



Standby power trolleys to mitigate load shedding using a lease or lease-to-buy business model

Applied Research Business Venture Project

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List of Acronyms

UPS – Uninterrupted Power Supply

AC – Alternating Current

DC – Direct Current

LED – Light Emitting Diode

LCD – Liquid Crystal Display

POPIA – Protection Of Personal Information Act

ARP – Applied Research Proposal

BVP – Business Venture Project

GPS – Global Positioning System

VRIO Analysis – Value, Rarity, Imitability and Organization Analysis

PESTLE Analysis – Political, Economic, Social, Technology, Legal and Environment Analysis

STP – Segmenting, Targeting and Positioning

B2B – Business to Business

B2C – Business to Customer

FMEA – Failure Mode and Effects Analysis

RPN – Risk Priority Number

ARP Information

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Executive Summary

The business venture envisions a brighter future for South Africa by providing reliable and affordable power solutions, with a focus on empowering small businesses. Exploratory research, leveraging a qualitative research methodology, was conducted and a public demand for a solution was established. The unique approach involves a power trolley lease and lease-to-buy model, allowing customers to test backup power solutions before committing to a specific solution. To support its vision, the business developed key capabilities such as customer management, product development, distribution, and marketing. An analysis indicates the potential for competitive advantage once the organization is established.

In the macro environmental analysis, the business identifies a market opportunity based on persistent power challenges in South Africa and economic constraints, creating a demand for cost-effective backup power solutions. The industry analysis suggests an attractive industry with low buyer power and limited competitive rivalry. The ventures positioning statement emphasizes a comprehensive service experience, offering innovative backup power products (power trolleys) with connected customer support. The venture's operational plan is driven by a supply chain strategy focused on responsiveness to meet the urgent backup power needs of small businesses, aligning with the connected marketing strategy.

The venture plans to focus its marketing and sales strategy on digital channels like Google advertisements and Facebook advertisements, specifically targeting the Gauteng region to minimize costs associated with physical advertising. The business adopts a differentiation pricing strategy, emphasizing quality service, given the lack of direct competitors. The founder plans to bootstrap the venture to retain control and minimize costs. The venture's preliminary financial forecasts project positive net profit, balance sheet growth, and positive cash flow after the second year of operation. It was concluded through methodical research that a solution to power outages in the South African context would provide a strong basis for a business venture. The business analysis conducted showed the optimal strategy and process to exploit the opportunity identified.

Chapter 1: Introduction

Statement of Purpose

The purpose of the study is to inform the design and build of a business venture plan in the battery technology industry. The research will specifically be leveraged to indicate the best method in which power trolleys can be utilized to service the household and small business market during power outages. The proposed venture aims to examine and then inform the business plan on the viability of offering the technology via a lease or lease-to-buy business model to improve both the reliability and accessibility of electricity in residential households and small business settings. The business venture is committed to producing cost-effective and sustainable value to its customers in the Gauteng region.

Overview

The first incident of what would soon be a regular occurrence of nationwide load shedding for South Africans transpired in the late months of 2007 (Walsh, et al., 2021). The term “load shedding” refers to routinely scheduled power outages, which involve the intentional shutdown of a portion of the country’s electricity grid to protect the network and reduce the possibility of a widespread blackout (Walsh, et al., 2021). Load shedding’s detrimental effects are not just limited to businesses and job losses, but also stretch into the households and personal lives of South Africans (Khumalo, 2022).

In the midst of Eskom’s announcement that load shedding will continue for the foreseeable future, many South Africans have turned to backup power solutions to provide their homes with electricity during the hours of load shedding (Ziebell, 2021). Ziebell continues to state that the three most common methods of grid-tied backup power solutions are generators, photovoltaic (solar panel) solutions or battery-inverter units (2021).

The most sustainable, but expensive, backup power method is the photovoltaic solution which leverages solar panels to harness sunlight to be converted into electricity and stored in batteries until needed (Samad, et al., 2013). Samad et al expands to include that this solar type solution is integrated into the household’s electrical DB board and can provide power to the entire home in the event of a power outage (2013). Generators provide power to households through the burning of fossil fuels and can vary in size from only providing electricity to a single plug to providing electricity to an entire home via integration with the home’s electrical DB board (Gerhardt & Biermeier, 2023).

The inverter unit works by charging a battery while the supply of electricity is available to the household and then making the power stored in the battery available for use when the home's power is interrupted (Fuji Electric Global, 2020). The inverter unit enjoys advantage over the generator unit due to the fact that it does not make a noise, it does not require fuel or oil to operate and it does not have to be serviced regularly (Dahal, et al., 2015). Given that the inverter unit solution is not as encompassing when compared with the photovoltaic solution, it still enjoys a significant cost benefit over its solar panel competitor (Brill, 2023).

One of the many applications or uses of the inverter unit in a household is via a power trolley. A power trolley is a flexible electric device specifically designed to supply electricity to a part of the household (usually via a single electric outlet) in the scenario where the supply of electricity from the utility to the household fails (OmniPower, 2018). The power trolley consists of three main parts which include a battery, an inverter unit and an enclosed trolley which acts as a housing for all the parts. The power trolley operates by plugging it into the home wall socket and then allowing users to plug in appliances to the power trolley itself. When the power feed from the wall socket is interrupted by load shedding, the power trolley will automatically switch the power of the connected devices to the trolley battery (Geewiz, 2023).

Figure 1: Power Trolley. Branson Holdings: (Smart Power Systems, nd)



The power trolley acts as an intermediary between the electrical appliances connected to it and the power supplied from the utility (Eskom). This not only enables a seamless switchover from utility power to battery power when the Eskom power is interrupted, but also protects the connected devices and appliances from the electricity surges that occur during load shedding (Energy Independence, 2002). Power trolleys have numerous designs and sizes which impact cost, but tend to range between R5000 and R18000 per unit (Labuschagne, 2022). Thus, it is expensive to purchase backup power solutions to battle the effects of power outages.

The high capital expenditure associated with energy generation equipment (backup power solutions included) has led to the development of many unique financial models. A lease-to-purchase (lease-to-buy) agreement is one such model, which consists of two parts. The first part is the lease contract that stipulates that the lender will lease the equipment for a specific period (or lease period) of time and the second part (usually optional), stipulates the terms that bind each party to the standard provisions of a purchase agreement (Koontz and Associates, 2020). The South African market has numerous suppliers from which generators or photovoltaic solutions can be obtained via lease or lease-to-buy options (Mavundza, 2020). However, this is not the case for inverter unit solutions (like power trolleys), as this market has remained almost completely untapped which brings to light a potential business opportunity (market gap).

The lease and lease-to-buy business models offer many opportunities and have many risks in any industry, with the energy sector being no different (Tongsopit, et al., 2016). A major opportunity offered via the lease and lease-to-buy models includes access to a larger market as more people can afford lease services due to the expenses being far lower than those associated with ownership (Huang, et al., 2021). Some risks pertaining to customer non-payment, high upfront costs and lack of customer awareness also exist in this market (Tongsopit, et al., 2016).

Research Questions

- What are the demand dynamics and distinctive characteristics of the backup power market, and how can financial gain be realized through the strategic utilization of power trolleys within this market?
- How feasible is the introduction of a product to the market through a lease or lease-to-buy model, and to what extent does the sustainability of the business model persist given the inherent risks associated with the offering?

Research Objectives

- To determine the feasibility and the layout of the business plan of a business venture offering power trolleys via rental agreement, with the option to purchase afterwards, to the market.
- To leverage the findings of the research conducted to inform the design and creation of a new venture business.
- To establish a financial model that can project figures with regards to start-up costs, pricing and revenue streams to forecast venture success, given the current financial constraints.
- To develop an encompassing business model (conceptual model) that will incorporate the different areas of business as well as external market factors to yield a venture design that will provide value to customers.

Justification of the Study

The business venture seeks to establish solutions that could improve the overall quality of life of households, and minimize power outage impact on small businesses, through exploiting market opportunities and leveraging technology. The entrepreneurial venture seeks to enter new markets to extract untapped value in the shape of new revenue streams and environmental impact. The importance of the venture is highlighted in that the study addresses the research questions posed and will provide valuable insights on the topic.

The business venture will leverage the results from the study to gauge whether or not a market appetite exists to take up the offering via a lease or lease-to-buy model. The results of the study will influence the business strategy, competitive outlook, operations, and organizational design, among other business areas of the venture. Other stakeholder groups impacted by the outcome of the business venture study include future entrepreneurs, researchers, economists, product developers, statisticians and marketing specialists who can extrapolate value from the data provided by the study.

Delimitations of the Study

The insights of the study will be extremely valuable; however, it is important to keep in mind that the study will be limited to the Gauteng region. It is also important to keep in mind that the specific data points to be collected regarding household perspectives only hold true when load shedding plays an active role in everyday life. If load shedding ever were to cease, consumer sentiment and preferences would need to be re-measured.

A business model delimitation is also applicable to the proposed business venture. The business venture specifically focuses on its unique business model of the lease and lease-to-buy of power trolleys, and the traditional business model of merely selling power trolleys would not form part of the scope of the venture. The focus of the effectuation theory is primarily on small-scale start-ups and entrepreneurial ventures, which means that the theory will only be able to support the venture (as it grows) up to a certain point. This implies that the business venture might need to transition to another framework when it evolves to a medium-sized business.

Structure of the Applied Research Business Venture Project

The applied research business venture project will be structured in the following manner. Chapter 1 serves as an introduction to the study. Chapter 2 shows a view of the current critical literature available on the topics of power trolleys and lease and lease-to-buy business models, as well as the framework that will be followed by the venture. Chapter 3 speaks to the details of the research methodology used. Chapter 4 unpacks the key findings that were made during the qualitative research. Chapter 5 is the business plan that was informed by the results as discussed in Chapter 4. Chapter 6 is the conclusion of the project.

Chapter 2: Literature Review

Introduction

Load shedding is implemented by Eskom across different parts of the nation on a rotational basis to reduce the stress on the electricity grid through purposely switching off electricity to homes and businesses in a specific area (Steenkamp, et al., 2016). South Africa experienced over 150 days of load shedding in 2022, which is up 75 days from 2021 and up 54 days from 2020. South Africa's power utility has warned that there are no observable signs of improvement and that load shedding will not drop below stage 2 for the foreseeable future (Crisis24, 2023).

The year 2022 was an extremely load shedding intensive year for South Africans with more than 3 773 hours of total power outages experienced by the country (Hako, 2023). An analysis by the Bureau for Economic Research shows an even further intensification of load shedding in the year 2023 with South Africans having experienced more power outages in January and February (2023) than the cumulative sum of all power outages in the years of 2018, 2019, 2020 and 2021 (Daily Investor, 2023).

Background to Venture Opportunity

Since the start of load shedding, South African households have seen a steep increase in home appliance expenses with 38% of households having had to replace their refrigerators or freezers due to damage brought on by power outages or electricity spikes (Stadler, 2022). South Africa has an estimated 18 million households, of which about 16.2 million households have access to electricity (Stats SA, 2022). The average electricity consumption per household is constantly rising with household electronics and white appliances being the primary drivers of the trend (Ürge-Vorsatz, et al., 2012).

The sudden electrical spikes from load shedding can severely damage, and in some cases destroy, sensitive household appliances like televisions, computers and broadband internet (Wi-Fi) routers (FAIS Ombud, 2023). Internet service providers (specifically broadband) are becoming increasingly concerned about the deteriorating performance of telecommunication services to households during load shedding (Comler, 2023). One of the many frustrations faced by broadband internet users during load shedding is that many fibre customers experience network loss at the same time. Thus, several users attempt to re-join the network simultaneously when the power in an area is restored which causes significant network traffic and overloading of systems. This can cause some users' broadband routers to take up to three hours to reconnect to the internet (after power has been restored) (Manyozo, 2019).

Cellular service providers have seen significant increases in cellular data network traffic in areas experiencing load shedding causing massive cellular network congestion. One of the factors driving this behaviour is additional users getting onto cellular networks due to the unavailability of fibre broadband networks during the hours of load shedding (Kennedy, 2022). Considering the already high unreliability of cellular towers in areas of load shedding, the large influx of users onto the cellular network during load shedding has numerous negative implications for households. Not only does this imply slow internet responses on cellular networks, but also causes increased internet costs to households since mobile data is significantly more expensive than fixed fibre data (Thompson, 2021).

Home backup power solutions can be leveraged to solve both of the aforementioned problems. Since optical fibre infrastructure lines remain operational during load shedding, backup power solutions only need to keep Wi-Fi routers in the household powered for users to remain connected to the internet during load shedding (Hill, 2022).

Market Size and Growth of Battery Technology

The global battery market is anticipated to increase by a factor of four between 2021 and 2030, with the market's dominating sector being lithium-ion batteries. The global battery market was estimated to be worth about \$112 billion in 2021, but is anticipated to grow to approximately \$424 billion by the year 2030 (O'Dea, 2023). In 2021, the global market for household backup power, specifically, was estimated to be worth about \$9.51 billion. The market is anticipated to expand at a compound annual growth rate of 7.6% from 2022 to 2029, equating to a global market value expansion from \$10.32 billion to \$17.28 billion (Fortune Business Insights, 2022).

The lithium-ion battery segment, which is primarily driven by the electric vehicle industry, has dominated the market and accounted for 40% of the worldwide revenue share in 2022 (Grand View Research, 2022). The increased adoption of lead acid batteries in vehicles and uninterrupted power suppliers (inverter units) is expected to drive substantial expansion of the lead acid battery industry. In the year 2022 uninterrupted power supply units (inverter units) accounted for more than 9% of worldwide revenue and is predicted to experience the greatest compound annual growth rate of 7.4% between the years 2023 and 2030 (Grand View Research, 2023).

The market for lead acid batteries in Africa was assessed at \$4.2 billion in the year 2021 and is anticipated to increase at a compound annual growth rate of 4.1% from 2022 to 2031. South Africa, specifically, has always held a sizable portion of the African continent's lead acid battery industry (Transparency Market Research, 2022). The growth of the South Africa battery market and its value chain could lead to the emergence of a thriving new sector with annual revenue

potential of up to R36 billion by as soon as the year 2032 (Erasmus, 2023). Erasmus continues to explain that South Africa's battery storage market is projected by the World Bank to increase from 270 megawatt-hours (MWh) in 2020 to 15 000 megawatt-hours (MWh) in the year 2030 (2023). A more comprehensive summary of the different battery technologies and their applications can be found in [Appendix E](#).

Power Trolleys

Inverter units (power trolleys) are comparable to UPS (uninterrupted power supply) units and operate using a battery storage system that transforms DC power into AC power which is used by the majority of household devices and appliances. Inverter units are generally used to power items like Wi-Fi routers, TVs, computers and low energy (LED) lamps (VSP, 2021). The power trolley consists of three main parts which include a battery, an inverter unit and an enclosed trolley itself which acts as a housing for all the parts (Geewiz, 2023). The power trolley serves as a conduit for the utility's power supply to the household devices and appliances connected directly to the trolley. This not only makes it possible for the connected devices to transition seamlessly from utility power to battery power when Eskom's power fails, but it also shields the connected devices from electricity spikes that occur during load shedding (Energy Independence, 2002).

There is no maintenance required on power trolleys, with the exception of the battery replacement when the battery reaches the end of its useful life (i.e. when it has reached its recorded number of cycle times). The power trolley's battery unit can easily be replaced by disconnecting the old battery from the inverter mechanism and reconnecting the new battery (Illidge, 2023). The power trolley, like the name suggests, is mounted on 4 wheels for increased manoeuvrability around the home and has a built-in LCD screen to display the current status of the device and load applied to it. The power trolley also has an integrated buzzer alarm to warn users when the trolley is overloaded or is experiencing technical difficulties (Ellies, 2022).

The South African power trolley (inverter unit) market has seen a massive growth in the last two years with some of the retailers reporting a 62% increase in year on year sales (Labuschagne, 2022). Certain South African retailers have experienced more than a 300% increase in inverter unit (power trolley) sales specifically between the months of November 2022 and January 2023 (Steyn, 2023). Thus, both the South African battery technology industry, as well as the power trolley industry have experienced significant growth in the last three years and have projected even higher growth figures for the years to come.

Market Structure - Lease and Lease-to-Buy Models

The lease and lease-to-buy business models offer many opportunities and have many risks in any industry, with the energy sector being no different (Tongsopit, et al., 2016). Lease-to-buy contracts give one the opportunity, but not the responsibility, to purchase a product at the end of the lease under the stipulated agreements. The option to purchase simply expires at the conclusion of the lease agreement (Floger, 2023). The biggest risks and barriers associated with lease and lease-to-buy backup power solutions refer to customer non-payment, high upfront costs and lack of customer awareness (Tongsopit, et al., 2016).

The advantages of the lease and lease-to-buy models include access to a broader market, since more individuals can afford leasing services due to the costs being significantly lower than those of owning (Huang, et al., 2021). Lease-to-buy business models offer a rare opportunity to the market as they provide an opportunity to provide assistance to low-income earners to access and finance equipment or other assets. Leasing models allow for the progressive increase of asset ownership and further allow users the opportunity to test an asset before purchasing it (Department of Human Settlements, 2018). The capitalization of the opportunity enlarges the size of the serviceable market contained within the total available market by including previously hesitant buyers.

Over and above the advantages presented by lease and lease-to-buy models, the model also carries with it the risk of non-payment. The main contributing factors to the risk of non-payment in the technology leasing industry, as well as their associated severity of risk, are identified as follows (Ekhlakov, Saprunov, Senchenko , & Sidorov , 2023):

Table 1: Risks of Non-Payment. Mathematics, 11(3): (Ekhlakov, et al., 2023)

Risk Factor	Risk Source	Risk Severity
Lessee bankruptcy	Economic issues on the side of the lessee	High
Arrear payment by the lessee	Economic issues on the side of the lessee	Moderate
Equipment malfunction brought on by the fault of the lessee	Technical issues on the side of the lessee	High
Equipment malfunction brought on by external factors	Technical issues on the side of the lessee	Moderate
Equipment theft by the lessee *	Social elements on the side of the lessee	Low
Equipment being recalled by lessor	Technical or economic issues on the side of the lessor	Low

* Assume that equipment is insured against theft

The successful facilitation of new business models (like lease or lease-to-buy models) in a business venture require essential enablers like smart meters, efficient communication infrastructure, remote network control and network digitization to be put in place. A concrete long-term policy framework that includes enabling policies and unambiguous regulatory requirements is also essential (Siksnyte-Butkiene, et al., 2023). The ability to develop and maintain lease and lease-to-buy contracts and models is made simpler every year through innovation and continuous technological improvements (Cao, 2020).

