

Strategy Business of Battery Swap for Electric Vehicle Using Business Model Canvas

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Abstract. Electric vehicles have developed rapidly in this global era. Many countries have replaced conventional vehicles into electric vehicles. Electric vehicles need batteries as electric reservoirs. The way to charge batteries for electric vehicles is only through charging and it takes a long time, so the idea of battery exchange grows to simplify battery changes in electric vehicles. This study aims to design a business for battery exchange with a canvas model business approach consisting of 9 important factors such as customer segments to map the market, channels to facilitate information provided to consumers, value propositions or set prices according to consumers by providing some advantages from battery replacement products, customer relationships or maintaining good relationships with consumers, revenue streams provide or provide other services in addition to battery changes, key resources to establish cooperation with raw material suppliers or banks to facilitate and provide discounts to consumers, key activities describe the activities to be carried out in the company, key partners give discounts to consumers who want to become members or regular customers, and the cost structure makes a breakdown of funds or costs from raw materials to commercial costs such as promotions, water, electricity, and so forth. The business model that has been formed will be the basis for designing a business plan consisting of a management profile and financial analysis. Researchers conducted qualitative research, namely data collection is done by searching from the previous literature. This research and analysis is to design a battery exchange business that can be done in the future.

1. Introduction

Business is an organization that provides goods or services that aim to earn profits. Business developments in Indonesia have developed that provide high competitiveness for each company. So companies are required to pay more attention to the environment [1]. Some research on business or strategy development uses the Strength, Weakness, Opportunities, Threats (SWOT) and Business Model Canvas (BMC) methods.

The business model canvas is a logical business model of how an organization creates, delivers and capture value (Osterwalder, 2010). The business model canvas can also be called a strategy in management in the form of a visual chart consisting of 9 elements that can comprehensively explain a business process. These 9 elements consist of customer segments (customers who have the potential to produce products or come from a problem that can be solved by the business), value propositions (value added that will make a business look attractive and different from other businesses such as innovation or solutions that are offer and become the company's main advantage), channel (a business



media used to deliver solutions that can be offered to consumers in the form of websites, applications, online advertisement, or sales person), customer relationships (knowing how to keep business in touch with the customers subscribers in the form of newsletters, after sales services, etc.), revenue streams (costs and revenue which need to describe the financials of a company such as products / services that can provide revenue), key activities (creating value proposition of the company), key resources (corporate strategy in the form of raw materials, infrastructure what is needed), and key partnerships (a business needs a partner that can be a supplier, vendor, agency, and the like), cost structure (what costs are needed to run the whole business activity) [2]. Managing costs efficiently will make the business being lived more economical and can minimize the risk of loss and can determine the right value proposition for customers.

The transportation sector is a major contributor to environmental pollution and dependence on oil, because the majority of vehicles are based on internal combustion engines. The development of technology in vehicles in recent years and to reduce greenhouse gas emissions, electric vehicles are one of the chosen paths. The future of mobility is interesting because there are many new players in the automotive industry who want to embrace electric mobility in a variety of products and services to overcome the energy crisis and climate change [3]. The commercialization of electric vehicles has not yet developed widely because there are still consumers who think that the cost is expensive or high, limited products, and the uncertainty of electric charging stations. Although the battery charging station is quite a lot, but the time to charge the battery is quite long and makes consumers uncomfortable. Then a battery exchange station was made, which only exchanges empty batteries for batteries that are fully charged making it easier for consumers without having to wait long enough [4]. The ownership of a leased battery is different from the ownership of the vehicle. Battery degradation due to charging or usage, maintenance, and labor costs will be carried out by those who have the batteries. While these battery customers simply pay a service fee. This is one way to reduce the cost of very expensive costs to customers [5]. Based on this development, it is possible for a business opportunity to come up with a battery station with a business model that is competitive and technological innovation in the ecosystem as a whole and is compatible with other business strategies, and is likely to succeed and last for a long time. The business model has six functions such as value propositions, customer segments, value chains, cost structures, formulation of competitive strategies, and the position of corporate strategies in the value network [6].

