
Table 6. List of participants in workshops.

Title	Name
Workshop 1	
Design Engineer	George Munyalo
Director	Isaac Macharia
Portfolio Development Manager	Kevin Ooro
CEO	Stephen Adwong'a
Implementation Engineer	Tom Kowojee
Workshop 2	
Director	Jonas Barman
Director	Sebastian Trygg

B.2 Material



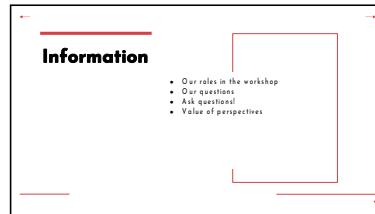
1



2



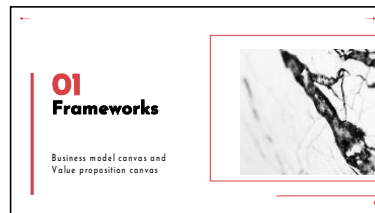
3



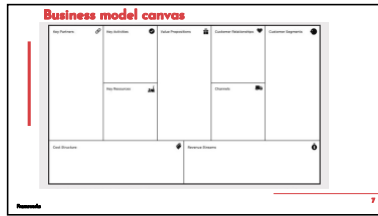
4



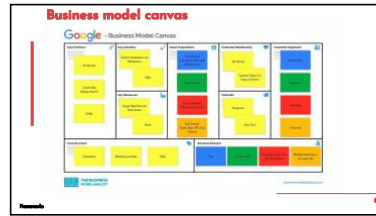
5



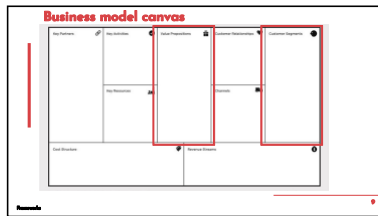
6



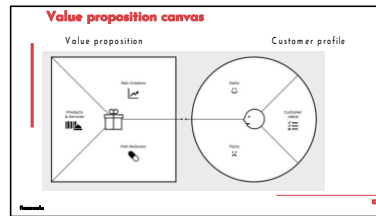
7



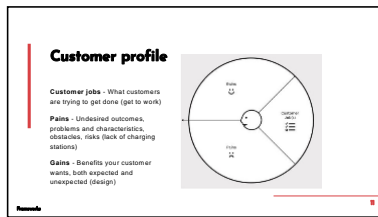
8



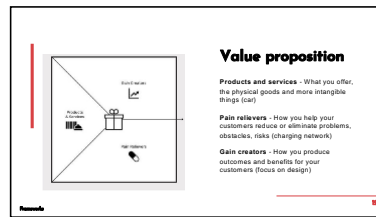
9



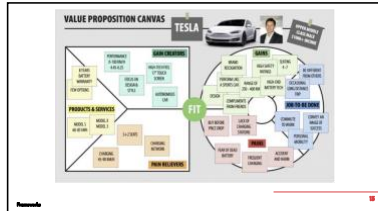
10



11



12



13



14

Early findings
Customer profile

Customer jobs - What customers are trying to get done

Pains - Undesired outcomes, problems and characteristics, obstacles, risks

Gains - Benefits your customer wants, both expected and unexpected

15

Brainstorm
Value proposition

Products and services - What you offer, the physical goods and more intangible things. What are Mia's products and services?

Pain relievers - How you help your customers reduce or eliminate problems, obstacles, risks. What pain relievers do Mia have?

Gain creators - How you produce outcomes and benefits for your customers. What gain creators do Mia have?

16

Break

17

Presentation of Value proposition

Do you agree?

18

03
Discussion on fits and misfits
 Transition and discuss based on Miale's water map



19

Connecting the dots

- One by one around the table
- We will not question what notes someone else thinks fit together
- We will have a discussion afterwards

Can we all agree on these pairings? Any changes? Thoughts?

20

Break

21

Summary of the most important findings

- Do you agree with this?
- Anything else you want to highlight?

22

04
A growing organization
 Coping with a growing organization



23

Other challenges?

- Are there other challenges which Miale are facing?
- What fits can be hard to keep when you are growing?