The lease and lease-to-buy business models provide enormous value to clients operating in a variety of uncertain settings due to the flexibility that the models offer (Tongsopit, et al., 2016). Lease-to-buy models of certain assets can provide numerous cash flow benefits to potential buyers, as the purchase of the asset can be spread out over time without relying on credit and thus incurring interest. Lease and lease-to-buy business models for photovoltaic solutions have been around for decades and are currently being used in many countries across the globe (Agrawal, Toktay, & Yucel, 2022). However, the same cannot be said for inverter unit-based backup power solutions like power trolleys.

Theoretical Background - Effectuation Theory

The effectuation theory is the core element of an entrepreneurial framework that stands in opposition to the prevalent causality school of thought in entrepreneurship research. The theory rejects the notion of pre-existing possibilities and instead focuses on how entrepreneurs handle the continual task of developing their businesses when there are few resources available and the environment is unpredictable (Nielsen & Lassen, 2012). Effectuation theory has emerged as a major cognitive science-based framework for explaining how embryonic entrepreneurs launch new ventures in the face of uncertainty (Kitching & Rouse, 2020)

Effectuation entrepreneurial knowledge is described as a decision making logic that provides a clear foundation for action in the business environment (Read, et al., 2009). Similar to design thinking, effectuation also fosters creativity in the context of new business ventures and helps contribute to areas such as innovation (Klenner, et al., 2021).

The conceptualization of a new business venture formation process with regard to decision making logic is shaped according to five principles (Kitching & Rouse, 2020):

- Start business ventures with the tools (skills, knowledge, etc.) at their disposal
- Invest in new business ventures only that which they can afford to lose
- Create a network of “self-selecting” stakeholders that can be leveraged via potential partnerships to extract business value

- Find a way to take advantage of unforeseen circumstances
- Leverage non-predictive strategy to control and shape the future

The principles of effectuation are closely aligned with the nature of decision making in start-ups where experimentation, collaboration and adaptability are often crucial (Sarasvathy, 2001). The effectuation process is particularly relevant to the context of start-ups due to the dynamic and uncertain nature of their operating environments (Sarasvathy, 2001).

In summary the effectuation theory demonstrates how important resourcefulness, innovation and flexibility are in the context of entrepreneurship (Kitching & Rouse, 2020). Entrepreneurs may apply the guidelines of the effectuation theory to improve their chances of business success through using their current available resources to create value and expand their business (Kitching & Rouse, 2020).

Other Business Frameworks Leveraged

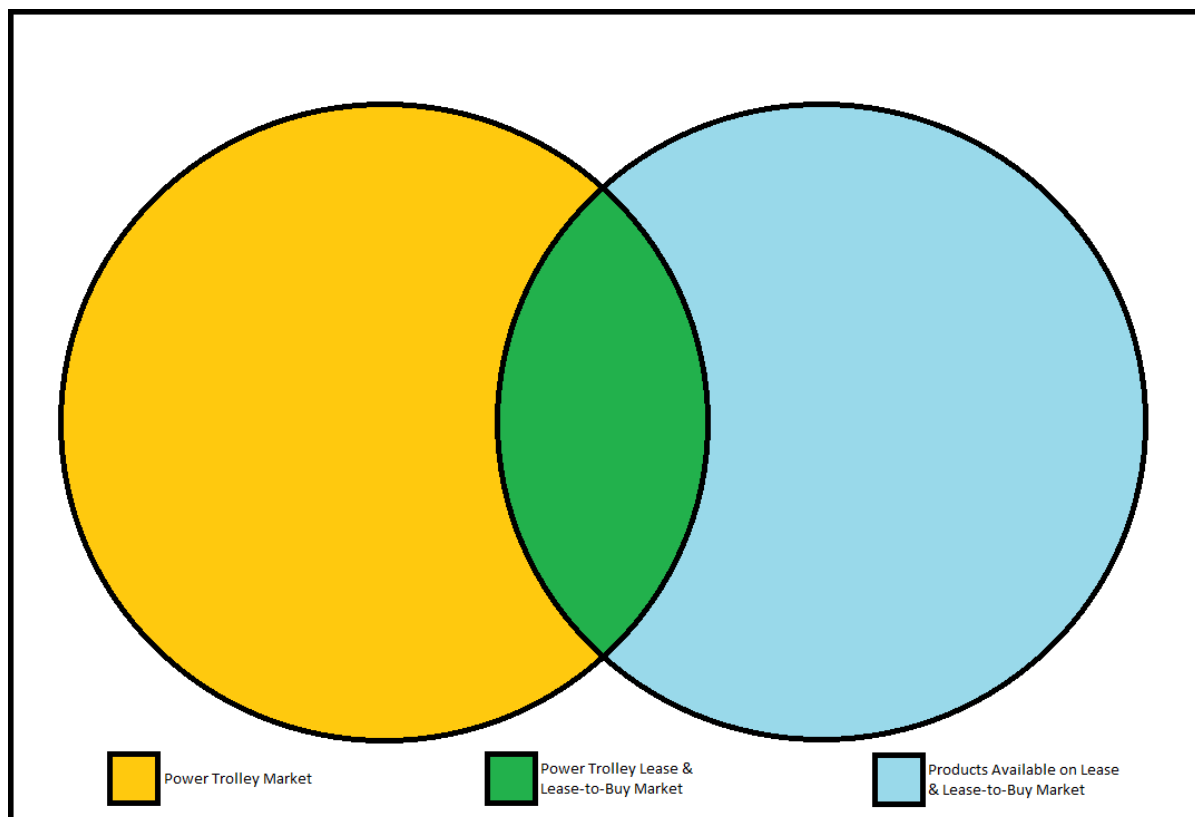
The Porter's 5 Forces model is a framework that can be used to determine a start-up's capacity to comprehend the strategic consequences of a venture within a particular industry (Porter, 2008). The connected strategy approach is used to engage customers and maintain close relationships from a marketing perspective. A business should establish a close relationship with its clientele such that the delivery of goods or services is ready and available even before customers are aware of their own demands (Association of MBAs, 2019). The VRIO framework is used to identify strategies of competitive advantage through considering capabilities from a value, rarity, imitability and organisational perspective (Barney, 1997).

Business Venture Opportunity (Research Gap)

A business venture opportunity exists in the incorporation of battery technology, particularly power trolleys, into a unique business model that is both affordable (cost effective) and reliable. Through leveraging low-cost battery technology, the venture plans to offer affordable backup power solutions to households, offices and small businesses to combat the effects of power outages. Through the innovative combination of the business venture's unique product and business model of lease or lease-to-buy options, the venture seeks to provide an uninterrupted supply of power to essential devices during power outages. Through the capitalization of the market opportunity the business venture seeks to mitigate the impact of load shedding on productivity and daily life.

Unique Market Offering

Figure 2: Market Opportunity Diagram



The South African market contains numerous vendors and suppliers that sell power trolleys as shown in yellow in the Venn diagram above. Power trolleys and other inverter unit-based solutions form a significant portion of the backup power industry today. Numerous power trolleys of different capacities, price ranges, qualities, functions, types, sizes and underlying technologies are available on the market. Thus, an entrepreneurial venture focused on selling power trolleys via traditional means will enter a market with both existing players and considerable competition.

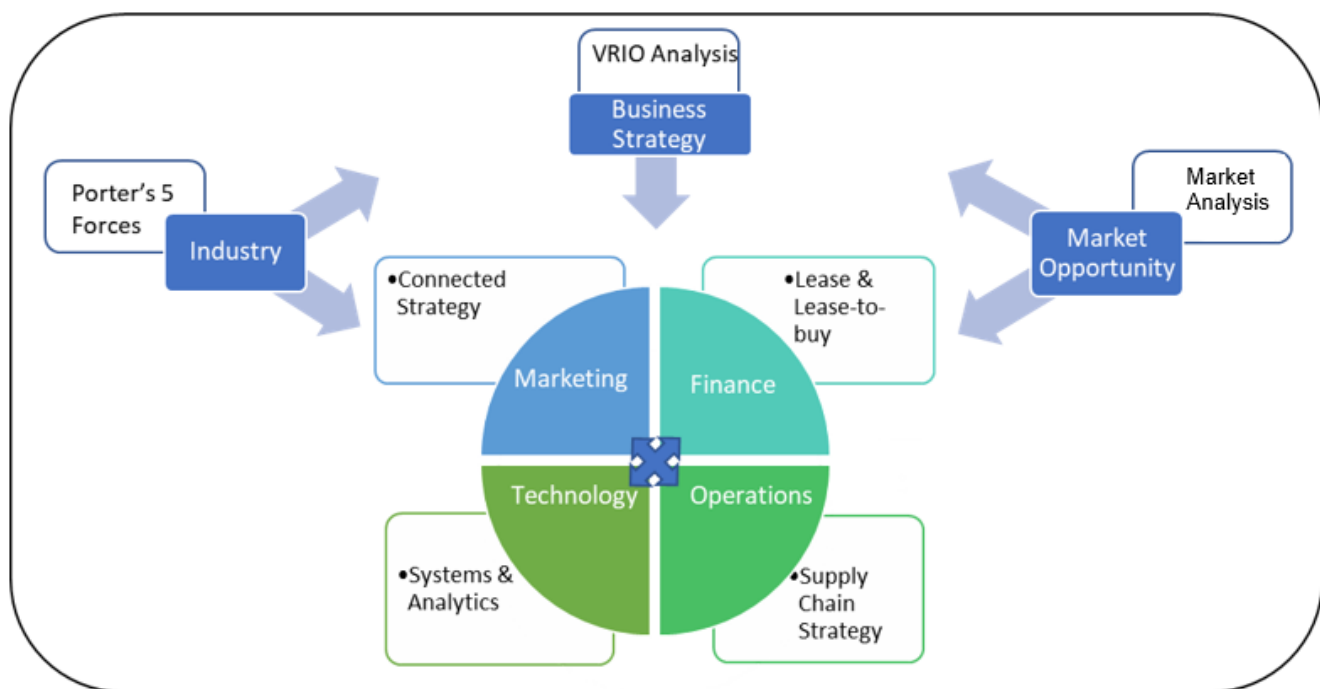
Another South African market exists where products are not traditionally bought, but rather leased for a period of time, after which the lessee has the option to purchase the product. This market is portrayed in blue in the Venn diagram above. The majority of leased products do not end with a purchase taking place, but with the lessee merely returning the leased product to its owner. Products that can be leased (and sometimes sold afterwards) on the market range from traditional products like power generators, property, laptops and vehicles to more intricate products like software licences and subscription products.

The unique marketing opportunity is created through combining the two existing markets to offer a traditional product to customers in a unique way, as shown in green in the Venn diagram above.

Hence, the business venture seeks to offer power trolleys (traditional products) to customers through a lease (and potentially lease-to-buy) model. The South African market has very few competitors that seek to lease power trolleys to its customers as a business value offering. Value is therefore not created by the product itself, but through the way in which the product is offered. Offering the product in this unique way will not only generate revenue for the venture via rent, but will also tap into the market of buyers who are too unsure to purchase a power trolley without testing it first.

Conceptual Business Model Framework

Figure 3: Conceptual Business Model Framework



The business model for the venture consists of two portions, of which the exterior portion refers to the business strategy, the specific industry and the market opportunity. The elements contained in the exterior portion influence each other, as well as the interior portion of the business model. The interior portion of the business model refers to the core section of the business model, which consists of marketing, finance, operations and technology. The elements contained in the interior portion of the business model interact and influence each other, but are also influenced by the exterior portion of the model.

The market opportunity element in the exterior portion of the model is concerned with the unique and untapped power trolley lease and lease-to-buy market as shown in green in the Venn diagram. The market opportunity will be investigated using market analysis and the outcomes can influence both the interior elements of the business model as well as the strategy on which

the business will embark. The industry element in the exterior portion of the model is concerned with the external influences of the industry on the business venture. The industry will be analysed using Porter's 5 Forces analysis and the outcomes will influence both the interior portion of the business model as well as the strategy of the business venture.

The business strategy element in the exterior portion of the business model is concerned with how the business venture will obtain sustained competitive advantage. Thus, the business strategy element will use both inputs from the industry and market opportunity elements contained in the business model. The VRIO analysis will be used to determine the capabilities and resources available to the venture to best position it in the market. The business strategy is deeply based in the effectuation theory and will thus focus on how to position capabilities and resources in the best way possible, given what is currently available to the business. The business strategy element can be influenced by the other elements in the exterior portion of the business model, but can in itself only influence the interior portion of the business model.

The interior part of the business model consists of four interconnecting quadrants. Each of the four quadrants can influence each other, but the quadrants as a collective are also influenced by the exterior portion of the business model. Even though all three of the elements in the exterior portion of the business model will influence the interior model, the business strategy element will influence the interior model to a greater extent.

The finance quadrant is concerned with the lease and lease-to-buy model and how it needs to be positioned with respect to the venture's other financial resources and responsibilities. The operations quadrant is concerned with the supply chain strategy to ensure the efficient moving of the product (power trolleys) and information (orders and payments) across the supply chain. The technology quadrant is concerned with what technologies and systems will be leveraged to enable the successful operation of the business venture. The marketing quadrant is concerned with how the venture will engage with the market and how it can align the venture in a connected strategy with its customers.

Operation of Business Model

The main focus of the business model will be on middle-income urban households, as well as on small businesses with a monthly turnover of less than R1 million. South Africa currently has approximately 4.1 million adults in the middle-income category (Eighty20, 2023) and approximately 700 000 small businesses (Opperman, 2023). However, only households and businesses situated in Gauteng will be targeted by the business venture.

The business venture will operate through customers placing orders via the business venture portal to lease a power trolley. The order placement process will guide the customer through the booking, payment and delivery procedures. Upon successful order, the power trolley will be dispatched for delivery to the customer's address or be ready for collection from the distribution point (depending on the option selected by the customer during the ordering process). On the last day of the lease the customer will have the option to purchase the leased power trolley in full, or return it to the business.

Customers will constantly be engaged through a connected strategy via the venture's online portal for the duration of the lease period. During low demand periods the portal will be used to entice customers to extend their leases on the power trolleys through incentivizing them with discounts. The portal will also be used to obtain feedback from, and provide referral discounts to, customers.

Conclusion

In conclusion, literature has shown that numerous backup power options are available in the market. This leads to the formulation of the first research question which seeks information on the market's perception on power trolleys through stipulating the question "What are the demand dynamics and distinctive characteristics of the backup power market, and how can financial gain be realized through the strategic utilization of power trolleys within this market?"

Literature has also shown that lease and lease-to-buy business models are used in many other products. However, it is unknown if the model would work in the context of the power trolley offering, which leads to the formulation of the second research question which stipulates "How feasible is the introduction of a product to the market through a lease or lease-to-buy model, and to what extent does the sustainability of the business model persist given the inherent risks associated with the offering?"

Chapter 3: Methodology

Introduction

The objective of the methodology section was to define how insights could be obtained to describe the market appetite for an entrepreneurial venture which sought to offer power trolleys to customers via lease and lease-to-buy business models. The data collected was leveraged to gain consumer insights into what people use power trolleys for, as well as the pricing they were willing to accept. The data was also used to determine the increase in willingness from consumers to purchase a power trolley, having first rented and tested it in their own environment. Ultimately the study sought to understand how the market perceived the product, as well as how it was offered.

Research Design

The three main approaches to research can be described as qualitative, quantitative or a combination of qualitative and quantitative (Creswell & Creswell, 2017). One significant benefit related to qualitative research is that it tends to draw attention to the ideas and experiences of the participants while also illuminating the motivations behind their actions and conduct. The second significant benefit includes that qualitative research sheds light on how people behave in different situations (Rahman, 2017). The characteristics identified made qualitative research the perfect option to embark on exploratory research to gain insights into answering the previously stated research questions.

Population

The population from which the data and insights were collected was from urban middle-class households and small businesses with monthly turnovers of less than R1 million. The interviewees included both decision makers in the households, as well as small business owners. Since the potential customers were identical (they only differed in the application of the technology), the same data collection instrument was used to collect both sets of data.

Sampling Method

Purposive sampling refers to instances in data collection in which the researcher picks cases to respond to questions based on specific criteria. Purposive sampling techniques are utilized in instances where sampling is done for a specific goal (Maree & Pietersen, 2007). A purposive sample was used for the study and was focused on households and businesses. A convenience sampling approach was taken to identify a sample, which was primarily located in the major cities and urban areas of Gauteng. The interview considered responses only from household

participants who lived on their own and who were responsible for funding their own solutions related to power outages (i.e. not children or students living with their parents). Similarly, business interviews were only conducted with owners of the small businesses who had decision making power with respect to purchasing backup power solutions.

Sample Size

The standard sample size to reach saturation in a qualitative study is approximately 12 to 13 responses (Laja, 2024). The sample size for the research conducted consisted of a total of 15 responses. Two thirds (67%) of the sample responses (10 responses) were focused on middle-class urban household individuals who have not yet installed permanent backup power solutions due to high costs. One third (33%) of the total sample responses (5 responses) was focused on small businesses who are not connected to business centre backup systems or who require a mobile backup power solution.

Data Collection

Face-to-face interviews, using open-ended questions, were conducted to collect feedback from respondents to gain a better perspective on potential reasons why people would potentially be interested in the offering. Interviews is a powerful tool used in qualitative research to collect data to establish views in a sample (Creswell & Creswell, 2017). The interviews were conducted in person and consent was obtained through physical signatures on a consent form (see [Appendix A](#) and [Appendix B](#) for participation information sheet and consent form respectively). The open-ended questions used in the interview guide were used to capture both the sentiment of what the market deemed as important characteristics for the product, as well as its interest in it. Interview questions 2 to 6 corresponded with the first research question and interview questions 7 to 11 corresponded with the second research question (see [Appendix C](#) for interview guide).

Data Analysis Techniques

With the use of theme evaluations, it is possible to discover research gaps and learn more about a specific occurrence or topic (Thomas & Harden, 2008). The data collected from the interviews needed to be analysed and processed into themes before being able to add valuable insights to the business venture. The thematic analysis process entailed that codes were first identified from the collected data. Once the codes had been established, they could be leveraged to identify any overarching themes that exist. The different themes were then grouped together based on their commonality and relation to the research questions.