The electric battery used for electric motorbike vehicles is usually made from lithium. These batteries have been packaged into one like a battery. Where it is easier and more practical in assembling the motor. When this battery runs out of power it can be recharged but with a long time allocation until the battery is fully charged or by the method of charging directly with electricity or in the charger or using the battery swap method [4]. Swap has the meaning of reducing it by exchanging batteries without having to wait longer and easier [7]. By exchanging batteries, the electricity network system does not need to be reinvested. Advances in battery technology will also make the system better. The advantages of exchanging batteries such as getting a full charge faster than vehicles that charge for hours, do not need electricity to increase high, charging, vehicle ownership and the batteries can be separated so as to reduce consumer risk.

This research was conducted to expand the design of business models in the business ecosystem in battery swaps for motor vehicles by illustrating or making a mature business plan by using the Business Model Canvas to reduce obstacles or the impact of losses that would occur before conducting the business and using a feasibility analysis to determine whether the business is worth doing.

2. Methodology

This type of research is a qualitative descriptive study, research that is used to analyze data by describing or describing collected data that is applicable to the public or generalization (Sugiyono, 2008). The type of data used in this study is qualitative data. Data qualitative is data that are not stated in numbers or numbers. The data collection method is used to search for data on electric battery companies in the world such as Tesla, Wanxiang, and BYD Shenzhen. Furthermore, the Business Model Canvas (BMC) data will be divided based on 9 elements, namely customer segments, customer relationships, customer channels, revenue structures, value propositions, key activities, key resources,

cost structures, and key partners in the business model canvas to create a battery swap business strategy.

By using the BMC that has been made, can then perform financial analysis projections. Financial analysis is a matter related to investment estimates, operating and maintenance costs, working capital requirements, sources of financing, income estimates, and calculation of investment criteria. There are 2 elements needed to make a financial analysis, projection, namely revenue stream (revenue) and cost structure (cost). By using these 2 elements, you can financially analyze the feasibility of the battery swap business.

3. Result and Discussion

The following is the design of the results of the business model of the canvas for the exchange of electric vehicle batteries:

Customer Segment

Segmentation is the activity of dividing markets into different groups of buyers. Market segmentation can be done based on geographical, demographic, psychographic, and consumer behavior (Osterwalder, 2010) Looking at examples from several companies such as testla, WanXiang, OEMs, and others, so that the market segment for battery swaps in Indonesia is selected in terms of its best class for electric vehicles, battery swaps are advances in the replacement of batteries in electric vehicles, and there is still a lack of battery swap business. Nearly 72% of Indonesians use motorbikes for transportation because they are considered faster, fuel efficient, cheaper and more sporty. Seeing from the many motorcycle users in Indonesia especially in big cities, the possibility of enthusiasts for electric motorcycles is also large, so the need for batteries also increases. Meanwhile, if you have to charge an electric motor battery requires around 2-3 hours and there is time inefficiency, it is necessary to exchange batteries to make it easier to replace an empty battery. The price for electric motorcycle vehicles can also compete with other conventional motorcycle vehicles, because the price of batteries is not included in it.

Value Propositions

The value that will be given to consumers will be divided into a number of things like the first newness where products for exchanging electric vehicle batteries in Indonesia are still underdeveloped so that the facilities provided to customers must be satisfactory, information and equipment are very clear, and the availability of battery exchange stations in Indonesia overall. Second, the performance provided is fast service, easy service, clear information, and equipment that is not lacking, and service that is both simple and easy. Third, the price on the battery exchange is relatively cheaper because the customer only needs to buy the electricity costs without having to buy the batteries back. Fourth, risk reduction is by giving guarantees to consumers related to products used so as to give a good impression to consumers.

Channel

Online and place of service is a means to provide services / products to consumers who need services when faced with obstacles during use. As for the swap battery replacement, there is a battery swap area that is easily accessible to customers. And notice of how to use is given online or in the battery swap area.

Customer Relationships

To maintain a good relationship with consumers, a company usually provides a service such as a company's brand, company reputation, discounts, guarantees and customer service. By providing these servants hoping to strengthen the relationship between the company and consumers personally.