24

Evolution and Revolution as organizations grow by Greiner

Five phases of growth

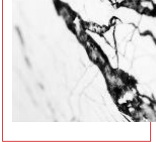
- Creativity
- Direction
- Delegation
- Coord
- Collaboration

Where is Miale?



25

Thanks!



26

Appendix C Customer Profile

Appendix C consist of individual customer profiles for each customer that was interviewed.

C.1 Customer profiles

See figure 17-23 for a detailed customer profile for each customer.

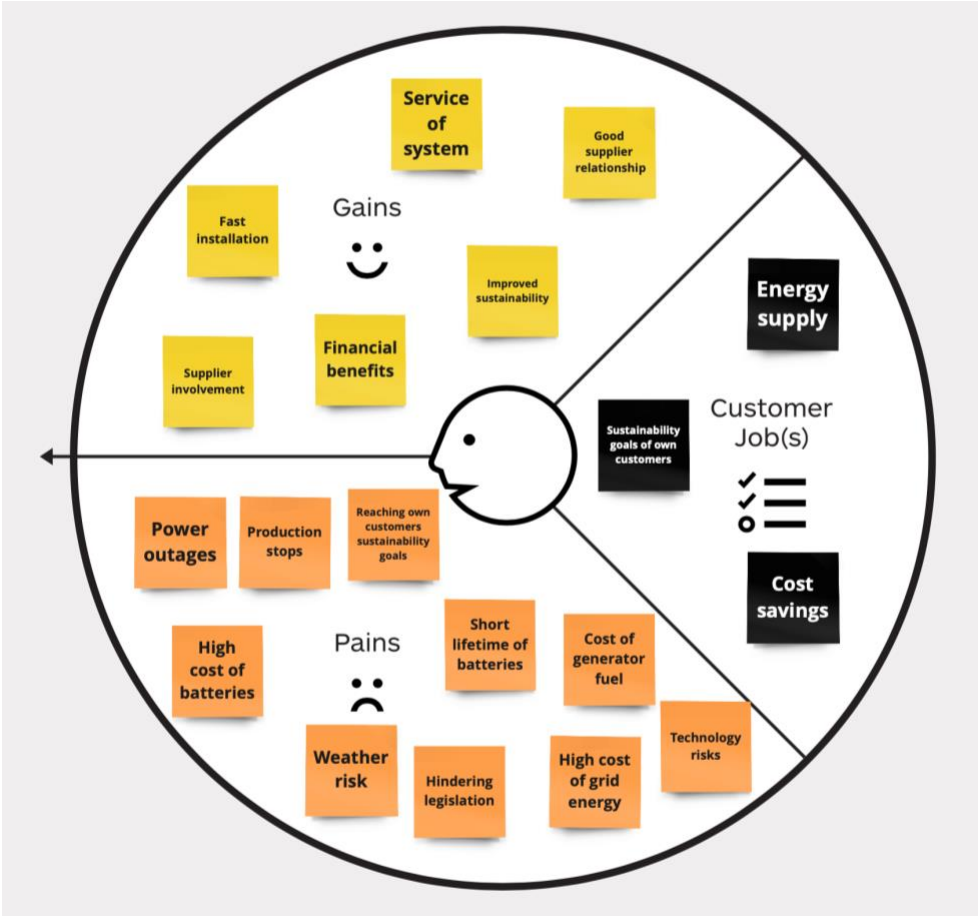


Figure 17. Cylinder Works Ltd. customer profile.