During the analysis of data it was presumed that some of the codes generated would directly align with specific elements contained in the effectuation theory. Some of the effectuation concepts that were lifted from the data included the flexibility and adaptability required from the operational strategy, given the data which was collected on the types of electronic devices to be powered using the power trolleys. Flexibility and adaptability are important effectuation principles in business projects (Nguyen, 2018). Other concepts extracted from questions that related to important factors and situations from lease-to-buy models included concepts that spoke to how the venture's partnership and supply network should be structured.

Data Trustworthiness

In a qualitative investigation, trustworthiness serves as evidence for the claim that the findings are significant and warrant further investigation (Lincoln & Guba, 1985). To ensure that the data collected in the study was trustworthy, the following controls that relate to transferability, dependability and credibility were put in place.

To ensure transferability, the thick description strategy was employed. This strategy entailed capturing all the context and behaviours of the interviewees, over and above the interview guide questions, during the interview process. The thick description strategy and an audit trail tactics was used to confirm trustworthiness to further ensure significance of qualitative study (Lincoln & Guba, 1985). The audit trail approach was used to ensure dependability of the data collected, through accurately and thoroughly describing all the research steps taken from the beginning to the end of the research endeavour. The credibility of the data was ensured through taking a triangulation approach to collecting the data. The data was collected at different times of the year, i.e. between the months of August and November, as well as at different locations across Gauteng. Lastly the data was also collected from different types of individuals ranging across numerous income brackets.

Ethical Considerations

Every effort was employed to ensure that the responders received information that was correct, non-misleading and was communicated in a simple and easy to understand manner. The responders were in no way, shape or form pressured to complete the interview or participate in the study. The interview questions were designed so that none of the respondents were caused angst or stress and were conducted in a way that was fair and honest. The interview was also designed so that none of the respondents' names or personal contact information were collected so as to ensure that no POPIA breaches were possible. The respondents' permission was sought and confirmed before the interviews were submitted for analysis and stored. The results of the

study were kept confidential and were only be shared with the business venture and the University of the Witwatersrand. Ethics clearance certificate can be found in [Appendix D](#).

Chapter 4: Key Findings

Interviews were conducted with stakeholders and their responses recorded and analysed (see [Appendix F](#) and [Appendix G](#)). The interview questions of the study were designed in such a way to ensure that only the responses from individuals who were responsible for funding their own (or their business's) backup power solutions during power outages were recorded. The next five questions revolved around power trolleys and what the public's ideal power trolley solutions looked like. The last five questions of the interview focused on the offering of lease and lease-to-buy financing models (in the backup power context). The interview questions in totality sought to identify key market perspectives and common themes from both individuals' and small businesses' perspectives and to determine how a business plan could be structured to include one or both of these market segments. See [Appendix N](#) for full coding analysis.

Individuals

The analysis conducted showed that the ability to stay connected to the internet and to be able to charge electronic devices were the most important needs to be met during power outages. The ability to power lights and other larger electronic devices (like fridges and freezers) during load shedding were also fairly important to some consumers. The analysis yielded that working hours were the most crucial time for consumers to have access to backup power. Some respondents also communicated the need for backup power during the evenings after work and at social gatherings.

The key features of the consumer's ideal power trolley were identified to be user friendliness and the ability to understand the amount of power the power trolley can provide (capacity monitoring). The key investment factors considered by the consumers before purchasing a power trolley were identified to be the price, mobility and overall quality/durability of a specific power trolley model. The power output and the operational duration were also identified as important factors.

The analysis showed that consumer perception with regards to leasing backup power products was overwhelmingly positive. Numerous consumers agreed that not only did a potential market exist in leasing, but that they (the consumers) would have preferred to leverage a lease model prior to having purchased a specific backup power solution. The main advantage of leasing backup power solutions was identified to be the flexibility associated with leasing and not having to commit to a specific solution for a long period of time. The fact that leasing offered a less capital intensive solution was also very beneficial to consumers.

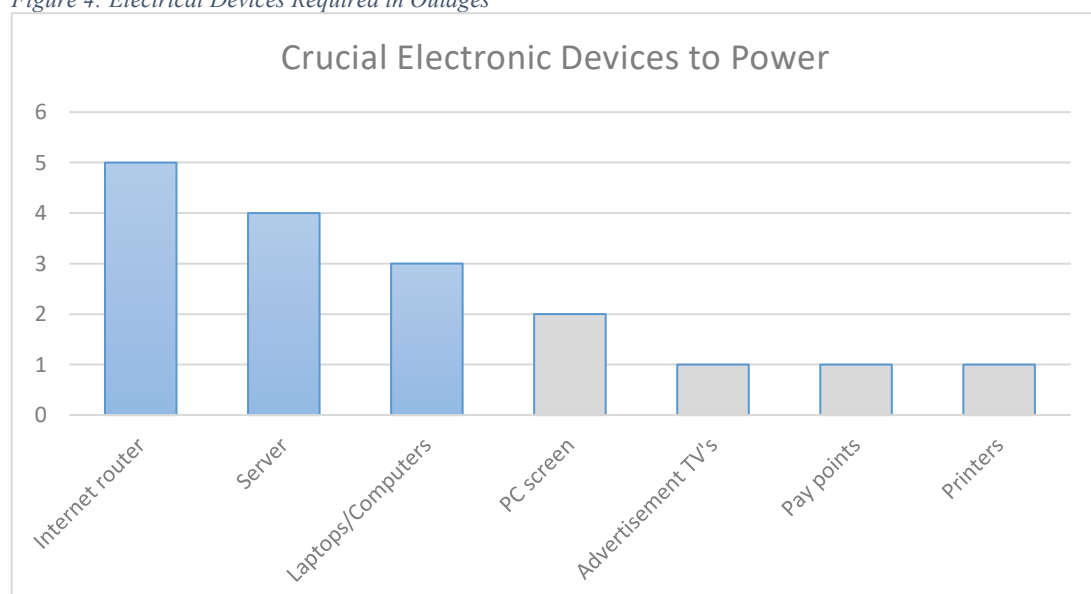
The study also highlighted some negative consumer sentiment towards leasing backup power solutions. The majority of participants were of the opinion that leasing was not sustainable in the long term due to the high costs associated with long-term leasing contracts. This was crucial information since the main factors influencing consumer decision making on backup power leasing were identified to be the costs of the lease and how frequently the solution would have been utilized. It was identified that the majority of consumers were willing to pay a monthly lease rate between R300 and R1000 per month, with the average being R630 per month.

Small Businesses

The key findings identified in the business environment were the common themes generated from the data collected. The four most important themes identified (from a total of 10 themes) to inform the business plan are as follows. The first theme speaks to the reason businesses require backup power and what types of devices they need powered during power outages. The second important theme speaks to the main factors considered by businesses when making the decision to invest in a power trolley. The third theme speaks to the perceived advantages, from the customer's perspective, of leasing a backup power solution and why potential customers would leverage the service. The last important theme to be considered for the business plan speaks to the factors that influence decision making in small businesses when considering a potential lease agreement.

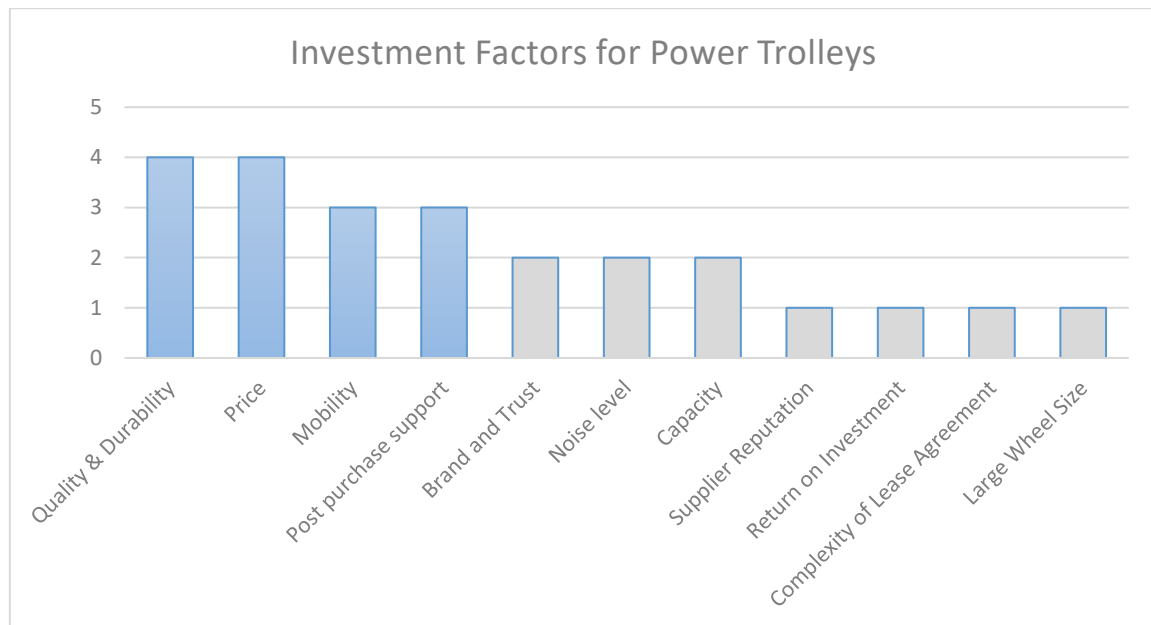
The first key theme highlights the most important needs to be met during power outages which were found to be the ability to stay connected to the internet and the ability to power office servers/computers during power outages. All businesses stated that standard working hours were the most important periods in which backup power would be used.

Figure 4: Electrical Devices Required in Outages



The second key theme showed that the price, mobility and overall quality/durability were identified to be the most important factors considered by businesses when deciding to invest in a specific power trolley model. The support and service from the supplier (post the purchase) were also identified to be very important factors considered by businesses when making decisions to invest in specific power trolleys.

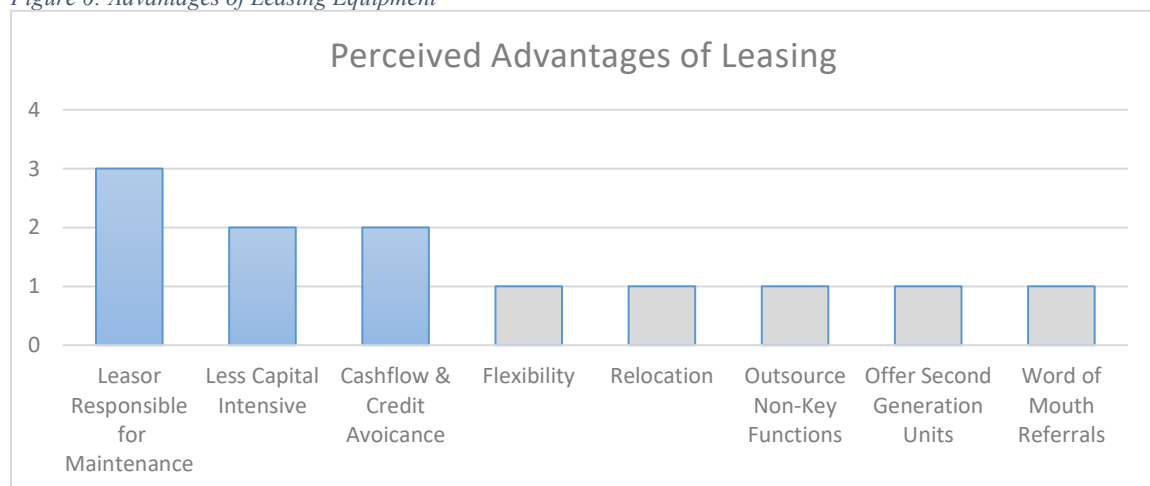
Figure 5: Important Factors for Power Trolleys



Businesses stated that user friendliness and the ability to understand the amount of power the power trolley can provide (capacity monitoring) were crucial features in the power trolley design.

The third key theme exhibited that the main advantage to businesses leasing backup power solutions was that the responsibility of maintenance was shifted from them (the business) onto the lessor. This, along with less capital expenditure, freed up more cash to be used in value-adding business operations.

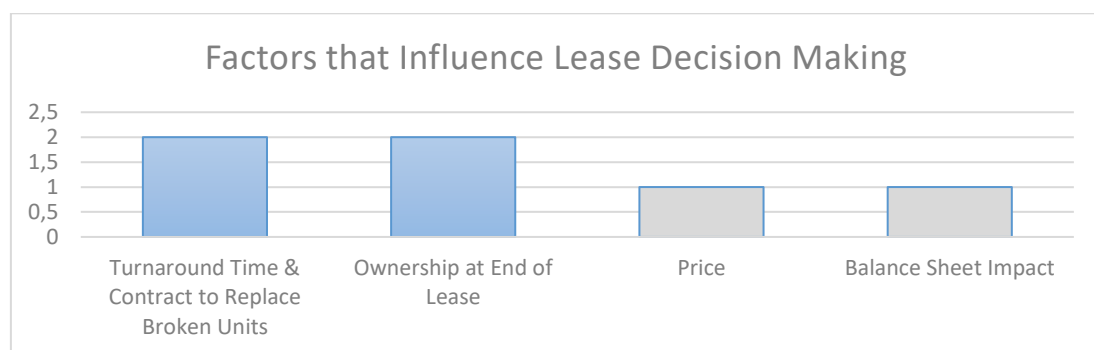
Figure 6: Advantages of Leasing Equipment



The primary business perceptions regarding the leasing of backup power products were overwhelmingly positive, with 100% of interviewed businesses (particularly those who want to preserve capital) agreeing that not only did a valid market exist in leasing, but that they themselves would leverage a leasing model prior to purchasing a backup power solution. It should also be noted that some businesses did share views of concern stating that leasing in itself might not be sustainable in the long term due to high costs accumulated over time.

The fourth key theme identified yielded that the most important factors considered by businesses when leasing were the effectiveness and turnaround time for lessors to get malfunctioning backup power units back online. The majority of businesses sought a 24-hour turnaround time contract agreement to get broken units back into operation. Numerous businesses also referred to the importance of the terms of the lease-to-buy agreement with regards to ownership of the assets. The interviewed businesses highlighted the importance of knowing the exact price to purchase the product before even signing the lease agreement.

Figure 7: Influences on Lease Decisioning



Conclusion

Individual households and businesses in South Africa both leverage backup power solutions, but for different reasons. Households tend to leverage backup power to minimize the inconvenience posed by power outages, where businesses leverage backup power solutions for business operation continuation. It was therefore decided that the business venture plan will only focus on servicing small businesses as the need or “burning platform” is a lot greater in this space.

The overall results of the study showed strong demand for the offering in the small businesses environment given that the quality, price, mobility and support characteristics are catered for in the offering. The price and quality aspects identified are also substantiated by modern price-sensitivity analysis (Vrouvas, 2023). The results also showed that leveraging a lease or lease-to-buy model in the offering is feasible, provided that the business venture can circumnavigate the risk of adhering to strict turnaround timelines with respect to replacing broken down power trolley units.

Chapter 5: Business Plan

Introduction

The previous chapter (Chapter 4) showed the key findings from the research study conducted and highlighted the opportunity that exists in the market for a business venture to capitalize on power outages through offering power trolleys to the small business market via a lease or lease-to-buy model. The business plan (Chapter 5) seeks to incorporate the discoveries made in the research and to become the foundation for a business venture to be developed. The business plan will function as the “blue print” for the new business venture through leveraging the results from the previous chapters (1 to 4) of the project.

Vision and Mission

Vison

Our vision is to bring dependable and affordable power solutions to people across South Africa. We are committed to creating a brighter future for our society. We empower our clients via our innovative offerings to have access to reliable power. Our unique model also grants our customers the opportunity to test a solution in their environment before making the commitment to making the solution a permanent part of their lives. We are in the business of lighting up a brighter, more empowered South Africa.

Mission

We are driven by the profound need to combat power outages through empowering people with cost-effective and accessible backup power options. Our unique approach offers flexible access to uninterrupted power without the burden of high upfront costs. Optimization and efficiency underpin every facet of our value chain to ensure we offer the best value to our clientele. We eliminate the crippling burden of power outages, empowering our customers to channel their energy into what truly matters.

Business Strategy

The business seeks to obtain a competitive strategy via differentiation leadership through the uniqueness in its offering. The business will focus only on servicing the small businesses market with its power trolley lease and lease-to-buy offering. The business venture will, as aligned to the effectuation theory, grow organically through developing its own capabilities naturally. Once the business venture has gained sufficient momentum and growth, it could potentially explore the possibility of expanding into the household market segment.

Objectives

The key objectives of the business venture are as follows:

- Purchase 14 power trolleys (720W) each with one 100mAh Lithium-Ion battery over an 18 month period
- Create a platform with an integrated website, email domains and payment solutions
- Establish supply chain to effectively move and manage power trolleys
- Launch advertisement campaign to market the business venture
- Market power trolley solutions to potential customers in the small business space via personalized outreach campaigns (“knock on doors”)
- Build up customer base (leverage existing network in accordance with effectuation process)

Products and Services

The business venture’s offering will be unique in the sense that its offering is both a service and a product. The lease of power trolleys to customers (other small businesses) will be offered via a service model. The service will consist of analyzing the customer’s backup energy requirements, delivering a suitable power trolley to the specified location, ensuring that the power trolley is up and operational for the entire duration of the lease agreement and finally collecting the power trolley once the agreement has lapsed. However, should the customer decide to purchase the power trolley post having leased it for a period of time, the offering would change to a product with the power trolley simply being sold to the customer.

