THE APPLICATION OF SUSTAINABLE INNOVATIONS WITHIN BUSINESS OPERATIONS: THE CASE OF NGEBUTS ELECTRIC BIKES

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<table>
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<tr>
<th>Accepted</th>
<th>Published</th>
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<tbody>
<tr>
<td>Bulan Juni 2023</td>
<td>Bulan Juli 2023</td>
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Abstract
This paper explores NGEBUTS electric motorbikes and examines how their manufacturers exemplify a sustainable innovation approach in their business operations. The study applies a five-stage sustainability mapping framework to understand NGEBUTS's emergence in the Indonesian EV market and their use of sustainable innovation. The findings highlight the importance of incorporating sustainability into business models, products, technologies, and processes to enhance competitiveness. The research reveals that sustainability initiatives can reduce operational costs and increase revenues, benefiting both the bottom line and the top line. NGEBUTS demonstrates how they seize innovation opportunities, leverage regulations, and apply circular economy techniques to create a sustainable business model. Additionally, the paper discusses the potential of Indonesia's natural resources for renewable energy and job creation. While the study acknowledges the limitations of measuring long-term success, it concludes that NGEBUTS's vision, innovative ideas, and utilization of local resources position them as a leading example for companies to prioritize social and environmental factors to thrive in the current competitive landscape.

INTRODUCTION

Through the Paris climate agreement in 2015, 196 international countries have signed an agreement to combat climate change with the main objective of reducing global average temperatures through a variety of strategies, including reducing greenhouse gas emissions with their respective national targets, by promoting environmentally friendly technology and renewable energy, the disclosure of climate change of each country, and increasing financial assistance to tackle climate change in developing countries (United Nations, 2016).

Indonesia as a signatory to the Paris Agreement has pledged to combat this climate change to reduce its GHG emissions by about 29% by 2030 on their efforts and by 41% with foreign assistance (National Energy Council, 2019). Indonesia's national condition, which is quite apprehensive, is increasingly encouraging Indonesia to fight its national climate immediately, this is mainly because of the increasing national GHG emissions every year (Ministry of Environment and Forestry, 2019).

High national energy consumption is one of the factors contributing to high national greenhouse gas emissions, especially in the transportation sector, which accounts for 27% of GHG emissions from energy use (Enerdata, 2020). The Indonesian government has begun to promote environmentally friendly low-emission technologies in an attempt to minimize national GHG emissions, one of which is encouraging the diffusion of electric vehicle technology into the Indonesian automotive market (Ministry of Industry, 2018).

Several studies have revealed that electric vehicles (EVs) are a viable solution to the problems of environmental pollution and energy depletion (Muneer et al., 2015). In 2018, the number of electric vehicle users surpassed 5.1 million (IEA, 2019). However, according to (Erwin, 2020) no matter how much emission is minimized by electric vehicles, it will all be pointless if the power infrastructure continues to rely on fossil fuels. Therefore, a more sustainable plan is needed by EV manufacturers to produce products that are efficient in both ways. By being sustainable companies are no longer faced with a single bottom line, which is expressed only from its financial position, but also have to consider the social and environmental aspects. Which makes the triple bottom lines (3 BL).

In 2020, the West Nusa Tenggara provincial government wants to showcase that it will be the first province to mass-produce electric motorbikes in Indonesia. The government appointed NGEBUTS as the lead provider of electric bikes in commemoration of the province’s anniversary and is targeting about 100-unit electric motorbikes ready at the end of 2020. In addition, Mataram which is the capital city of West Nusa Tenggara is appointed as the host of the 2021 MotoGP event. The governor plans that only electric bikes will be the only mode of transportation that can be used in the area and are
targeting around 1000 units of electric motorbikes that can be produced by 2021 (Yuliastuti, 2020).

This paper aims to explore the company NGEBUTS which produces electric motorbikes and how they provide a good example of using a sustainable innovation approach as the core of how their business operates, which made them the lead supplier and frontier in the province showcase. Through descriptive case study development. We sought to understand how NGEBUTS became one of the emerging players in the Indonesia EV market and how they used a sustainable innovation approach in their business operations processes. The structure of this paper will first cover the background of the company. Followed by the application of Nidumolu et al (2009) five-stage sustainability mapping framework to develop insights and understanding of how innovation is used. The final section will cover the discussion and conclusions.

COMPANY BACKGROUND

History of the company and how it was funded?