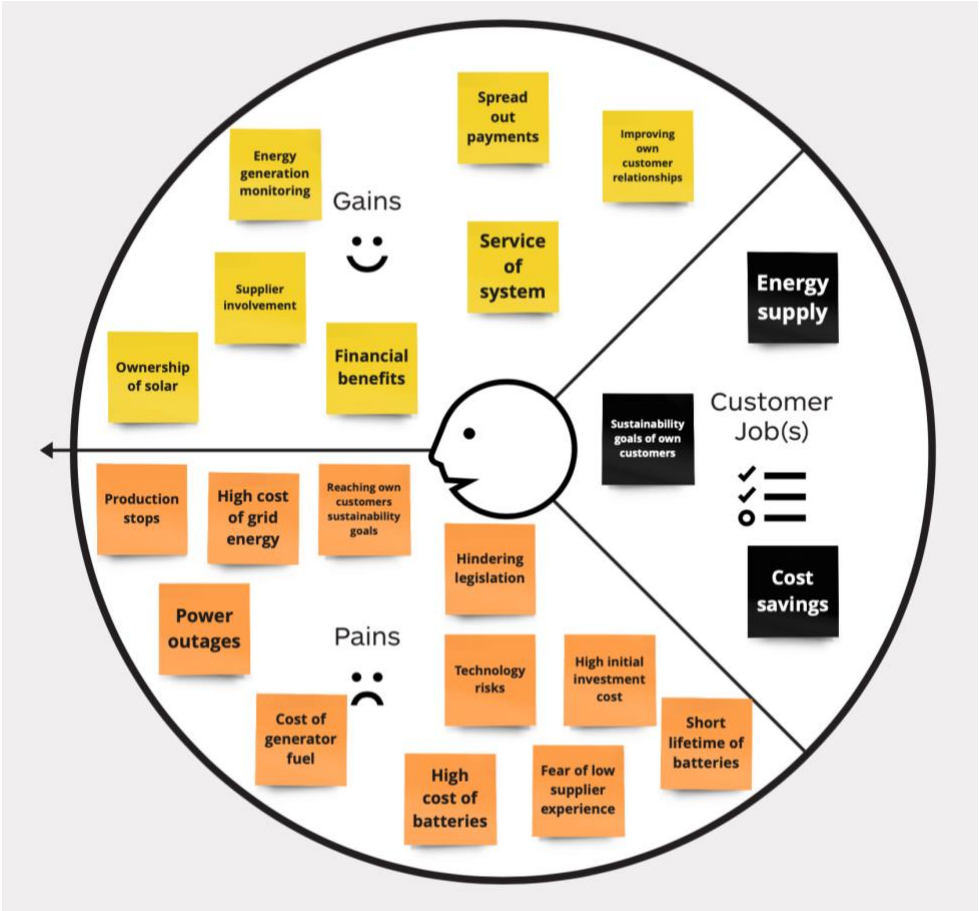


Figure 18. East Africa Spectre Ltd. customer profile.