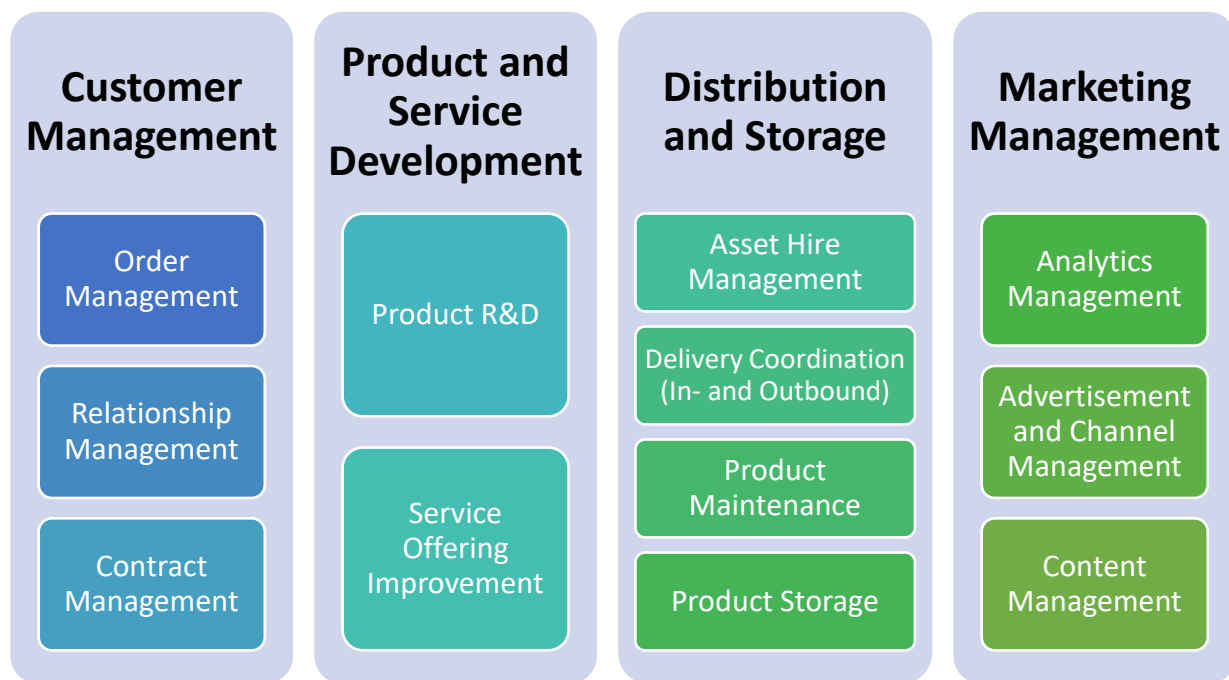
Value Proposition

The unique value proposition of the offering will be encompassed in the combination of the power trolley product and the lease (or lease-to-buy) financing model. The offering to customers will be an affordable and hassle-free service that will ensure that the businesses always have reliable access to electricity so as to ensure the continuation of their business activities during power outages. The value proposition continues to include the purchasing of the power trolley (at the end of the lease term), post the customer having tested the solution in their own business environment.

Business Capability Development

The business capabilities will be developed in accordance with the business objectives and business strategy. The following capabilities (and their components) will be aligned with the business venture’s vision and mission statements, and will enable the venture to service its customers successfully. Customer management, product and service development, distribution and storage, and marketing management are key business capabilities identified and each consist of individual components that make up the business capability.

Figure 8: Business Capability Design



VRIO Analysis

The VRIO analysis is leveraged to perform a preliminary determination as to what extent the venture's resources and capabilities are valuable, rare, inimitable and supported by the venture. The results not only influence the strategic competitive advantage of the business venture, but also influence the interior quadrants of the business venture's business model (marketing, finance, operations and technology).

Table 2: VRIO Analysis

Capability Description	Valuable	Rare	In-imitable	Organizational Support	Competitive Advantage
Customer Management	YES	YES	YES	NO	Unused Competitive Advantage
Product and Service Development	YES	YES	YES	NO	Unused Competitive Advantage
Distribution and Storage	YES	YES	NO	NO	Temporary Competitive Advantage
Marketing Management	YES	YES	YES	NO	Unused Competitive Advantage

The VRIO analysis conducted on the four key capabilities of the business venture showed various levels of competitive advantage. None of the capabilities have organizational support, since the organisation (business venture) has not been established yet. This implies that none of the capabilities can enjoy sustained competitive advantage at this point in time. Additionally the distribution and storage capability is technically imitable by competitors, which implies that the capability currently only enjoys temporary competitive advantage.

If the capabilities are considered holistically (all four together), it is clear that the business venture's capabilities are on average valuable, rare and inimitable. This implies that the business venture's capabilities in totality have unused competitive advantage until the business is established and can properly support the capabilities from an organizational perspective. Only then will the venture transition to a state of sustained competitive advantage.

Macro Environmental Analysis of Market Opportunity

To better understand and define the market opportunity a macro environment analysis is conducted on the business venture landscape. The analysis is conducted to better understand the external influences on the environment in which the business venture operates.

Table 3: PESTLE Analysis

P olitical	E conomical	S ocial	T echnological	L egal	E nvironmental
• Increased amount of load shedding in South Africa over the past 3 years. • High levels of corruption have extreme negative impacts on governmental service delivery. • South Africa has become increasingly politically unstable in recent years. • Governmental policies play a significant role in the energy sector of South Africa.	• Wars abroad in Ukraine and Israel have a significant impact on supply chains into the country. • Extremely low economic growth in South Africa over the past 4 years (average of 0.23% growth in GDP 2019-2022). • Load shedding has had a severe impact on the economy costing the country billions of Rands in the past decade. • Worsening exchange rates make it increasingly more difficult to import.	• Increasing population growth in South Africa implies growing potential markets and increased energy consumption needs. • Year-on-year increase in migration of people to large cities. • South Africa faces extreme challenges with regards to the high unemployment in the country.	• Technological advances in solar and backup energy are driving down prices of the equipment. • Improved access to data make demand predictions more accurate. • Certain data-driven technologies can optimize electricity generation, transmission and usage for users.	• Tight government regulations exist in the electricity sector of South Africa. • Certain legal frameworks allow for tax deductions to be made for green energy generation. • Tax benefits can be leveraged when doing business and trading with specific countries (BRICS). • Large energy projects frequently require government permits to be issued before they can be launched.	• Increasing awareness of leveraging green energy sources in South Africa. • South Africa is making strong efforts to decrease its carbon footprint. • The energy sector is under pressure to decrease greenhouse gas emissions (present during certain energy generating activities) due to climate change concerns.

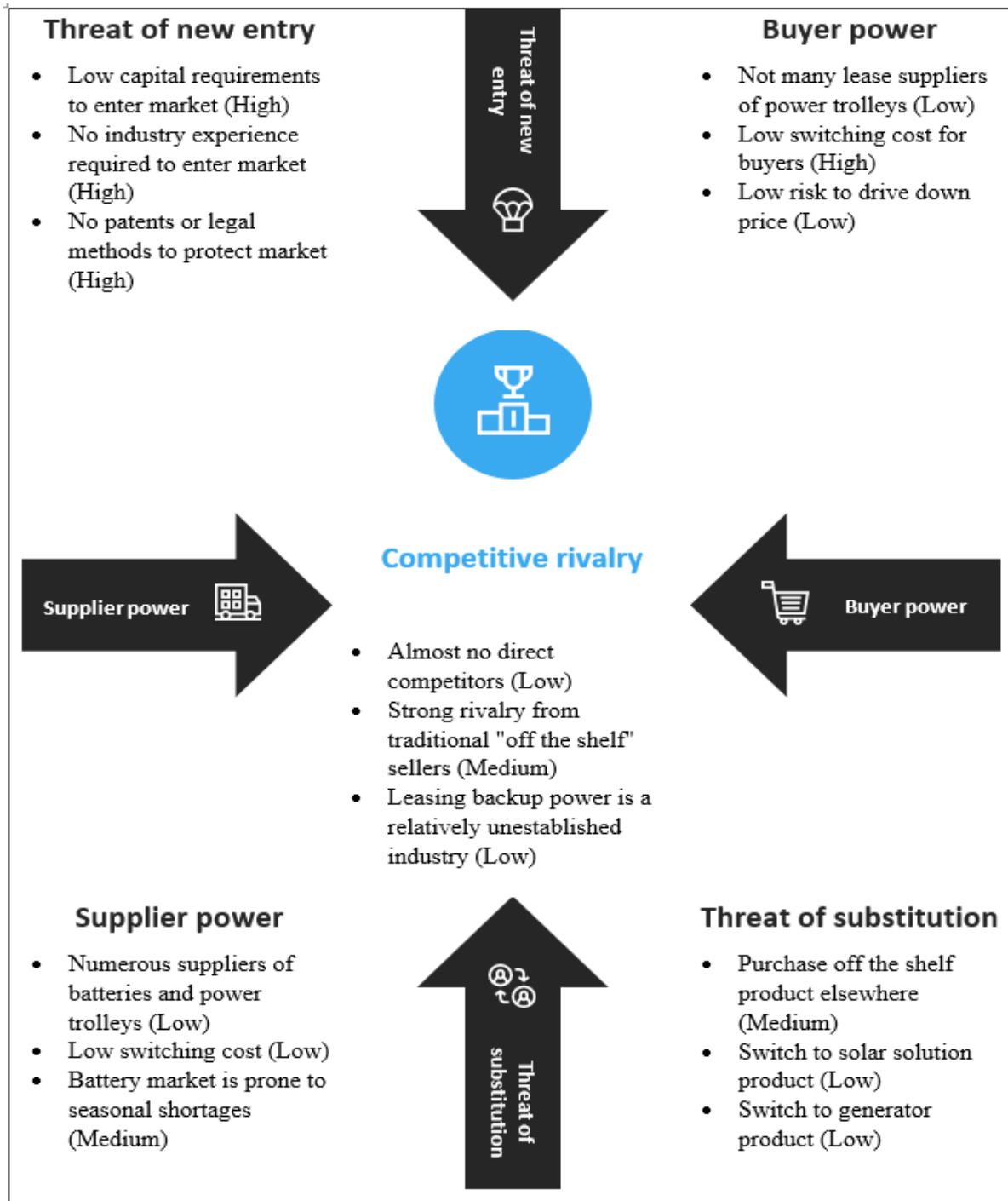
The current political climate indicates that load shedding and other forms of power disruptions will still be present in the country over the next decade. This indicates that the need for backup power solutions will also still exist for the same period. The economical external factors indicate that South Africans will remain under economical constraint for the years to come due to a myriad of causes. This indicates that businesses potentially will not have the necessary capital to purchase backup power solutions and will be forced to lease (rent).

The social and technological factors show an increase in urban area footprint and more efficient ways to service customers respectively. This could indicate potential future growth opportunities to specific businesses operating in specific industries. The legal and environmental factors show very little impact on small businesses operating within the energy sector. The global move to become more environmentally conscious could yield growth opportunities for businesses in the energy sector who focus on producing green (carbon-free) energy.

Industry Analysis of Market Opportunity

The Porter's 5 Forces analysis is used to describe the competitive environment, as well as the overall attractiveness of the industry in which the business venture is set to operate. The results of analysis, as shown in Figure 9 below, indicate that the industry is attractive, but that risks exist in numerous areas in the lease and lease-to-buy industries (especially with regards to the threat of new entrants).

Figure 9: Porter's 5 Forces Analysis



The analysis shows overall medium risk in buyer power in the industry. The strong industry forces of low switching costs and low customer volumes are offset by the fact that the market is still new with very few competitors operating in the space. This gives buyers some power in driving down prices and in the negotiation of service terms. The only competitive rivals in the industry are in the traditional market spaces of buying and selling of power trolleys. This yields a low force in the competitive rivalry section. The threat of substitution in the backup power lease industry is also very low since the alternatives (solar and generators) all have major negative setbacks associated with them.

The supplier power also has a low force impact on the industry as a whole since numerous suppliers exist in the battery and power trolley industry. This gives suppliers very low power in terms of driving up prices or dominating trading negotiations. The largest force impacting the industry space is the threat of new entrants. This force is very strong since the barriers to entry into the industry are very low due to low capital requirements needed to enter the market, as well as very limited methods of protecting business interests (patents, licences, etc.).

In conclusion, the analysis of the industry as it exists today shows that it is a very favourable environment to enter. The restricted customer buyer power with the limited substitution alternatives available in the market indicates that the business venture will not be bullied (or forced) into dropping its prices. The limited competitive rivalry in the backup power leasing industry, alongside the limited power of suppliers, indicate that a healthy and undisruptable value chain can be established for the business venture. However, the high threat of new entrants into the industry indicates that the business venture might be difficult to sustain in the medium to long term. With very limited means in which the business venture can protect its market from new entrants, it is difficult to guarantee that the business model is sustainable indefinitely.

Competitor Analysis on Market Opportunity

Obtaining Competitive Advantage

Considering that the business venture seeks to make use of bootstrapping for its initial funding, the venture will be vulnerable to competition in its early stages of growth. This highlights the importance for the business venture to build an aggressive competitive business model. The VRIO and Porter's 5 Forces analysis show that competitive advantage in the market (industry) can be obtained in the short to medium term, and that the business venture can potentially obtain sustained competitive advantage in the long term (provided it gets organizational support for all its capabilities).

Through providing a well-sought-after product (power trollies) via the unique method of the lease and lease-to-buy financing model, the business venture has created an innovative offering. Thus, the business venture identified a potentially sustainable market space in which it could start and grow from. The Four Actions Framework is leveraged to further flesh out the market requirements. The analysis, informed by the research conducted, shows which aspects of the offering should be eliminated, reduced, raised and created in order to perfect the offering to the customer market.

The Four Actions Framework

The insights from the qualitative study on small businesses were used to inform the following analysis.

Eliminate • Remove smart app integration (smart power trolleys) since it greatly increases price and very few customers make use of the feature. • Remove customizable shutdown sequencing features since the features rarely get used when the product has the correct capacity and does not need to shut down. • Do away with long-term lease agreements since the majority of customers prefer shorter term lease agreements with regular renewals.	Reduce • Narrow the product range since most customers only require their network equipment and computers to be powered. • Reduce leveraging well-established brands since this is irrelevant to the customer due to the fact that all maintenance on products is the responsibility of the lessor. • Reduce efforts to moderate noise levels since the majority of customers do not find the cooling fan too off-putting.
Raise • Improve capacity monitoring on the power trolleys since the majority of customers viewed this as a critical feature. • Improve the durability of the product through using higher quality casings in which to store the inverter and battery units. • Decrease the weight of the products since the majority of customers require regular movement of the product. • Optimize the turnaround time to replace broken down units.	Create • Create an environment where communication and other forms of post-purchase support is easily accessible to the customer. • Incorporate into the advertisement that leasing is good for a business's capital preservation and cash-flow, which in turn is good for expanding businesses. • Incorporate into the first customer engagements the fact that leasing allows for a trial usage of the product in the customer's environment prior to potential purchase (this was a big attraction point to many businesses). • Develop and present to the customer the cost and terms of ownership of the product (should they choose to purchase it at the end of the agreement) prior to the commencement of the lease agreement.

The actions identified will drive the changes in both the product and the way in which the product is offered. The changes will drive cost savings since the primary focus of the offering is shifted to the customer's requirements. Doing away with unnecessary elements in the offering will help shape a more efficient offering which will increase product take-up and sales.

Market Analysis

Marketing Strategy

The business will adopt a marketing strategy that will primarily focus on market penetration through leveraging a connected strategy to provide wraparound support to its customers. Market penetration will be the first priority of the business venture during its start-up phase, after which it will focus on market development, product development and lastly unrelated diversification (Refer to Ansoff matrix in [Appendix I](#) for full analysis).

Market Penetration

The targeted market from STP analysis outcome will be penetrated through bringing a new offering to the small business market. The new offering will consist of offering a readily available product (power trolley) through an innovative means (lease financing model) to produce value in the small business market. Market penetration will further be enforced through a highly responsive customer relationship management plan. The customer relationship will be managed through a connected strategy in which customers are not only holistically supported in a complete wraparound customer support model, but also where customer communication channels are proactively and continuously utilized.

The connected strategy will be executed on digital channels such as email and online chat functions (e.g. WhatsApp) to ensure that data can be collected and analysed from all customer interactions. The business venture will leverage more sophisticated digital channels like smartphone Apps when it is better established in the market and enjoys higher customer volumes. The business venture will leverage the digital communication channels to inform customers of regular promotions, obtain feedback on faults and maintenance that need to be scheduled and to collect feedback on how the business can further improve its offerings.

Market Development

Once the targeted market has been successfully penetrated and the business venture has been established in its focus market, the next step will be to expand its market horizons further. This will be done through shifting the focus of the business to include the household market. Once the household market has been captured, the venture can proceed to extend its offerings to other markets like the informal business sector and medium-sized enterprises.

Product Development

Upon successful entry into other markets, the next step in the business venture's long-term strategy will be to offer more products. The new products will also be offered via a lease and lease-to-buy model but will stretch beyond power trolleys to include generators and more specialized battery solutions to be used for IT equipment (like UPSs).

Unrelated Diversification

Upon successful entry into other markets and post the development of more products in its offering, the business venture could potentially diversify into other unique markets and products. These offerings could take the shape of offering smaller backup power devices (like power banks) which are not necessarily used during power outages to the informal sector. Alternatively

the business could choose to enter a more niche market with more customizable offerings like power-stations to charge smartphones in shopping malls.

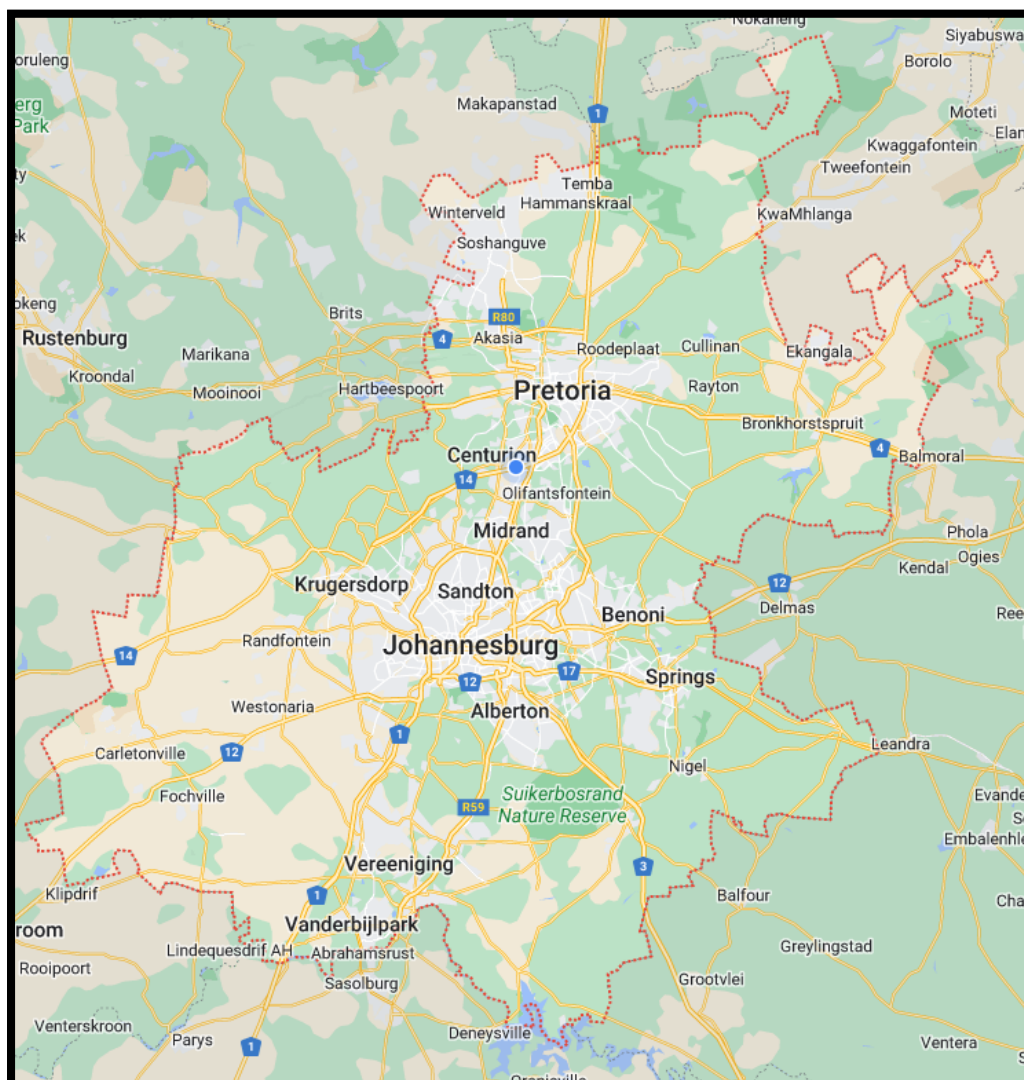
Market Segmenting, Targeting and Positioning (STP)

The STP approach is utilized further to understand, define and target the customer market which the business venture will set out to capture. A better understanding of the customers and their needs will allow the business venture to influence the customers more effectively. This will lead to a higher overall customer satisfaction and loyalty which, in turn, will produce better profits for the business.