Revenue Streams

Focusing on the automotive segment revenue, the energy generation and storage segment and the battery swap application. This battery swap application covers how you use, notices, components, and

so on about the battery swap information. To provide consumer interest, prices can be set according to the price of electricity or the manufacturing process or see existing companies.

Key Activities

To achieve good, friendly, fast and innovative services the company makes updates to its design, carries out maintenance for charging stations, builds charging stations in strategic locations, develops and maintains software or technology on battery swaps, and maintains sales and marketing for batteries. swap.

Key Resource

The most important key resources are people, systems and equipment. People here mean labor that runs the presentation of services. A business or business is largely influenced by the interaction between labor, systems and instruments. If the system can work and the workforce is also satisfying, the consumer perception of the company is very good. So the company provides services to consumers such as battery systems, effective coolers, technological knowledge, inverters, automatic and technicians.

Key Partnerships

Raw material is an important element in the process of making and providing services. From a financial point of view, raw material also influences profitability. If you get good and suitable raw materials, the electrical content will last long and the battery can be used several times. If you get cheap raw material prices, you can get high profits. So it is suggested that the company has a partnership with fund holders, major suppliers, transportation companies, and the government to facilitate the operation of the company and get high profits.

Cost Structure

The cost structure can be determined from key resources, key activities, and key partners in the business model canvas. The costs required are divided into 2 types, namely the first variable cost where costs incurred are costs such as electricity, water, battery installation facilities, overtime employees. In the variable there is a cost savings in a company's expenses such as water that is used only. The second fixed cost is the cost of the building because it is the largest cost incurred.

Based on the discussion of the model design above, we obtain the elaboration of 9 elements of the battery canvas replacement business model as follows:

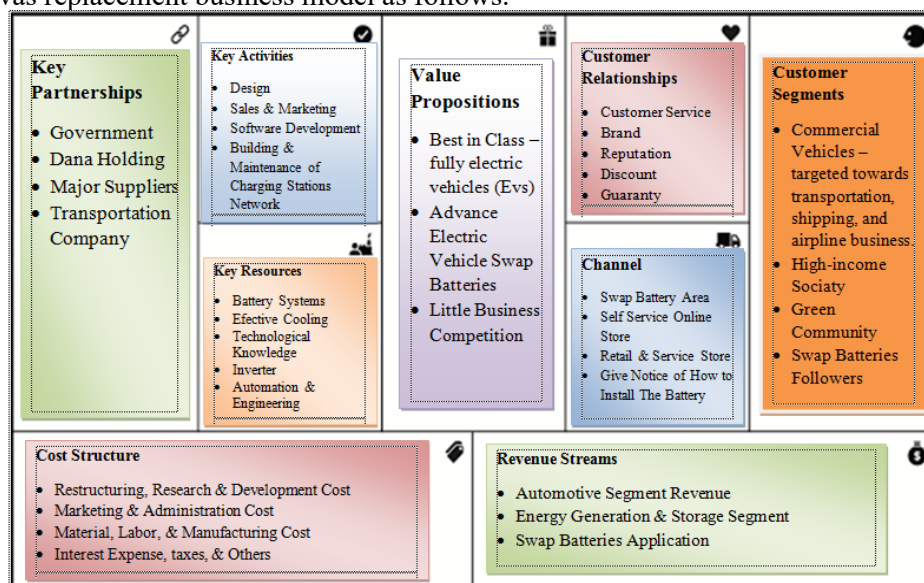


Figure 1. Business Model Canvas for business strategy of battery swap

The marketing plan must be known by the public by providing promotions and clear information about exchanging batteries for electric motor vehicles.

Financial Analysis

Financial analysis is important, used to calculate capital expenditures, and the estimated costs required to open a new business, these are the elements contained in financial analysis:

Initial investor projections

Starting a battery exchange business for electric vehicles that is motorcycles requires investment in land and buildings, renovation of buildings, investment in equipment and supplies at the battery exchange station. The following is the total initial investment needed for the business of exchanging electric motor vehicle batteries of Rp. 119,000,000.