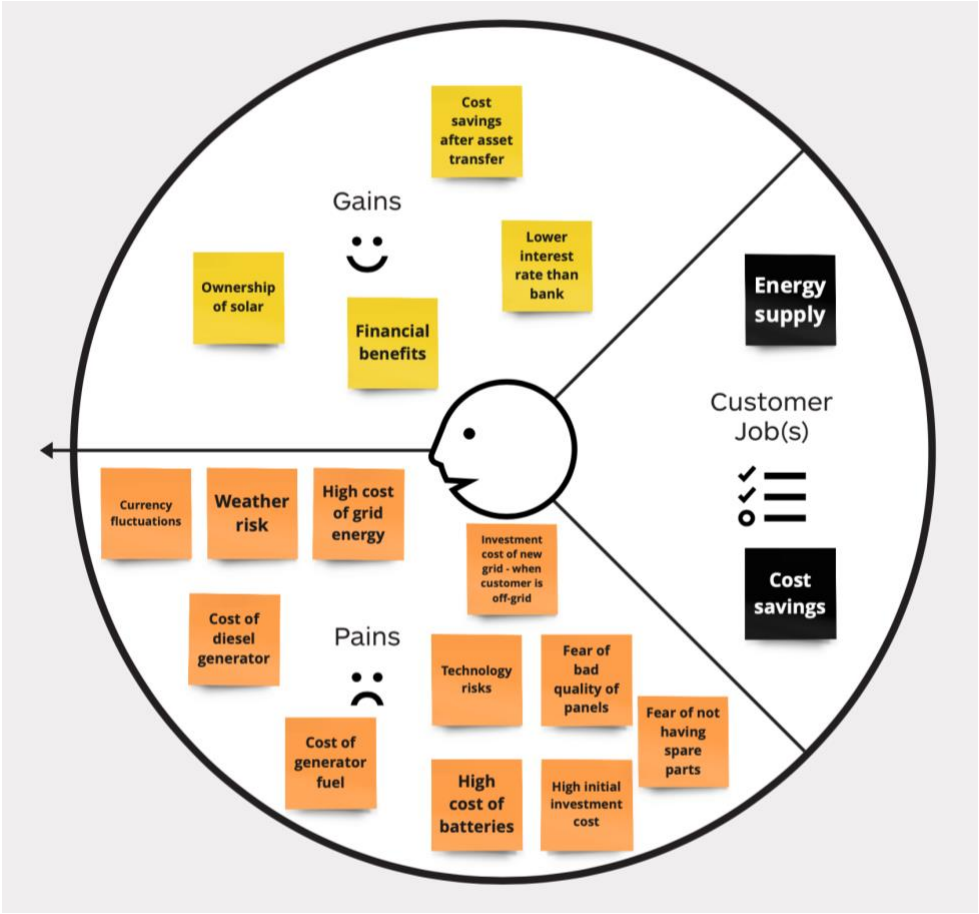


Figure 19. Haywood Farm Ltd. customer profile.

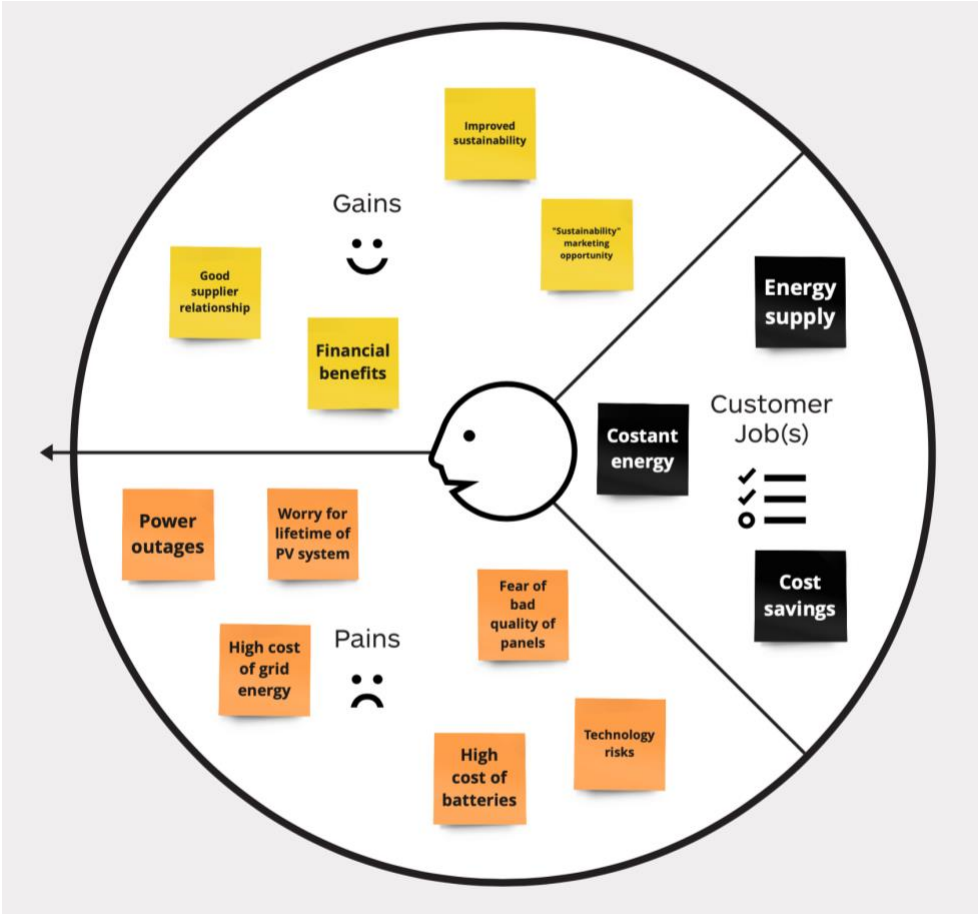


Figure 20. Kenswed Org. customer profile.