Segmenting

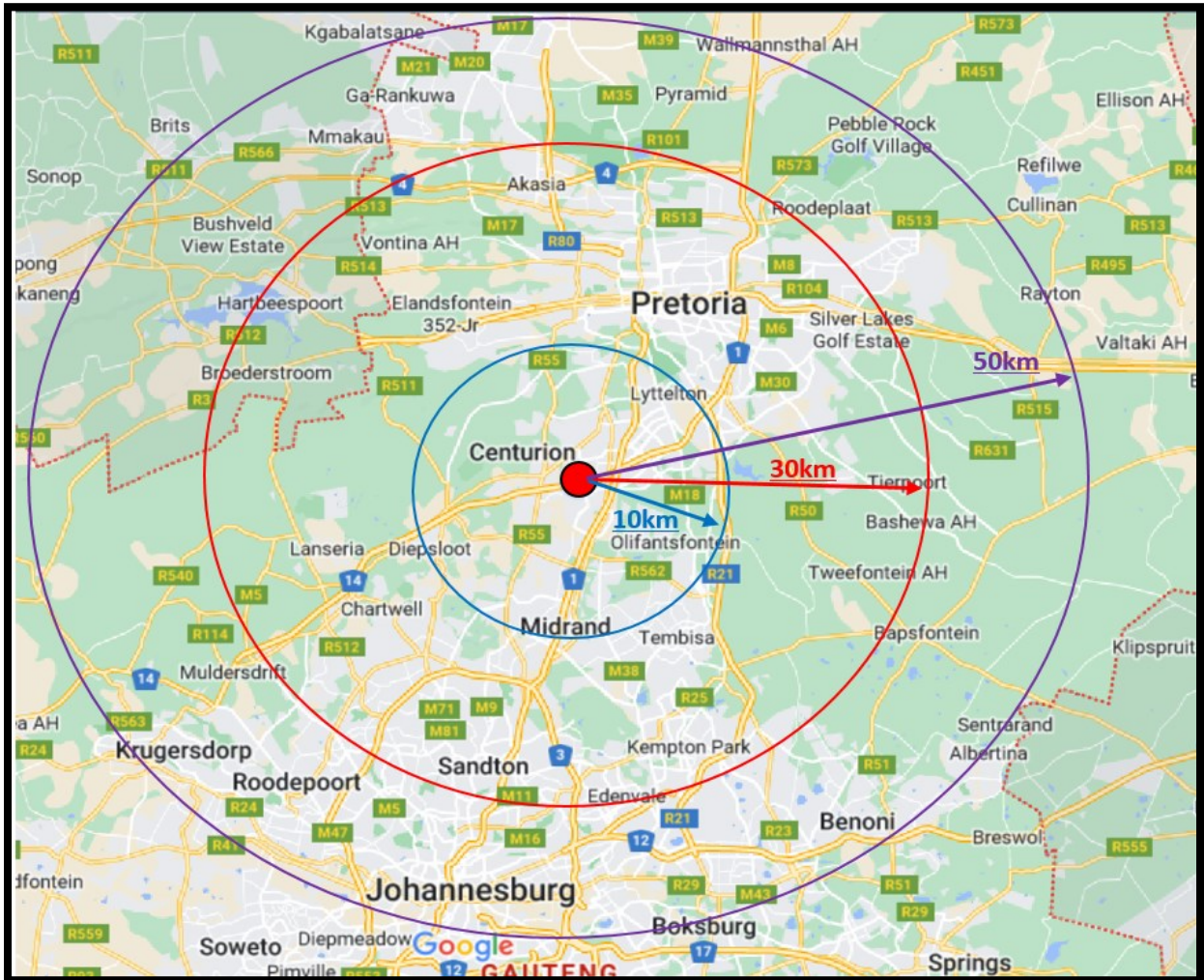
Geographic segmentation is leveraged to identify and segment customers into different clusters. Customers who share similar geographical locations in Gauteng are grouped together. The scope is limited to the Gauteng region (see Figure 10) as this is the only area on which data is available (qualitative analysis).

Figure 10: Gauteng Province



The customer segmentation is divided into 3 groups with respect to the distance from the distribution centre (and office) in Centurion. The first customer segment (indicated in blue) is customers with a geographical location within a 10km radius from Centurion. The second customer segment (indicated in red) is customers with a geographical location within a 15km radius from Centurion. The third customer segment (indicated in purple) is customers with a geographical location within a 50km radius from Centurion.

Figure 11: Customer Segments



Targeting

Post-segmentation, the venture must select a specific segment to target with its marketing efforts. The targeting is done based on the market attractiveness which is the balance between segment size and cost to service the segment. The larger the segment size (radius from central distribution point) the more potential customers can be serviced; however, the supply chain cost to service customers also increases with the distance from the distribution centre located in Centurion. The segment attractiveness is also influenced by the growth potential of small businesses in the segment.

The first market segment (blue) is small and contains two major cities (Centurion and Midrand). The fact that the customer selection pool is small is offset by the low transportation cost to service the customers in the segment (max 20km return trip). The second market segment (red) is slightly larger than the former and includes another two major cities (Pretoria and Sandton). The segment is larger which implies more potential customers, but it also implies a higher cost to service customers located further than 10km from the distribution centre.

The third market segment (purple) is the largest of the segments and includes an additional three cities (Johannesburg, Krugersdorp and Roodepoort) when compared with the previous segment. This segment has the highest number of potential customers, but it could be very expensive to service some of the customers on the outskirts of the segment. The customers located between 30km and 50km would be very expensive to service as a delivery to or from the customer would take about half a day to complete.

The second market segment (red) is considered to be the optimal point in the balance between market size and cost to service. The market contains four major cities, all of which are on the same main highway (N1) which will simplify logistics for delivery of products. Pretoria, Centurion, Midrand and Sandton are all established cities with numerous small businesses located within them. The major cities also make targeted social media marketing easier, since most digital advertisement platforms are aware of the geographical location of these cities.

Positioning

The positioning of the business venture is done to create a compelling perception of the product in the minds of its customers. Given that the business venture lacks conventional competitors within its operational milieu, particularly those engaged in the leasing of power trolleys, it follows that the business entity assumes the sole responsibility for generating awareness regarding its service offerings. The 7P's analysis is leveraged to develop a customer-centric marketing mix and to guide the business venture on how best to position itself in the market. The 7P's in the analysis refer to product, price, place, promotion, people, process and physical evidence.

Product

The "product" in this case is a service that is offered to small businesses to enable them to combat the effects of power outages and to keep their businesses operational during load shedding. The service entails the leasing of a power trolley (or trolleys) for a period of time during which the customer has all the benefits of backup power, but none of the responsibilities like maintenance, setup or replacement. Thus the product is under warrantee for the duration of the agreement.

The service lapses at the end of the lease agreement with the customer being provided with a choice of three options. The first option allows the customer to extend the lease agreement over an extended period during which the terms of service will remain the same as during the initial lease period. The second option allows the customer to return the power trolley. The third option allows the customer to purchase the power trolley for a specified amount; however, the terms and support that were applicable during the lease period will cease.

Price

The lease price of the power trolley is set to be around R1200 per month per power trolley. Economies of scale will impact pricing with discounts being awarded to customers who lease numerous power trolleys at a time. Customers who are willing to agree to longer lease periods for the power trolleys will also be eligible for discounts.

Place

The distribution of the product will be the responsibility of the business venture. Upon product uptake, the venture will transport the product from its distribution centre in Centurion to the customer's location (and back at the end of the agreement period).

Promotion

Promotions will be done via digital marketing channels like social media, Google advertisements, Facebook advertisements and email communications. Business representatives will also attend entrepreneurial gatherings and expos to market the business physically to other businesses (B2B). The business venture will initially invest large quantities of capital into marketing channels until the business and its offering are more well known in the market. The venture will then slowly taper off its marketing expenses as "regular" customers are established and word of mouth concerning its offering increases.

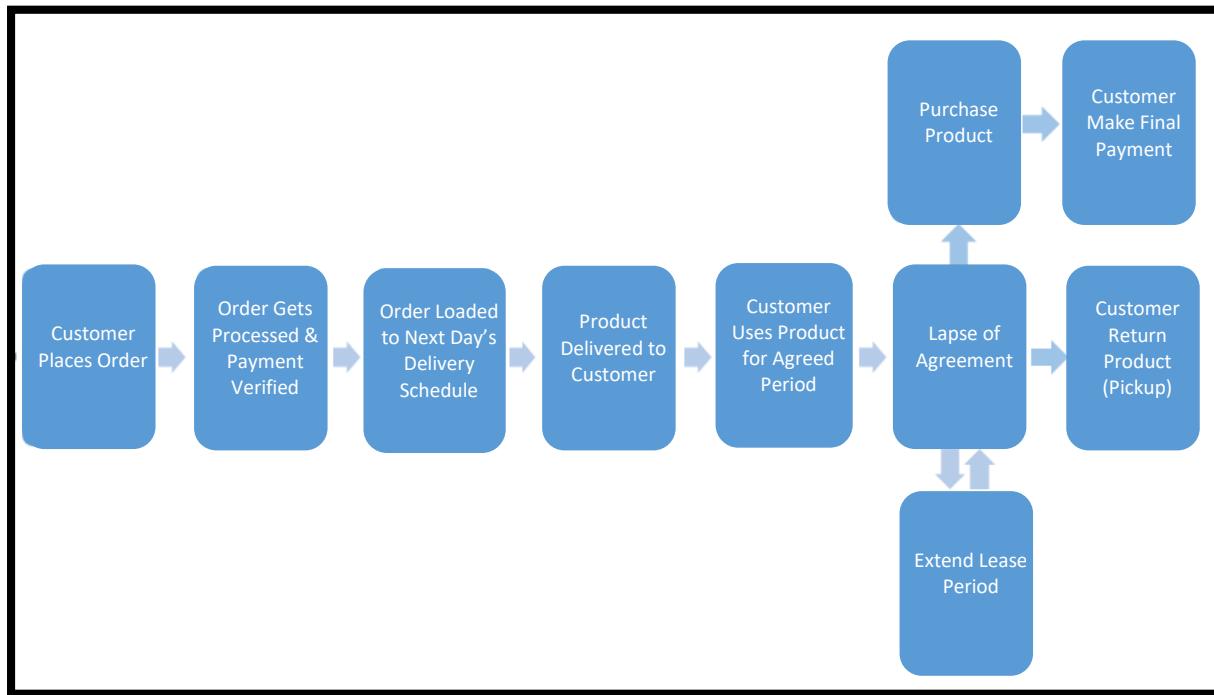
People

All customer-facing staff will be trained well in customer relationships management. This includes delivery staff, deal making staff, as well as help desk staff. The staff will embody the brand during interactions with all stakeholders from suppliers through to customers.

Process

The process will start off with the ordering and payment from the customer to the business venture. The venture will then deliver the power trolley(s) to the customer at the specified location. The customer can then use the trolley for the defined period after which they have three options. The customer can either purchase the product, return the product or extend the lease term of the product after which they will be presented with the same three options again.

Figure 12: Operational Process



Physical Evidence

The only tangible elements with which the customers can interact are the power trolleys themselves. It is therefore extremely important that the physical power trolleys embody all the characteristics of the business brand. The power trolleys need to be durable, of high quality, dependable and have the look and feel of a “posh” product. Positive interactions and perceptions with the power trolleys will spill over into positive customer perceptions of the business venture.

Positioning Statement

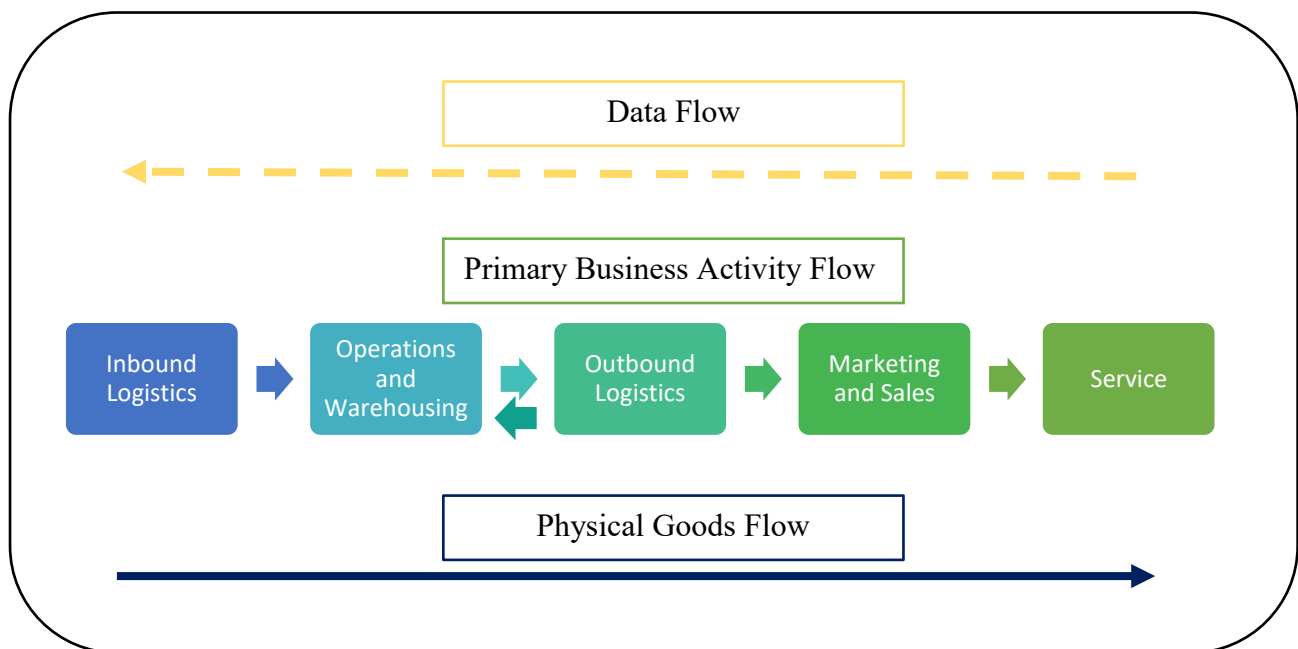
The positioning statement of the business venture will be used to communicate the essence of the business to the outside world to attract customers. It will also be leveraged as an internal business compass to provide guidance in decision making and brand development. The business venture’s positioning statement is as follows:

“The business venture redefines the perception of backup power solutions by offering more than just a product, but also offering a comprehensive service experience. Through an innovative approach, consumers can lease cutting-edge backup power products, ensuring uninterrupted energy access without any of the complexities of ownership. Throughout the entire lease period all burdens of capacity planning and maintenance are taken care of through connected wraparound customer support, guaranteeing both uninterrupted business continuity and peace of mind.”

Operational Plan

The operational plan of the business venture will leverage a non-predicative approach, aligned to the effectuation process, to control unforeseen circumstances in the future and will be primarily driven by its supply chain strategy. Due to the nature of the customers that the venture seeks to service (small businesses), the venture will need to be able to supply the power trolleys within a very short turnaround time. This is due to some of the urgencies that could exist with respect to backup power from the customer perspective. The supply chain strategy will be highly responsive (24-hour turnaround time) to integrate optimally with the connected strategy contained in the venture's marketing strategy. The supply chain strategy is based off the primary business activities contained within a standard value chain.

Figure 13: Operational Flow Chart



Inbound Logistics

The inbound logistics business activity will refer to how the power trolleys are sourced from suppliers into the business. The potential suppliers for power trolleys are EcoFlow, ServerWarehouse and Geewiz and all have delivery options included in their costing models. The receiving of the products into the venture's warehouse (distribution centre), as well as the loading of the new products onto the venture's system, will be conducted by an employee of the business. The first order quantity will be six power trolleys when the business venture goes live. The power trolleys will initially be ordered from the same supplier since all of the suppliers give discounts when quantities of five or more power trolleys are ordered.

Operations and Warehousing

Post having received the batch of power trolleys, a warehouse employee will conduct a quality assessment on each of the products to ensure that all trolleys are in working condition. If the product is identified as faulty, the supplier will be contacted to arrange for a return and refund for the faulty product. Post passing the inspection, the power trolleys will be plugged into the electricity grid of the warehouse to ensure that the batteries are fully charged when the power trolleys are ordered.

Power trolleys that are returned from customers will also immediately be plugged into the electricity grid of the warehouse to be charged. Each of the power trolleys will be serviced every three months to ensure that both the battery and inverter units are still in good working condition. The batteries will be completely removed from the trolley casing to be tested on a battery analyzer. The analysis will be conducted on the battery's health, ability to maintain an effective voltage and overall deterioration to ensure that only quality batteries are included in circulation.