Alfantmotors is a Sumbawa-based company that manufactures electric bikes. The company was founded in 2016 by a group of engineers from the Sumbawa University of Technology. In late 2019, the company decided to merge with an academic institution and rebranded it to “NGEBUTS” which translates as speed in Indonesian. The merger turns out to be a turning point in the company’s development since it opens new landscapes and exposure to the new resources and knowledge they gain (Chairul, 2021). The company has a vision that electric vehicles can be one of the key drivers in guiding Indonesia to a more sustainable future. In early 2020, they were able to secure seed funding from several investors for approximately US 500 thousand dollars. In addition, they also get full support from the government to produce electric bicycles. Moreover, at the end of 2020, the government ordered around 100 units of electric bikes from them (Yuliastuti, 2020).

How was the innovation conceived?

NGEBUTS seeks an alternative way of transportation to reduce carbon emissions. What makes this company different is that not only that they design and produce electric motorbikes, but they also design renewable sources of energy that can be used to charge the bikes. One of the main problems of electric vehicles is no matter how much they reduce the pollution; it will all be pointless if the power infrastructure still comes from fossil fuels (Erwin, 2020). With the company’s collaboration with other institutions, NGEBUTS began to prototype new sources of renewable energy from natural resources that were already available on the island of Sumbawa.

Why E-bikes? What are their advantages over conventional motorbikes?

Besides being more environmentally friendly, Electric bikes also have the advantage of efficiency which is very high. According to (Chairul, 2021) A conventional IC motor runs less than 20% of motion energy. The energy converting into fuel into motion energy is only about 20% of a possible 100%. While electric bikes can be up to 80% more efficient. By using a battery, it immediately converted into motion energy and uses an electric machine so that the efficiency can be more than 20%. Electric bikes are also more compact and easily manageable. Therefore, the riders’ only concern is the battery control. Another thing is that in a conventional combustion engine when moving, more than twenty parts are moving at the same time such as pistons, etc. Electric bikes use less than that. thus, making it pollution free and cooler. Since moving parts are very influential on the wear and tear of the engine. In terms of the cost of charging, it is also cheaper, for example, the distance to another city with a distance of 1000 km requires gasoline around Rp. 100,000 if using an electric vehicle is only half of the cost to charge the bike.

In addition to these features, they are actively conducting forums with Electric bike communities and students. For their electric bikes to be very stylish and ergonomic they follow trends that are liked by young people. Currently, they have five prototypes ready and even a bike designed especially for women. Since most women in Indonesia ride a motorbike can be quite challenging when wearing a skirt, they have designed an electric bike that has been adapted to this. They also have built a pilot solar power charging stations area around Mataram to charge the bikes. In addition, charging a battery is relatively cheaper because, with a 700-800-watt battery for an electric bike, it can travel about 80km on a single charge. And charge about 1,470k which is ten times cheaper than the regular petrol vehicle.

What were the challenges to making this successful?

Making an electric motorbike is certainly not an easy task. The company went through many stages of innovation. First, it took a while to design an electric motor that is quite stylish but also ergonomically convenient. Secondly, making cheap electric bikes is also a challenge. Many electric bicycle components are still not available in the Indonesian market and manufacturers that provide these components are still at a minimum. Therefore, the price of electric bikes is relatively expensive compared to other countries. Moreover, producing and selling electric bicycles in Indonesia requires a lot of technical testing. This is something that the
company is preparing. Since, the technical test requires a lot of time, money, and resources.

Another challenge is if Indonesia has opened a market for electric vehicles, companies will compete. According to (Chairul, 2021) two factors will determine the future competition for electric vehicles in the market. The first is low cost, either a product or service that is low cost will win against other competitors. For example, Air Asia succeeded because they found a way to make flying cheaper than most airlines. The second is the differentiation a company offers. This has been mentioned earlier that their NGEBUTS product is more stylish and ergonomic compared to other competitors and that the technology of its solar charging stations can be a game-changer in this industry. Currently, they are still trying to figure out the low-cost factor. Therefore, they must excel in this differentiation for consumers to feel that the electric bicycle design is very good and that it covers the price.

What are the prospects?

The island of Sumbawa is very rich in natural resources as it is in the province of West Nusa Tenggara. This place is ideal for being a source of renewable energy. Instead of burning fossil fuels the company is currently designing prototypes for renewable energy sources. Sumbawa is a large island with lots of hills, running water sources, agriculture, and beaches. All these resources can be used to become sources of renewable energy. For example, A wind turbine for a source of energy is a very challenging thing in Indonesia, because of the very hot climate, and building it requires a very large area. However, a recent study (LAPAN, 2020) shows that two places in Indonesia could be ideal places for the construction of these wind turbines and one of them is on the island of Sumbawa. Therefore, NGEBUTS continues to collaborate with the government to make this happen. In addition, they are currently developing several renewable resources using bioenergy as well. Since West Nusa Tenggara is very rich in agriculture, Corn, for example, can be used to produce ethanol, a form of biofuel that can then be used as vehicle or airplane fuel. Another example, the researchers also develop a power source from tidal locations. Technically, energy is taken by installing a turbine that is driven by water flow. Since tidal currents in the sea are kinetic energy. Therefore, by installing a tidal current generator, the generator will drive the turbine and produce energy. The local government provides NGEBUTS and its partners with large injections of funds for its R&D and has allocated machines that are necessary to speed up the process. The local government believes that this method has the potential to be a renewable source of electricity for the West Nusa Tenggara region.