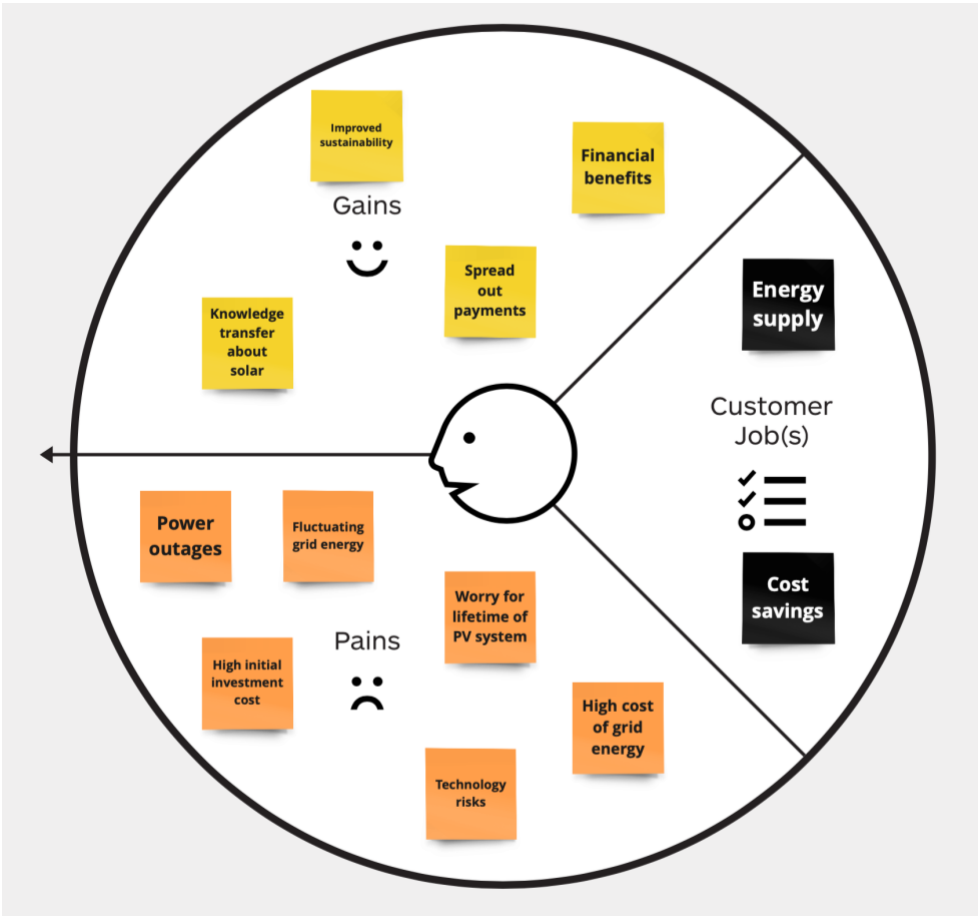


Figure 21. Naivasha Water and Sanitation Company Ltd. customer profile.