The warehouse's electricity grid will eventually be migrated to a solar solution; however, it will remain on the Eskom utility grid for the short term until enough capital has been saved to fund the expense. The ability to charge the power trolleys with photovoltaic (solar) power while in storage in the warehouse will significantly reduce the storage costs associated with the power trolleys.

Outbound Logistics

The outbound logistics process will be initiated off the back of a customer order having been received. The specified number of power trolleys will be loaded onto a delivery vehicle and delivered to the customer's location within 24 business hours from order placement. To fulfil larger orders (more than three power trolleys at a time), the venture will hire a trailer to deliver the power trolleys. The outbound logistics team will also be responsible for picking up the power trolleys from the customer's location and bringing the trolleys back to the warehouse when the lease agreement has lapsed (assuming the customer did not opt to purchase the power trolley). The delivery team will also perform the necessary setup of the power trolleys when they deliver to the customer's location.

Marketing and Sales

Advertising

The service offering will be advertised only on digital channels due to the high costs associated with physical advertisement. The digital channel will leverage Google advertisements and Facebook advertisements to ensure that the offering is only advertised in the Gauteng region in

accordance with the geographical constraints identified in the marketing mix. The digital channels also provide more control with respect to the number of users that can see the advertisements and allow for increasing or decreasing advertisement exposure based on the sales volumes for the month thus far.

Promotions

Considering the high costs associated with the transportation of the power trolleys, as well as the opportunity costs associated with the power trolleys being idle in the warehouse, the business venture will strive to minimize the amount of time the power trolleys are not with a customer. This will be managed via promotions through incentivizing customers, who already have the power trolleys in their possession, to extend their lease agreements. Post a customer having leased a power trolley for a month or longer, a promotion will be extended to the customer in the last three days prior to the lease agreement ending. The promotion will provide the customer with a 25% discount on their next month-long lease agreement, provided that they take up the offer before their initial agreement lapses (three days prior).

Pricing

Considering the lack of direct competitors in the business environment, the business venture will take a differentiation pricing strategy. Orders for the power trolleys will be placed via the business's website, email or via contact number. The pricing strategy will thus focus on providing a quality or premium service to its customers, instead of only focusing on keeping costs down. The initial pricing of the power trolleys will be set as follows:

Table 4: Pricing Options Table

Lease period	Cost per period	Monthly cost for period
2 weeks	R650	R1300
1 month	R1200	R1200
3 months	R2700	R900

Service

Post the customer having signed the lease agreement, the customer will be on-boarded into the wraparound customer support model. This entails providing the customer with a WhatsApp number, an email address and a contact number which they can use to communicate with the business venture. The channels will be leveraged to provide customers with a quick response on queries, fault loggings, or potential purchase requests (lease-to-buy). The email channel will also be used to communicate promotions, or to arrange for planned maintenance to be conducted on the power trolleys (only applicable to lease agreements spanning three months or longer). The

maintenance will be conducted onsite (at the customer location) and at a time that is convenient for the customer.

The business venture will also reach out to the customer (via email or telephone) post the lease agreement having lapsed to fill out a questionnaire. The questionnaire will be used to obtain feedback from the customer on their experiences throughout the entire customer journey. The customer feedback data will be used to improve the overall customer experience.

Operational Technologies Leveraged

Numerous technologies will be leveraged throughout the business venture to minimize cost and improve efficiency of business processes and activities. The business venture's primary drive will leverage open source technologies for its operations and will only purchase software (or other technologies) if no open source options are available. Social media technologies like Google advertisements and Facebook advertisements will be used to reach a high number of potential customers at a relatively low cost. These technologies will also make it possible to contain marketing campaigns to the Gauteng area. The technologies also make the data available to advertisers (in this case the business venture) to provide them with insights into how their product or service is perceived by the market.

GPS technologies and applications will be used to inform logistics through determining the optimal routes and time of day to make deliveries. Open source load shedding technologies (e.g. ESP) will be used to monitor power outages in certain areas, which will indirectly inform potential promotions that will be communicated to customers situated in those areas. Electronic signing applications (technologies) will be leveraged to manage the lease agreements. This will improve the speed, reliability, cost and environmental impact of the contracting process.

The long-term strategy for the technology component of the business model will be to grow with the business venture and its requirements. The technology strategy (as well as the marketing, supply chain and financing strategies) will pivot from a short-term to a long-term focus when the business venture has reached its two-year mark. The emphasis of the application of the technology will be shifted from minimizing costs to accommodating and driving scaling in the business. At this point in time the venture will also implement platform technology that will enable all interactions with the venture to take place on the same platform. Thus, all communications, promotions, orders, scheduling, contracts, purchases, complaints, planned maintenance and information requests will be centralized and managed from the same platform.

Business Funding

Financing

The business venture will be funded by the founder and proprietor through the practice of bootstrapping, with the aim of enabling the founder to retain maximum control over the venture. The funding strategy will purposefully be focused only to require a small capital investment since the strategy is aligned to the effectuation principles of only investing funds which one can afford to lose. Due to the tight capital constraints imposed on the venture, there will be a strong drive to minimize costs and avoid high capital expenditure investments.

The venture will strategically capitalize on available resources and, when necessary, engage in resource leasing. This approach is designed to distribute the financial obligation over several months, offering a more feasible alternative to bearing the entire capital cost before the commencement of operations. The finance strategy will consist of two components.

Table 5: Financing Strategy

Component Number	Finance Method	Amount	Percentage of Total Capital Requirement
1	Savings (Equity)	R60 000	75%
2	Personal Loan (Debt)	R20 000	25%
	Total	R80 000	100%

Forecasts

Projected Income Statement

The projected income statement shows the estimates of income and expenses over the next four years. The statement is divided into half-annual categories to indicate clearly the changes in business behaviour and decision-making that occur every six months. Although the income statement shows a positive net profit from year one, this is not the case in practice since the purchasing of the power trolleys that will be leased form part of “equipment” and is not included in the income statement. The tax expense in the statement is shown as zero since small businesses in South Africa with revenues below R95 750 per annum are exempt from paying income tax.

Table 6: Projected Income Statement

Income Statement Projection								
Description	Jan - Jun 2024	Jul - Dec 2024	Jan - Jun 2025	Jul - Dec 2025	Jan - Jun 2026	Jul - Dec 2026	Jan - Jun 2027	Jul - Dec 2027
1. Revenue								
Sales (A) ¹	R34 560	R57 600	R80 640	R80 640	R80 640	R80 640	R80 640	R80 640
Dead Stock Approx. 5 % of Revenue (B)	R1 728	R2 880	R4 032	R4 032	R4 032	R4 032	R4 032	R4 032
Gross Profit (A - B)	R32 832	R54 720	R76 608	R76 608	R76 608	R76 608	R76 608	R76 608
2. Operating Expenses								
Wages ²	R0	R5 400	R7 200	R7 200	R7 200	R7 200	R7 200	R7 200
Depreciation Expenses ³	R6 128	R10 213	R14 298	R14 298	R14 298	R14 298	R14 298	R14 298
Website Design and Build	R0	R0	R0	R0	R0	R0	R0	R0
Vehicle Hire	R0	R0	R0	R0	R0	R0	R0	R0
Warehouse Rent Expense	R0	R0	R0	R0	R0	R0	R0	R0
Battery Analysis Tool	R1 000	R0	R0	R0	R0	R0	R0	R0
Trailer Hire for Delivery ⁴	R0	R4 200	R6 300	R6 300	R6 300	R6 300	R6 300	R6 300
Utilities	R3 000	R5 000	R7 000	R7 000	R7 000	R7 000	R7 000	R7 000
Website Hosting Fees	R720	R720	R720	R720	R720	R720	R720	R720
Business Bank Account Fees	R510	R510	R510	R510	R510	R510	R510	R510
Advertising Expenses ⁵	R15 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000
Loan Repayment Interest ⁶	R840	R840	R840	R840	R840	R840	R0	R0
Total Operating Expenses	R27 198	R36 883	R46 868	R46 868	R46 868	R46 868	R46 028	R46 028
Operating Profit (1 - 2)	R5 635	R17 838	R29 741	R29 741	R29 741	R29 741	R30 581	R30 581
Tax	R0	R0	R0	R0	R0	R0	R0	R0
Net Profit	R5 635	R17 838	R29 741	R29 741	R29 741	R29 741	R30 581	R30 581

Notes: The income statement note numbers correspond to the detailed notes made in [Appendix J](#). The asset lifespan analysis and depreciation and cost breakdown calculations can be found in [Appendix K](#) and [Appendix L](#) respectively.

The full set of detailed financial statements is attached in [Appendix M](#).

Projected Balance Sheet

The projected balance statement shows a small cash surplus at the end of the first year. This is due to the power trolleys (equipment) that are to be purchased in the first year, as well as the R6 667 down payment on the R20 000 loan. The balance sheet shows stable and significant growth from the year 2024 to 2025.

Table 7: Projected Balance Sheet

Balance Sheet	2024 Projection		2025 Projection	
Assets				
Current assets:	R	14 345,00	R	56 234,00
Cash	R	14 345,00	R	56 234,00
Accounts Receivable	R	-	R	-
Prepaid expenses	R	-	R	-
Inventory	R	-	R	-
Total current assets	R	14 345,00	R	56 234,00
Property & Equipment	R	98 800,00	R	138 320,00
Accumulated Depreciation	R	(14 524,00)	R	(43 119,00)
Total Assets	R	98 621,00	R	151 435,00
Liabilities				
Current liabilities:				
Accounts payable	R	-		
Accrued expenses	R	-		
Unearned revenue	R	-	-	
Total current liabilities	R	-	R	-
Long-term debt	R	13 333,00	R	6 666,00
Other long-term liabilities	-		-	
Total Liabilities	R	13 333,00	R	6 666,00
Shareholder's Equity				
Investment capital	R	60 000,00	-	
Retained earnings	R	25 288,00	R	144 769,00
Shareholder's Equity	R	85 288,00	R	144 769,00
Total Liabilities & Shareholder's Equity	R	98 621,00	R	151 435,00
<i>Balance</i>	<i>R</i>	<i>-</i>	<i>R</i>	<i>-</i>

Projected Cash Flow

The projected cash flow statement shows a significant deficit in cash flows over the first year. This is due to the ten power trolleys (equipment) that will be purchased during this year, as well as a third of the loan that will be repaid. The R65 655 negative cash flow highlights the importance of the R80 000 start-up capital. During the end of the second year the business starts to show positive cash flows which is shown by the R41 889 positive cash flow at the end of 2025.

Table 8: Projected Statement of Cash Flows

Cash Flow Statement		
For the Year Ending	Year 2024	Year 2025
Cash at Beginning of Year	R80 000	R14 345
Operations		
Cash receipts from		
Customers	R87 552	R153 216
Other Operations		
Cash paid for		
Inventory purchases		
General operating and administrative expenses	-R40 660	-R49 060
Wage expenses	-R5 400	-R14 400
Interest	-R1 680	-R1 680
Income taxes	0	0
Net Cash Flow from Operations	R39 812	R88 076
Investing Activities		
Cash receipts from		
Sale of property and equipment		
Collection of principal on loans		
Sale of investment securities		
Cash paid for		
Purchase of property and equipment	-R98 800	-R39 520
Making loans to other entities		
Purchase of investment securities		
Net Cash Flow from Investing Activities	-R98 800	-R39 520
Financing Activities		
Cash receipts from		
Issuance of stock		
Borrowing		
Cash paid for		
Repurchase of stock (treasury stock)		
Repayment of loans	-R6 667	-R6 667
Dividends		
Net Cash Flow from Financing Activities	-R6 667	-R6 667
Net Increase in Cash	-R65 655	R41 889
Cash at End of Year	R14 345	R56 234

Projected Financial Ratios

Projected financial ratios are leveraged to estimate the potential performance of the business venture, as well as to facilitate future decision making. The ratios are derived from the projected financial statements at the end of the year 2025.

$$\begin{aligned}
 1) \text{ Return on Assets} &= \frac{\text{Net Profit}}{\text{Total Assets}} \\
 &= \frac{R31\,329}{R98\,621} \\
 &= 0,317670679 \\
 &= 31.77\%
 \end{aligned}$$

Any return on asset ratio above 20% is considered to be very good. The venture's return on asset ratio of almost 32% indicates that the assets are very efficient in generating profit.

$$\begin{aligned}
 2) \text{ Debt to Equity} &= \frac{\text{Total Liabilities}}{\text{Total Equity}} \\
 &= \frac{R6\,666}{R14\,7946} \\
 &= 0,04505698 \\
 &= 4.5\%
 \end{aligned}$$

A debt-to-equity ratio beneath 50% is considered good. Thus a 4.5% debt-to-equity ratio indicates that the business venture has a very low leverage and has a very low risk of defaulting on its credit. However, it can also be considered as a missed opportunity to grow the business. The business venture will look at increasing its debt to fund business activities post its first four years of start-up.

$$\begin{aligned}
 3) \text{ Debt Ratio} &= \frac{\text{Total Liabilities}}{\text{Total Assets}} \\
 &= \frac{R6\,666}{R154\,612} \\
 &= 0,043114377 \\
 &= 4.3\%
 \end{aligned}$$

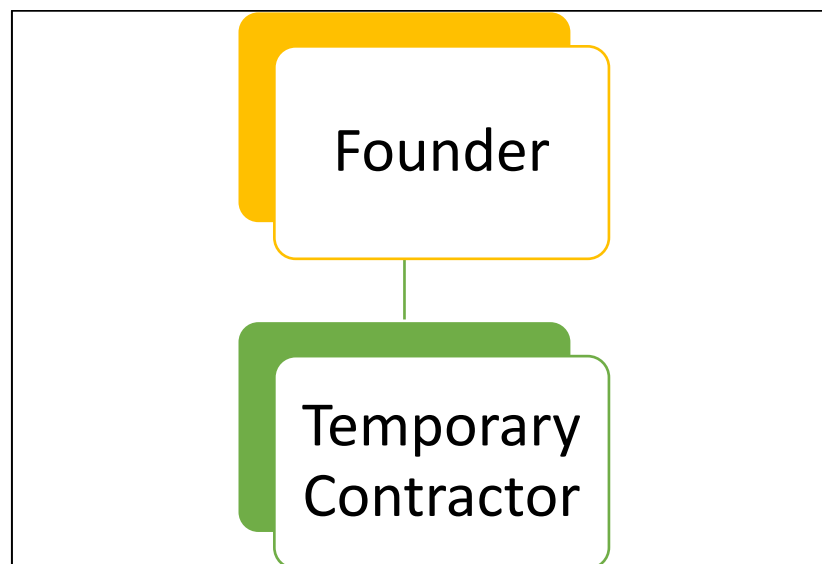
The debt ratio shows that a very small portion of the business venture's assets is financed through debt. This indicates very little reliance on creditors to fund business activities. When the business venture is successfully established in the market, the venture will focus on increasing the 4.3% debt ratio to better leverage available debt to grow the business.

Personnel Requirements

One of the main focus points of the strategy of the business venture, in accordance with the effectuation theory principles, is to keep costs down as much as possible until the business is established in the market. Thus during the first six months of operation the venture will only have one employee (the founder) who will not take a salary. This will allow for the maximum amount of capital to be reinvested into the venture. After the first six months of operation, the projected number of power trolleys to be leased will exceed the capabilities of a single person to manage. It is at this point in time where a temporary employee (on contract basis) will be employed to assist on busy days when delivery requests are high.

Organogram

Figure 14: Business Venture Organogram



Implementation Plan

The following implementation steps will be followed over the next two years (January 2024 to December 2025) to establish the business venture in the market. The implementation plan specifically focuses on a two-year period since this is statistically the highest risk period for failure for start-ups and entrepreneurial ventures. Post the business venture's "survival" of the first two years, a medium and long term strategy will be developed that focuses less on incubation and more on growth and scaling.

Table 9: Implementation Schedule

No	Description	Jan 2024 - Mar 2024	Apr 2024 - Jun 2024	Jul 2024 - Sep 2024	Oct 2024 - Dec 2024	Jan 2024 - Mar 2025	Apr 2024 - Jun 2025	Jul 2024 - Sep 2025	Oct 2024 - Dec 2025
1	Register Company								
2	Open Business Bank Account								
3	Fund R60 000 into Business Account								
4	Apply for R20 000 Loan and Deposit into Business Account								
5	Design and Build Website								
6	Setup Email and WhatsApp Accounts								
7	Purchase Battery Analysis Tool								
8	Invest R15 000 into Facebook and Google Advertisements Marketing								
9	Setup Relationships with Potential Suppliers								
10	Purchase and Assemble Components for 6 Power Trolleys								
11	Searching and Identifying of New Potential Customers								
12	Purchase and Assemble Components for 4 Power Trolleys								
13	Invest R10 000 into Facebook and Google Advertisements Marketing								
14	Hire Temporary Employee to Assist with Order on Busy Days								
15	Identify a Low Cost Trailer Hire Business to Hire from								
16	Purchase and Assemble Components for 4 Power Trolleys								
17	Invest R10 000 into Facebook and Google Advertisements Marketing								
18	Start Taking Monthly Salary Based on Available Monetary Resources								
19	Invest R10 000 into Facebook and Google Advertisements Marketing								
20	Evaluate past 2 Year Performance and Develop 5 Year Strategy								

Risk and Uncertainty Management

Risk Analysis

A projected failure mode and effects analysis (FMEA) conducted on the business activities show the risks that the business ventures will face, as well as the action plans put into place to mitigate the identified risks. The risk priority number (RPN) is calculated using a function of the probability, severity and detection capability associated with the specific risk. The complete FMEA can be seen in [Appendix O](#).

Primary Risk Identification and Mitigation

The biggest risk associated with the venture is the risk of power trolley theft by the customer as this would result in a significant loss in both assets and revenue (since equipment can no longer be leased). The risk could be caused by refusal of the customer to return the power trolley at the end of the lease period. A potential control method to mitigate the risk would be to request a deposit from the customer, especially first-time customers with large order quantities, before the power trolleys are delivered.

Other big risks include warehouse theft of equipment and breakdown of power trolleys whilst in the customer's possession. The effect of the former risk will be a loss of asset and revenue, but can be mitigated through implementing additional security measures at the warehouse (e.g. additional locks). The effect of the latter risk is reputational damage suffered by the venture when a product breaks down while being leased to a customer. Potential mitigating measures that could be put in place include doing preventative maintenance before products are dispatched to customers, as well providing customers with discounts on their lease agreements when they experienced downtime due to faulty power trolleys.