RESEARCH METHODS

Exploratory case study methodology was used using (Nidumolu et al 2009) five-stage sustainability mapping framework to develop insights and understanding of how the innovation is used and can be used as a reference for future companies and ventures on how a company can have a competitive advantage. The five-stage framework provides direction regarding the central challenges, the needed competence, and the innovation opportunities that a company needs to achieve sustainability. The information that is collected from this essay came from interviews and various articles.

RESULTS AND DISCUSSION

In this section, the author will discuss and evaluate using (Nidumolu et al, 2009) five-stage mapping framework on how NGEBUTS makes sustainability a major factor in everything they do within how the company operates to become a frontier in becoming an EV provider in West Nusa Tenggara.

Stage 1: Viewing Compliance as an Opportunity

The legislation is typically the first step a business would take on the long path to achieving sustainability. Companies must conform to the existing rules and regulations and change their plans accordingly. This can be substantial since companies can also be the first movers in their business. The Indonesian government is currently investing in programs to encourage the use of electric vehicles. They claim that environmentally friendly technology is becoming more common around the world. The depletion of fossil fuels, as well as the carbon emissions they emit, are pushing the industry to turn to environmentally friendly renewable energy sources. Recently the Indonesian government issued Presidential regulation no.55 of 2019 concerning the acceleration of the battery-based electric vehicle program. Through this, the government has committed to accelerating the adoption of electric vehicles through fiscal and non-fiscal incentive schemes (Presidental Regulation No. 55, 2019). The Indonesian government has also set a target for electric cars to reach 2,200 units by 2025. However, the Indonesian Government stipulates that this short term is more encouraging for the acceleration of electric motors only because most Indonesians use motorbikes more often for transportation modes. them in their daily life. Recent data (BPS, 2019) reveals that around 70 to 80% of the Indonesian population uses motorbikes.

In the case of NGEBUTS, the Governor of West Nusa Tenggara has issued a regulation regarding electric motorbikes. The government realizes this is something that must be supported and ready to provide the required resources. NGEBUTS took advantage of this momentum to produce electric-based motors that were the most efficient in
terms of batteries and prices. This regulation can also be an opportunity to open new businesses as well. This is because the government has regulations and supports the production of electric motorbikes. The need for the provision of electric charging infrastructure for battery-based electric motorized vehicles is bound to be enormous.

Stage 2: Making Value Chains Sustainable (Circular Economy)

Once businesses have learned to keep up with the current regulations, they take a more active role in environmental concerns. At this stage, the organization must focus on the flow of all of its production processes, starting from the supply chain to the workplace.

Currently, one of the challenges for NGEBUTS is the disposal of the batteries used. Since battery is a chemical-based energy storage medium it is also categorized as hazardous and toxic waste. Therefore, how to overcome it must be done correctly and intensively. The average battery life is five years, so after that time, they have to figure out a way to dispose of them properly. With the collaboration of researchers in the metallurgical field and other parties. They found out that once a battery's lifespan is finished its materials can still be recycled for the use of other products within the workshop and campus. They are now planning a pilot program to recycle battery waste and they are planning before mass producing their electric bikes. Another plan is that they are also planning how to order batteries more efficiently.

The reason is the type of battery used as the core of the bicycle is lithium-ion. Currently, Indonesia does not have a factory that produces this type of battery. Therefore, the battery is mostly imported from China. The procurement division in the company is currently setting up a coordinated scheduling program with suppliers in China to further reduce the cost and operation of their battery importing. In addition, ongoing talks are taking place within the Indonesian government regarding the opening of a battery factory in Indonesia. According to (Agus G, 2020) Indonesia is very rich in the key material for lithium-ion batteries, namely nickel. Therefore, NGEBUTS and the local government also continue to maintain relations with the central government providing recommendations for how the factory should operate. Moreover, after this pandemic, representatives from the company have been selected as one of the several representatives appointed by the government to fly to China to see the battery manufacturing process there and hopefully this will be an important insight when building its factory in Indonesia (Sandi, 2020).

Stage 3: Designing Sustainable Products and Services (Eco-products)

At this stage, business executives can begin manufacturing more environmentally friendly products. For their company to gain a competitive advantage over its competitors.