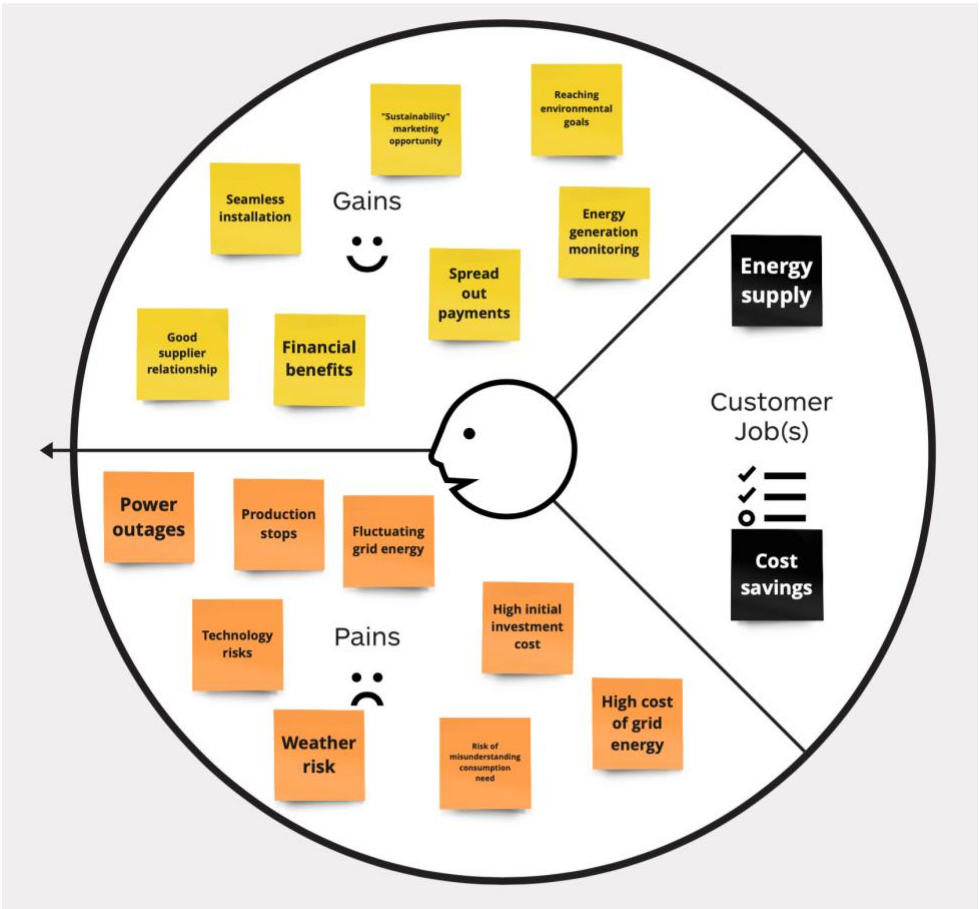


Figure 22. Signode Kenya Ltd. customer profile.

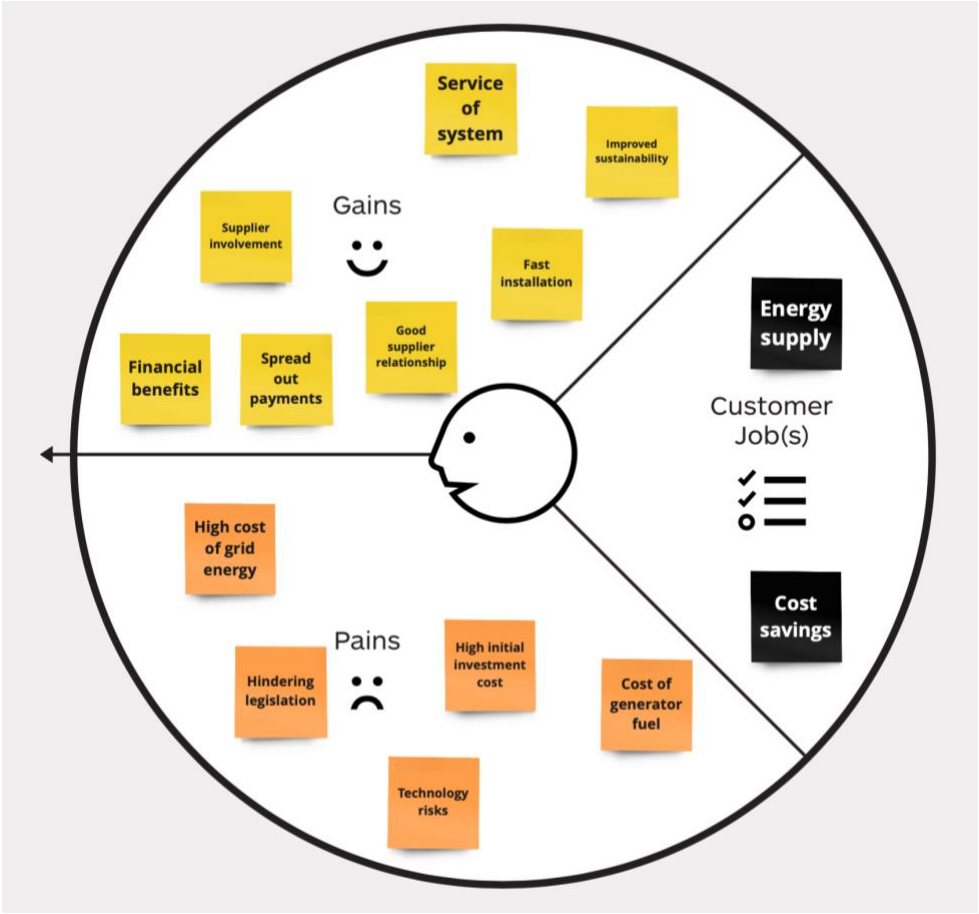


Figure 23. Van den Berg Kenya Ltd. customer profile.