Chapter 6: Conclusion

The business venture envisions a brighter future for South Africa by providing reliable and affordable power solutions, with a focus on empowering small businesses. The results from the research provided much needed guidance to the business plan on what to focus on and how to structure the offering such that it would be attractive to the small business market. The study also produced valuable insights, with respect to customer sentiment and context, into what problems the targeted market faces and how the venture should be strategically positioned to provide maximum value to its customers. The study outcomes showed that a lease or lease-to-buy model, in which customers could lease a solution with the option of purchasing it later, could serve as a feasible foundation for a business venture.

The business plan (“blue print”) shows that in order to support the vision and mission of the business venture effectively, the business designed capabilities to achieve competitive advantage in the market. The market analysis shows a great opportunity based on economic constraints and persistent power challenges in South Africa, creating a strong demand for cost-effective backup power solutions. The venture’s operational plan is driven by the supply chain strategy focused on responsiveness to meet the urgent needs of small businesses, aligning with the connected marketing strategy. The founder plans to bootstrap the venture to retain control and minimize costs. The financial forecasts project a positive net profit, balance sheet growth and cash flow after the second year of operation.

In conclusion to establish a successful entrepreneurial venture two elements were required. The first element was the research study which provided input on “what” had to be done. The second element was the business analysis and planning which provided input on “how” it had to be done. With the successful drafting of the business plan, the venture can now be formalized and launched in accordance with the implementation plan.

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Appendices

Appendix A: Participation Information Sheet



Good day Sir/Madam

My name is Jean du Toit and I am a Master's student in Business Administration at the University of the Witwatersrand, Johannesburg. My supervisor is Prof. McEdward Murimbika. I am conducting a research study about how battery technology, specifically power trolleys, can help households and small businesses navigate the challenges that are posed by power outages during load shedding. The study seeks to understand the qualities and characteristics of the ideal power trolley solution, as well as how to best offer it. The study title is "Standby power trolleys to mitigate load shedding using a lease or lease-to-buy business model".

I want to extend an invite to yourself to take part in an interview. Should you decide to take part, your participation in the research study will take approximately 15min. The interview will be conducted in a face to face approach and will take place at a time and location suitable to you.

With your permission, I would like to produce an audio recording of the interview for record keeping and audit trail purposes. The audio data will be stored in a secure, password-protected repository for a period of 1 year and will then be deleted. Only the researcher will have access to the data. The interview will be confidential and every attempt will be made to keep your responses anonymous, however this cannot be guaranteed. When I share the results of the research study, I will not include your name or other specific details that could identify you.

If you decide to take part in the research study, it should be because you want to do so as a volunteer. You do not have to take part. You can stop the interview at any point in time, should you feel the need to do so. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to participate in the research study. You will not lose any services, benefits or rights you would normally have if you decide not to join. Taking part in the research study will not have any costs associated and you will not be paid for your participation in the research study.

The risks for this research study are no more than what happens in everyday life and none of the questions asked should make you feel uncomfortable or upset. This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

Jean

Researcher:

Jean du Toit

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Prof. Mc Edward Murimbika

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011 717 3658

Appendix B: Consent Form

Standby power trolleys to mitigate load shedding using a lease or lease-to-buy business model

By Jean du Toit

I,, agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me. I understand what this study is about.	YES	NO
--	-----	----

I understand that I am a volunteer in the study	YES	NO
---	-----	----

I agree that the interview will be audio recorded	YES	NO
---	-----	----

I agree that direct quotations from my interview may be used by the researcher in their research report	YES	NO
---	-----	----

I agree that my participation will remain confidential (my name or other identifying data will not be used by the researcher in their research report)	YES	NO
--	-----	----

Participant Details

Name

Date

Signature

Researcher Details

Date

Signature

Appendix C: Interview Guide Questions

- 1) Do you currently reside in your own home and are you financially responsible for funding your own solutions to power outages?
- 2) Are you aware of power trolleys as a backup power solution to be used during outages?
- 3) Describe the specific functionalities or features of power trolleys that you find valuable during a power outage? Why do you consider those features important?
- 4) What do you consider to be the most crucial electronic devices to power during power outages and why?
- 5) During what circumstances or occasions would you mostly need a backup power solution in your home/office?
- 6) What factors would influence your decision to invest in a power trolley as a backup power solution? Are there any specific considerations such as price, durability, or ease of use that would sway your decision?
- 7) What are your initial thoughts or impressions about the concept of leasing options for battery technology to power appliances during power outages?
- 8) What specific factors would make you more or less inclined to consider utilizing leasing or lease-to-buy options for battery technology?
- 9) How much money would you be willing to spend (more or less) on the hiring of such a solution?
- 10) Do you think you would be more willing to purchase a backup power product, having first tested it in your home environment? Why?
- 11) Share any examples, scenarios or situations where you think leasing or lease-to-buy options for battery technology would be particularly advantageous?

Appendix D: Ethics Clearance Certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg



Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/BA2549149/996

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Standby power trolleys to mitigate loadshedding using a lease or lease-to-buy business model
Investigator / Researcher	Mr Johanes Jacobus du Toit
Nature of Project	MBA (Business Venture Proposal)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentiality.
Issue Date of Certificate	2023-07-27
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba  +27 11 717 3976  +27 82 733 6587  pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

10/08/2023

Date:

Appendix E: Battery Technology and its Applications

Battery Technology in South Africa

South Africa is responsible for the production of millions of batteries every year, with their lead acid battery manufacturer (First National Battery) producing over 2.2 million batteries per annum. The majority of batteries produced in the country are exported to over 40 other countries, to be used in a wide variety of applications in the automotive, telecommunications, mining, railway and energy sectors (FNB, 2023). The high demand for a range of different types of electronics has seen an explosive growth in the battery market in South Africa. The current international battery market is valued at about \$965 million and is expected to reach \$1.75 billion by the end of 2030 (Data Bridge Market Research, 2022). Battery energy storage systems have already seen an exponential increase in uptake over the past decade and the trend is expected to continue in the years to come (Salim, et al., 2019).

There are four main categories (or types) of battery technology specifically used for the storage of electricity in stationary situations. These categories include lithium-ion (li-ion) batteries, vanadium redox flow batteries (VRFB), high temperature sodium nickel chloride (NaNiCl) batteries and lead-acid batteries. Vanadium redox flow batteries are seldom used in modern backup power projects due to the additional complexities and electrolyte flow requirements needed for its operation (Charles, et al., 2019). The most common technologies leveraged for home backup power in South Africa are lithium-ion batteries and lead-acid batteries, each having their advantages and disadvantages (Albright, et al., 2012).

Lead-Acid vs Lithium-Ion battery Technology

Lead-acid batteries are the oldest battery type with the underlying technology having been developed more than a century ago. The lead-acid battery has become an umbrella term used to describe batteries that operate in similar ways, although slight differences might exist between older and more modern models (e.g. gel models, absorbed glass matt models, etc.) (Albright, et al., 2012). Lead-acid batteries used in backup power systems, as opposed to motor vehicles, are called deep cycle batteries. This technology allows for 80% of the stored capacity to be used and they generally have a longer life when compared to shallow cycle batteries used in motor vehicles (Casacca, et al., 1996). The expected number of life cycles, thus the number of times fully charged and discharged, for a lead-acid battery is around 300 cycles (Battery University, 2022)

Lithium-ion batteries, although technically developed in the 1970s, did not see widespread adoption until the late 1990s. Lithium-ion batteries can be sub-divided into lithium iron phosphate and metal oxide type batteries, but both of these models are generally simply referred to as lithium-ion batteries (Albright, et al., 2012). Albright continues to explain that one of the advantages of lithium-ion batteries is that the battery can be almost completely discharged when used in a backup power solution (2012). Lithium-ion batteries, although more expensive, also have longer life cycles (2000 cycles) when compared with lead-acid batteries. This shows that lithium-ion batteries would require less frequent replacement when installed in a particular backup solution (Ayeng'o, et al., 2018). Despite the recent lithium-ion battery shortage in South Africa, batteries have become increasingly more accessible to the public in recent years with the cost per kWh having dropped by more than 85% since 2010 (Mordor Intelligence, 2023).

In conclusion, lead-acid batteries are usually the most attractive option due to their ease of availability and inexpensive capital investment costs; however, these batteries are very sensitive to deep depletion and have limited cycle lifetimes when compared with other battery types (Charles, et al., 2019). Lithium-ion batteries are approximately three times more expensive to purchase from a capital expenditure perspective when compared with lead-acid batteries. However, in the long term when battery life is taken into consideration, the lithium-ion batteries become the more cost effective option (Safety4Sea, 2022). The technology used in lithium-ion batteries is more innovative and advanced, and thus allows for the batteries to be, on average, between 18% and 35% more cost effective when compared with lead-acid batteries (Albright, et al., 2012).

Application of Battery Technology

Battery technology can be used to supplement household power needs in the absence of utility power. Backup battery power solutions are usually used as a supplement power source for low-energy appliances and devices like basic lighting, TVs, cell phone chargers and certain refrigerators (Charles, et al., 2019).

The term “inverter” (or inverter mechanism) was most likely coined in 1925 by David Price since he was the first to use the term formally in a published article in the “GE Review”; however, it is nearly impossible to know if he was the one who created the term (Owen, 1996). The term is used when making reference to any machine or device able to convert direct current (DC) into alternating current (AC) and *vice versa* (Owen, 1996). Virtually all batteries operate on the principle of using direct current (DC) as input to store electrical energy and also produce direct current as output when discharging (Musavi, et al., 2013).

All home electrical devices and appliances in South Africa require 220 volt (V) of alternating current (AC) to operate. Thus, the inverter mechanism is used to convert the electricity between x volt direct current (xV DC) and 220 volt alternating current (220V AC) as required by the batteries and home appliances respectively (Evalina, et al., 2021). The inverter unit works by charging a battery (DC) using the inverter mechanism while the supply of electricity (AC) is available to the household and then making the power stored (DC) in the battery available for use when the home's power (AC) is interrupted (Fuji Electric Global, 2020).

Appendix F: Data Analysis on Interviews with Individuals

Groups of Codes Consolidated	Frequency	Theme
Group 1: Financial Responsibility for Power solution		
Residence and Financial Responsibility	10	All participants were financially responsible for funding their solutions to power disruptions
Group 2: Awareness and Knowledge		
Good Awareness of Power Trolleys	7	The majority of participants were very familiar with power trolleys and their functions
Moderate awareness of Power Trolleys	3	
Group 3: Valuable Features		
Valuable Features - User friendliness and Operation	4	User friendliness and the ability to understand the amount of power the power trolley can provide were the most sought after features in the power trolley design.
Valuable Features - Available Capacity Monitoring	4	
Valuable Features - Load Management and Alarm	2	
Valuable Features - Smart App Integration	1	
Valuable Features - Versatile Input Requirements	1	
Valuable Features - Automatic Switchover	1	
Valuable Features - Digital features	1	
Group 4: Crucial Electronic Devices		
Crucial Electronic Devices - Internet router	9	The ability to stay connected to the internet and charge electronic devices are the most important needs to be met during power outages. The ability to power lights and power larger electronic devices are also moderately important for consumers.
Crucial Electronic Devices - Charging of devices	6	
Crucial Electronic Devices - Laptop	6	
Crucial Electronic Devices - Lights	5	
Crucial Electronic Devices - Fridge and Freezer	5	
Crucial Electronic Devices - TV	4	
Crucial Electronic Devices - Xbox	1	
Crucial Electronic Devices - PC screen	1	
Group 5: Backup Power Needs (Occasions)		
Backup Power Needs - Working hours	6	Working hours are the most crucial times for consumers to have access to backup power. Evenings after work and at social gatherings are also moderately important for having backup power.
Backup Power Needs - Social gatherings	3	
Backup Power Needs - Evenings	3	
Backup Power Needs - Meal Times	2	
Backup Power Needs - During Extended Blackouts	1	
Backup Power Needs - Weekends	1	
Group 6: Investment Factors for Power Trolley		

Investment Factors - Price	9	The price, mobility and overall quality/durability are the most important factors considered by consumers when deciding to invest in a specific power trolley model. The amount of power to be delivered is also very important.
Investment Factors - Mobility	6	
Investment Factors - Quality and Durability	6	
Investment Factors - Power Output	4	
Investment Factors - Capacity	4	
Investment Factors - Safety and Liability	1	
Investment Factors - Power Outage Duration	1	
Investment Factors - Warranty and Return policy	1	
Investment Factors - Eco-friendly	1	
Investment Factors - Low noise levels	1	
Investment Factors - Convenience and Comfort	1	
Group 7: Perceptions of Leasing Backup Power		
Perceptions of Leasing - Overall valid	9	The consumer perception with regards to leasing backup power products is overwhelmingly positive with many consumers agreeing that not only does a market exist in leasing, but that they would leverage a leasing model prior to purchasing a backup power solution. There is also agreement that leasing is not sustainable in the long term due to high costs.
Perceptions of Leasing - Positive to Trial Usage	9	
Perceptions of Leasing - High long term costs	3	
Perceptions of Leasing - Ownership is Better	2	
Perceptions of Leasing - Neutral to Trial Usage	1	
Perceptions of Leasing - Budget equal to offset of losses	1	
Perceptions of Leasing - Flexibility	1	
Perceptions of Leasing - Convenience	1	
Perceptions of Leasing - No Equipment Responsibility	1	
Perceptions of Leasing - Provide More Options	1	
Perceptions of Leasing - Not Beneficial	1	
Perceptions of Leasing - Good for Cash flow	1	
Perceptions of Leasing - Homeowners Would Rather Purchase Solution	1	
Group 8: Factors in Decision-Making		
Factors in Decision - Cost of Purchase vs Lease	4	The main factors influencing consumer decision making on backup power leasing are the costs of the lease and how frequently the solution will be utilized.
Factors in Decision - Power outage frequency	3	
Factors in Decision - Lease Terms and Insurance	2	
Factors in Decision - Power outage intensity	1	
Factors in Decision - Maintenance Terms	1	
Factors in Decision - Lease period	1	

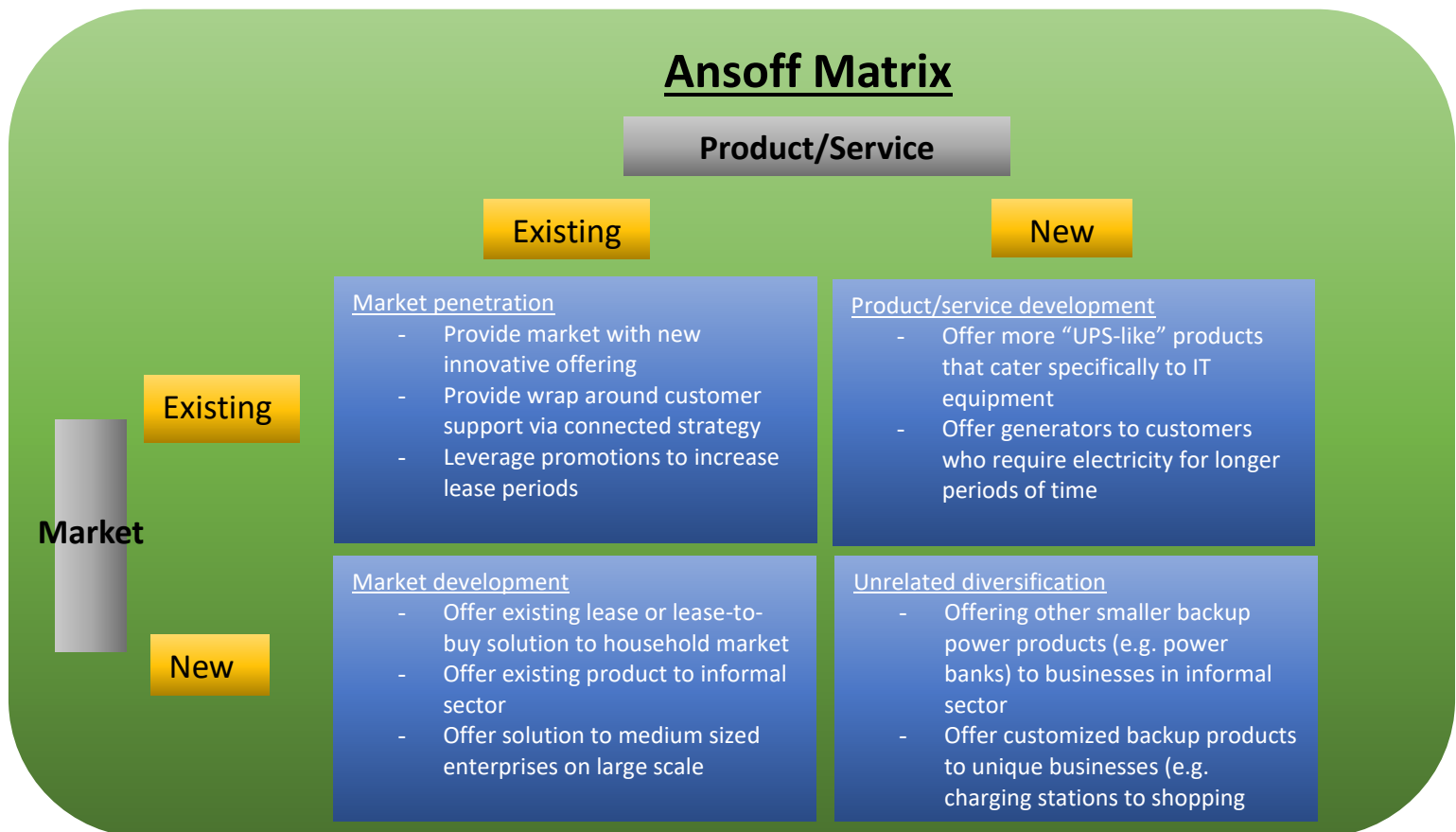
Group 9: Advantages of Leasing Power Trolleys		
Advantages of Leasing - Financial and Circumstantial Flexibility	6	The main advantage of leasing backup power solutions is the flexibility associated with leasing and not having to commit to a specific solution for a long period of time. The fact that leasing offers a less capital intensive solution is also very beneficial to consumers.
Advantages of Leasing power trolleys - Lower Risk for Inexperienced Users	3	
Advantages of Leasing power trolleys - Less Capital Intensive	3	
Advantages of Leasing power trolleys - Maintenance by Supplier	1	
Advantages of Leasing power trolleys - Incorporate Upgrades	1	
Group 10: Acceptable Lease Rate		
Acceptable Lease Rate - R5000 per month	1	
Acceptable Lease Rate - R3000 - R6000 per month	1	
Acceptable Lease Rate - R1000 to R2000 per month	1	
Acceptable Lease Rate - R1200 per month	1	
Acceptable Lease Rate - R1000 per month	1	
Acceptable Lease Rate - R750 per month for power trolley	1	
Acceptable Lease Rate - R500 to R600 per month	1	
Acceptable Lease Rate - R500 per month	1	
Acceptable Lease Rate - R300 - R400 per month	1	
Acceptable Lease Rate - R1200 per month for solar	1	
Acceptable Lease Rate - R7000 - R8000 per month for solar	1	
Acceptable Lease Rate - Budget equal to offset of losses	1	
Acceptable Cost - More than utility rate	1	
**Group 10: Acceptable Lease Rate (Categorized)		
Acceptable Lease Rate - R0 - R999 per month	4	The majority of consumers are willing to pay a monthly lease rate between R300 and R1000, with the average being R630 per month.
Acceptable Lease Rate - R1000 - R2000 per month	3	
Acceptable Lease Rate - More than R2000 per month	2	
Group 11: Other		
Uncertainty and lack of data	1	
Value for Money Calculation	1	