Table 1.The initial investment

No.	Initial Investment	Price (Rp)
1.	Land and Building	50,000,000
2.	Renovation	4,000,000
3.	Equipment and Supplies	32,000,000
4.	Storefront	3,000,000
5.	Decor	30,000,000
Total		119,000,000

Sales projections

To get a profit or profit, an income from a business that is obtained from sales made by the exchange of batteries and services provided is Rp. 160,000,000 with a replacement price of Rp. 5,000 and a damaged battery is purchased for Rp. 15,000,000. If there are 50 customers who come to charge a battery, the company will get a payback period in the 16th month.

Projected costs

Cost projections are needed in financial analysis because with the projected costs it can be seen that new income projections for battery exchange can reach Rp. 180,000,000.

Projection of income statemen

To find out how much profit or loss is obtained, it must be sought how much total income earned each month and then reduced by the amount of expenditure incurred each month. Because the business for exchanging batteries is still new in Indonesia, the benefits are still uncertain at the beginning. However, this business has a high profit, because the development of electric vehicles, especially motorcycles, has been growing rapidly in Indonesia.

Table 2.The payback periode

Payback Periode	Net Income (Rp)
Mounth 1	1,500,000
Mounth 2	3,000,000
Mounth 3	4,500,000
Mounth 4	6,000,000
Mounth 5	7,500,000
Mounth 6	9,000,000
Mounth 7	7,500,000

Mounth 8	6,000,000
Mounth 9	7,500,000
Mounth 10	6,000,000
Mounth 11	6,000,000
Mounth 12	6,000,000
Mounth 13	7,500,000
Mounth 14	9,000,000
Mounth 15	9,000,000
Mounth 16	9,000,000

4. Conclusion

With the business model canvas, it can be described that there are 9 elements that must be done to create a battery swap business strategy, namely customer relationships, customer segments, channels, key activities, key partnerships, cost structures, key resources, revenue streams, and value propositions. Battery swaps must have marketing objectives and the right place to install battery swaps so that the right partner is needed. To carry out all activities oriented to the value created by potential consumers, the battery swap must prioritize raw materials and key resources in human resources, systems, and renewable technology equipment. Thus reducing the risks that will occur in the future.

To improve the driving performance of the company, it must cooperate. Establish cooperation not only with companies that provide raw materials, but also with other companies that can reduce production costs to provide high profits. The battery swap business in Indonesia also still has many opportunities and has low business competition.

From the canvas business model that has been designed to analyze the finances in the battery replacement business for electric motor vehicles, that the company gets a payback period in the 16th month. Based on this research, it can be seen that the business model canvas can be a tool or a simple medium to produce alternative corporate strategies in knowing what is needed to do a business.

References

- [1] M. E. Porter 1992 *Keunggulan Bersaing: Menciptakan dan Mempertahankan Kinerja Unggul* Erlangga
- [2] Wisnu Dewobroto November 2012 *Penggunaan Business Model Canvas Sebagai Dasar untuk Menciptakan Alternatif Strategi Bisnis dan Kelayakan Usaha* ResearchGate
- [3] Chew Vee Kuan 2016 *Business Dynamic Evaluation of Battery Swapping in Electric Vehicle Systems* Keio Associated Repository of Academic Resources Japan
- [4] Sarkar R. M. Pandzic Hrvoje Ortega Vazquez A. M. 2013 *electric Vehicle Battery Swapping Station: Business Case and Optimization Model* University of Washington Seattle, Washington
- [5] Sarkar R. M. 2010 *Electric Vehicles as Grid Resources* University of Washington, Washington
- [6] H. Chesbrough and R. S. Rosenbloom 2002 *The Role of The Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spin-off Companies* Industrial and Corporate Change, vol. 11 no. 3 pp. 529-555
- [7] A. Osterwalder Y. Pigneur and C. L. Tucci 2005 *Clarifying Business Models: Origins, Present, and Future of The Concept* Communication of The Association for Information Systems vol. 15

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