Appendix G: Data Analysis on Interviews with Businesses

Groups of Codes Consolidated	Frequency	Theme
Group 1: Financial Responsibility for Power solution		
Office Location and Financial Responsibility	5	All participants were financially responsible for funding their solutions to power disruptions for the business.
Group 2: Awareness and Knowledge		
Good awareness of Power Trolleys	5	The majority of participants were very familiar with power trolleys and the value they can provide to their business.
Group 3: Valuable Features		
Valuable Features - Available Capacity Monitoring	2	User friendliness and the ability to understand the amount of power the power trolley can provide were the most sought after features in the power trolley design.
Valuable Features - User Friendliness	2	
Valuable Features - Automatic Switchover	2	
Valuable Features - Smart App Integration	1	
Valuable Features - Customizable Shutdown Sequencing	1	
Group 4: Crucial Electronic Devices		
Crucial Electronic Devices - Internet router	5	The ability to stay connected to the internet and power office servers and computers were the most important needs to be met during power outages.
Crucial Electronic Devices - Server	4	
Crucial Electronic Devices - Laptop/Computers	3	
Crucial Electronic Devices - PC screen	2	
Crucial Electronic Devices - Advertisement TVs	1	
Crucial Electronic Devices - Pay points	1	
Crucial Electronic Devices - Printers	1	
Group 5: Backup Power Needs (Occasions)		
Backup Power Needs - Business hours	5	All businesses stated that standard working hours were the most important time periods in which backup power would be used.
Backup Power Needs - Training webinars	1	
Group 6: Investment Factors		
Investment Factors - Quality and Durability	4	The price, mobility and overall quality/durability are the most important factors considered by businesses when deciding to invest in a specific power trolley model. The support and service from the supplier (post the purchase) are also very important factors considered by businesses when making decisions to invest in power trolleys.
Investment Factors - Price	4	
Investment Factors - Mobility	3	
Investment Factors - Post purchase support	3	
Investment Factors - Brand and Trust	2	
Investment Factors - Noise level	2	
Investment Factors - Capacity	2	
Investment Factors - Supplier Reputation	1	
Investment Factors - Return on Investment	1	
Investment Factors - Complexity of Lease Agreement	1	
Investment Factors - Big Wheels	1	
Group 7: Perceptions of Leasing		
Perceptions of Leasing Backup Power - Valid	5	

Perceptions of Leasing - Positive to Trial Usage	5	The main business perceptions with regards to leasing backup power products are overwhelmingly positive with many businesses (especially those who want to preserve capital) agreeing that not only does a market exist in leasing, but that they would leverage a leasing model prior to purchasing a backup power solution. There is also agreement that leasing is not sustainable in the long term due to high costs.
Perceptions of Leasing - High long term costs	3	
Perceptions of Leasing - Good for Capital Preservation for Expanding Businesses	3	
Perceptions of Leasing - Prefer Short Terms with Regular Renewal	2	
Perceptions of Leasing - Reasonable Opt-out Clauses	1	
Perceptions of Leasing - Better to Buy than Lease	1	
Perceptions of Leasing - Scepticism About Large Retailers	1	
Perceptions of Leasing - Lower Risk for Over/Under Device Specifications	1	
Perceptions of Leasing Backup Power - Effective Adapting to New Technology	1	
Perceptions of Leasing - Solution to Specific Business Needs	1	
Group 8: Factors in Decision Making		
Factors in Decision - Turnaround Time and Contract to Replace Broken Units	2	The most important factors to consider for businesses are the effectiveness and time it takes to get malfunctioning backup power units back online, as well as the structure and terms of the lease agreement with regards to ownership of the assets.
Factors in Decision - Ownership at End of Lease	2	
Factors in Decision - Price	1	
Factors in Decision - Balance Sheet Impact	1	
Group 9: Advantages of Leasing		
Advantages of Leasing power trolleys - Lessor Responsible for Maintenance	3	The main advantages to businesses in leasing backup power solutions is that the responsibility of maintenance is shifted from them onto the lessor. This along with less capital expenditure frees up more cash to be used in value-adding business operations.
Advantages of Leasing power trolleys - Less Capital Intensive	2	
Advantages of Leasing power trolleys - Cash flow and Credit Avoidance	2	
Advantages of Leasing - Flexibility	1	
Advantages of Leasing - Relocation	1	
Advantages of Leasing power trolleys - Outsource Non-Key Functions	1	
Advantages of Leasing power trolleys - Potentially Offer Second Generation Solution	1	
Advantages of Leasing power trolleys - Word of Mouth Referrals	1	
Group 10: Acceptable Lease Rate		
Acceptable Lease Rate - R500 per month for power trolley	2	N/A - not enough data points
Acceptable Lease Rate - R1000 per kilowatt	1	
Acceptable Lease Rate - Dependent on Turnover	1	

Appendix I: Ansoff Matrix



Appendix J: Income Statement Notes (Detailed)

	Note	Calculation	Jan - Jun 2024	Jul - Dec 2024	Jan - Jun 2025	Jul - Dec 2025	Jan - Jun 2026	Jul - Dec 2026	Jan - Jun 2027	Jul - Dec 2027
1	Assume 80% of Power Trolleys are being leased at any given time	$R1200 * 6 \text{ months} * 0,8 * (6)(10)(14)$	R34 560	R57 600	R80 640	R80 640	R80 640	R80 640	R80 640	R80 640
2	Contractor wage R150 for days with large delivery volumes. Assume 6 days per month delivery for second semester year 1. Assume 8 days per month delivery for year 2.	$R150 * 6 \text{ months} * (6)(8)$		R5 400	R7 200	R7 200	R7 200	R7 200	R7 200	R7 200
3	Straight line depreciation. Residual value R710	$((8880 - 710)/4) * (6)(10)(14) \text{ over 1 year}$	R5 447	R9 078	R12 709	R12 709	R12 709	R12 709	R12 709	R12 709
4	Assume 2 return extra-large deliveries per month (i.e. trailer required @R350 per day) for second semester year 1. Assume 3 extra-large deliveries per month for year 2.	$350 * 2 * 6 \text{ months}$		R4 200	R6 300	R6 300	R6 300	R6 300	R6 300	R6 300
5	Facebook and Google Advertisements. R15000 over first 6 months and R10 000 over next 6 months to follow.		R15 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000
6	Loan repayment of R695 per month over 36 months (15% interest rate on R20 000 capital loan) = interest R140 per month	$140 * 6 \text{ months}$	R840	R840	R840	R840	R840	R840		
7	Number of trolleys purchased		6	4	4	0	0	0	0	0

Appendix K: Lifespan Analysis

Equipment Lifespan Analysis of Power Trolley		
Item Description	Assumptions	Calculation
1.2KVA/720W Inverter Unit	1650 switch overs from AC to DC before failure 365 days in a year	$1650/365$ 4,1 years
1,2kWh 12V 100AH Lithium Ion Battery	5000 cycles as per manufacturer Avg. Stage 3 loadshedding = 3,5 power outages per day 365 days in a year	$5000/(3.5*365)$ 3,91 years
Customized Wheels (4*R120)	Wheel will last avg. of 4 years	4 years
Trolley Casing	Casing will last 4 years if expected to be sold for R500	4 years
Average Lifespan of trolley		4,1 years Approx. 4 Years

Appendix L: Depreciation and Cost Breakdown Analysis

Power Trolley Cost Breakdown	
Item Description	Item Cost
1.2KVA/720W Inverter Unit	R 3 000,00
Trolley Casing	R 750,00
1,2kWh 12V 100AH Lithium Ion Battery	R 4 600,00
Customized Wheels (4*R120)	R 480,00
Paint and Signage Design	R 50,00
Total Power Trolley Cost	R 8 880,00
Residual Value at end of Life Expectancy	
Battery	R 210,00
Trolley Casing	R 500,00
Total Power Trolley Residual	R 710,00
Total Depreciable Base Amount (R8880-R710)	R 8 170,00
Break-even rate per year (R8170/4)	R 2 042,50
Break-even rate per month (R2042/12)	R 170,21

Appendix M: Projected Financial Statements (Full Set)

Income Statement

Income Statement Projection								
Description	Jan - Jun 2024	Jul - Dec 2024	Jan - Jun 2025	Jul - Dec 2025	Jan - Jun 2026	Jul - Dec 2026	Jan - Jun 2027	Jul - Dec 2027
1. Revenue								
Sales (A) ¹	R34 560	R57 600	R80 640	R80 640	R80 640	R80 640	R80 640	R80 640
Dead Stock Approx. 5 % of Revenue (B)	R1 728	R2 880	R4 032	R4 032	R4 032	R4 032	R4 032	R4 032
Gross Profit (A - B)	R32 832	R54 720	R76 608	R76 608	R76 608	R76 608	R76 608	R76 608
2. Operating Expenses								
Wages ²	R0	R5 400	R7 200	R7 200	R7 200	R7 200	R7 200	R7 200
Depreciation Expenses ³	R6 128	R10 213	R14 298	R14 298	R14 298	R14 298	R14 298	R14 298
Website Design and Build	R0	R0	R0	R0	R0	R0	R0	R0
Vehicle Hire	R0	R0	R0	R0	R0	R0	R0	R0
Warehouse Rent Expense	R0	R0	R0	R0	R0	R0	R0	R0
Battery Analysis Tool	R1 000	R0	R0	R0	R0	R0	R0	R0
Trailer Hire for Delivery ⁴	R0	R4 200	R6 300	R6 300	R6 300	R6 300	R6 300	R6 300
Utilities	R3 000	R5 000	R7 000	R7 000	R7 000	R7 000	R7 000	R7 000
Website Hosting Fees	R720	R720	R720	R720	R720	R720	R720	R720
Business Bank Account Fees	R510	R510	R510	R510	R510	R510	R510	R510
Advertising Expenses ⁵	R15 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000
Loan Repayment Interest ⁶	R840	R840	R840	R840	R840	R840	R0	R0
Total Operating Expenses	R27 198	R36 883	R46 868	R46 868	R46 868	R46 868	R46 028	R46 028
Operating Profit (1 - 2)	R5 635	R17 838	R29 741	R29 741	R29 741	R29 741	R30 581	R30 581
Tax	R0	R0	R0	R0	R0	R0	R0	R0
Net Profit	R5 635	R17 838	R29 741	R29 741	R29 741	R29 741	R30 581	R30 581

	Note	Calculation	Jan - Jun 2024	Jul - Dec 2024	Jan - Jun 2025	Jul - Dec 2025	Jan - Jun 2026	Jul - Dec 2026	Jan - Jun 2027	Jul - Dec 2027
1	Assume 80% of Power Trolleys are being leased at any given time	$R1200 * 6 \text{ months} * 0,8 * (6)(10)(14)$	R34 560	R57 600	R80 640	R80 640	R80 640	R80 640	R80 640	R80 640
2	Contractor wage R150 for days with large delivery volumes. Assume 6 days per month delivery for second semester year 1. Assume 8 days per month delivery for year 2.	$R150 * 6 \text{ months} * (6)(8)$		R5 400	R7 200	R7 200	R7 200	R7 200	R7 200	R7 200
3	Straight line depreciation. Residual value R710	$((8880-710)/4) * (6)(10)(14) \text{ over 1 year}$	R5 447	R9 078	R12 709	R12 709	R12 709	R12 709	R12 709	R12 709
4	Assume 2 return extra-large deliveries per month (i.e. trailer required @R350 per day) for second semester year 1. Assume 3 extra-large deliveries per month for year 2.	$350 * 2 * 6 \text{ months}$		R4 200	R6 300	R6 300	R6 300	R6 300	R6 300	R6 300
5	Facebook and Google Advertisements. R15000 over first 6 months and R10 000 over next 6 months to follow.		R15 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000	R10 000
6	Loan repayment of R695 per month over 36 months (15% interest rate on R20 000 capital loan) = interest R140 per month	$140 * 6 \text{ months}$	R840	R840	R840	R840	R840	R840		
7	Number of trolleys purchased		6	4	4	0	0	0	0	0

Balance Sheet

Balance Sheet	2024 Projection		2025 Projection	
Assets				
Current assets:	R	14 345,00	R	56 234,00
Cash	R	14 345,00	R	56 234,00
Accounts Receivable	R	-	R	-
Prepaid expenses	R	-	R	-
Inventory	R	-	R	-
Total current assets	R	14 345,00	R	56 234,00
Property & Equipment	R	98 800,00	R	138 320,00
Accumulated Depreciation	R	(14 524,00)	R	(43 119,00)
Total Assets	R	98 621,00	R	151 435,00
Liabilities				
Current liabilities:				
Accounts payable	R	-		
Accrued expenses	R	-		
Unearned revenue	R	-	-	
Total current liabilities	R	-	R	-
Long-term debt	R	13 333,00	R	6 666,00
Other long-term liabilities	-		-	
Total Liabilities	R	13 333,00	R	6 666,00
Shareholder's Equity				
Investment capital	R	60 000,00	-	
Retained earnings	R	25 288,00	R	144 769,00
Shareholder's Equity	R	85 288,00	R	144 769,00
Total Liabilities & Shareholder's Equity	R	98 621,00	R	151 435,00
<i>Balance</i>	<i>R</i>	<i>-</i>	<i>R</i>	<i>-</i>

Statement of Cash Flows

Cash Flow Statement		
	For the Year Ending	
	Cash at Beginning of Year	
	Year 2024	Year 2025
	R80 000	R14 345
Operations		
Cash receipts from		
Customers	R87 552	R153 216
Other Operations		
Cash paid for		
Inventory purchases		
General operating and administrative expenses	-R40 660	-R49 060
Wage expenses	-R5 400	-R14 400
Interest	-R1 680	-R1 680
Income taxes	0	0
Net Cash Flow from Operations	R39 812	R88 076
Investing Activities		
Cash receipts from		
Sale of property and equipment		
Collection of principal on loans		
Sale of investment securities		
Cash paid for		
Purchase of property and equipment	-R98 800	-R39 520
Making loans to other entities		
Purchase of investment securities		
Net Cash Flow from Investing Activities	-R98 800	-R39 520
Financing Activities		
Cash receipts from		
Issuance of stock		
Borrowing		
Cash paid for		
Repurchase of stock (treasury stock)		
Repayment of loans	-R6 667	-R6 667
Dividends		
Net Cash Flow from Financing Activities	-R6 667	-R6 667
Net Increase in Cash	-R65 655	R41 889
Cash at End of Year	R14 345	R56 234

Appendix N: Additional Project Content

No	Description	File
1	Detailed Coding Analysis for Theme Generation – Households	 Coding Table Personal Nov 2.xlsx
2	Detailed Coding Analysis for Theme Generation – Small Businesses	 Coding Table Business Nov 2.xlsx
3	Panel Presentation of Project Proposal	 Pannel Presentation Final.p
4	Certificate of External Proofreading	 Certificate of Proofreading.pdf

Appendix O: Failure Mode and Effects Analysis

No	Function	Potential Failure Mode	Potential Effect of Failure	Severity (A) [highest 10]	Potential Cause of Failure	Probability of Occurrence (B) [highest = 10]	Established Controls	Probability of Detection (C) [highest = 1]	Risk Priority Number (A*B*C)	Recommended Action
1	Power trolley theft (customer)	Theft of power trolleys from customer	Loss of asset and revenue since equipment cannot be leased	7	Customer refuses to return product at end of lease period	2	Request deposit before power trolleys are delivered to site	9	126	Incorporate a customer vetting process for first-time customers with high lease order quantities
2	Power trolley theft (warehouse)	Theft of power trolleys from warehouse	Loss of asset and revenue since equipment cannot be leased	8	Warehouse theft	2	Standard lock	7	112	Install additional lock and security measures in warehouse
3	Breakdown of power trolley - customer	Breakdown of power trolley while being leased by customer	Reputation damage to business venture	9	Defective battery or inverter unit	3	Preventative maintenance	3	81	Give discounts to customers to make up for business downtime experienced
4	Late payment from customer	Customer fails to extend contract or return product at end of lease period	Loss of revenue since equipment cannot be leased	4	Inability to contact customer successfully when lease expires	4	Deposit can be used to cover losses	4	64	Obtain more than one method of contact from customer during on boarding process
5	Warehouse natural disaster	Fire or weather damage to warehouse and equipment	Loss of asset and revenue since equipment cannot be leased	10	Fire, flooding, rain damage, etc.	1	Insurance on both equipment and structure	4	40	N/A
6	Start-up loan	Bank declines loan application	Venture cannot raise enough capital to effectively start up	8	Credit record limitations	3	Regular follow ups with bank on application progress	1	24	Identify numerous financial institutions at which the loan can be applied for
7	Breakdown of power trolley - warehouse	Breakdown of power trolley while in warehouse (maintenance conducted)	Loss of equipment	5	Defective battery or inverter unit	4	2 Year warranty on products	1	20	Record component breakdowns and refrain from buying from the specific suppliers
8	Transit damage	Transportation related damage to power trolleys	Power trolleys are broken when delivered to customer location	7	Power trolley dropped or bumped during transportation process	2	Power trolleys are setup and tested when delivered to customers	1	14	N/A
9	Communication technology breakdown	Breakdown of email or WhatsApp communication technology	Inability to communicate with customers	6	Technology or platform(s) downtime	1	Established numerous inter-dependent communication channels	1	6	N/A