With continuous support from the local government and other institutions, they have designed charging stations for the batteries on their electric bicycles that use solar energy that will be around the area in Mataram. This is because in Mataram there are already solar panels with an area of five hectares and currently the solar panels already have the power to provide more than enough power to approximately 20,000 households in Mataram. In addition, it is also used to become a source of energy for electric bicycles. On that note, they also develop multifunctional solar technology. In the West Nusa Tenggara region, there are only summer and rainy seasons. Once the rainy season will continue to rain non-stop for 6 months. Therefore, solar technology can still be used. The solar panels are also designed to absorb rainwater. The rainwater is transported to the hydro turbine which will later utilize the flowing flow into electrical energy. In addition, the government has sent institutions in the energy sector to help the company develop new sources of renewable energy. The island of Sumbawa is very rich in terms of natural resources. This place is ideal for renewable energies. Instead of burning fossil fuels the company and academics are currently designing prototypes for renewable energy resources. Sumbawa is a large island with lots of hills, running water sources, agriculture, and beaches. All of these resources can be used to become a source of renewable energy. The government is very supportive of this project with the hope that it will become a source of electricity for West Nusa Tenggara.

Stage 4: Developing New Business Models

At this stage, it is hoped that the company will be able to rethink its business model and design a value proposition that takes environmental and community factors into account.

Initially, NGEBUTS only wanted to manufacture and design the coolest electric bikes. However, over time they realized that for a company to be sustainable, they had to pay attention to their surroundings. Therefore, they re-designed their business model and implements a cooperation scheme with a Penta helix format. The collaboration consisted of academic representatives consisting of researchers and students, local companies that had jobs to help supply the needed needs and sometimes did a little manufacturing, and communities, such as electric vehicle lovers and green earth communities to help design and provide feedback about the need for the ideal electric bike for today's market, and the mass media. The mass media helps create awareness
of the importance of electric vehicles to the environment. This collaboration is carried out with the hope of designing an electric bicycle that is the most environmentally friendly and cost-effective.

The reason behind the merger is that the company found out that academic institutions are usually eager to master all fields. For example, they want to build a manufacturing project, etc. But in the end, all its academic assignments were left out. As a result, researchers who work at the campus are not optimal and the staff also has limited time. Therefore, NGEBUTS created this work scheme that is mutually beneficial to all parties involved. For example, if the realm of manufacturing the bikes, it is not the universities job but the company's job. In return, universities can help transfer technology and knowledge to the company. The process is B2B because they merge with the academic own private company which specialized in electricity and renewable energy. The company also often do internships to help produce their motorbikes, because Sumbawa contains a lot of vocational high school, they are also involved in the process. In addition, Since the merger, they often travel to Mataram and Jakarta to consult and do prototyping because the technology is more sophisticated and not available in Sumbawa.

Stage 5: Creating Next-Practice Platforms

At this stage, a company is expected to create new practices that are expected to change people’s paradigms of the practice process. With the help of the government, currently, the company has carried out an educational program to the public on the importance of protecting the environment and also the incentives they get when using electric vehicles. Since most Indonesian people outside the capital are still not familiar with electric vehicles. Indonesia currently has over a thousand islands and is one of the most populous countries. Therefore, the awareness of the importance of transition becomes even more crucial. According to (Erwin, 2020) it was found that with this awareness people also use less transportation. Imagine if this awareness reached the minds of all Indonesians. This will have a profound impact on the earth.

CLOSING

Discussions

For businesses to continue to survive in this rapidly competitive environment, companies must implement sustainability a key factor in how their business operates. Being sustainable is not the financial drain that many people believe it is. By being more environmentally wary, it will lower operational costs and increase revenues. As a result, all companies should make sustainability a priority.

This necessitates companies to rethink their business models, products, technologies, and processes.

Since there are no shortcuts to achieving long-term sustainability. Despite this, many companies assume that as they become more environmentally conscious, their competitiveness will suffer. Many company leaders believe it would increase prices while providing no immediate financial benefits. Executives behave as if they must choose between the mainly social advantages of manufacturing sustainable products or processes and the associated financial costs that come with them. However, this is not the case. (Nidumolu et al 2013) did research on 30 large corporations that have implemented sustainability initiatives as part of their core businesses. According to their research, sustainability is a pinnacle of organizational and technological advancements that favor both the bottom line and the top line. Environmentally sustainable practices minimize costs because businesses use less inputs. Furthermore, the method generates additional revenue from improved goods or creates new business opportunities. In addition, smart companies are now treating sustainability as the next frontier of innovation, as these are the goals of corporate innovation (Nidumolu et al 2013).

This paper contributes to knowledge and practice on how NGEBUTS sees innovation opportunities that arise from the situation and the environment they are in and made them work for their benefit. Starting from using regulation as an opportunity to innovate and apply circular economy techniques, like, instead of disposing of batteries that can be recycled back into spare parts for their workshops. In addition, this paper also provides knowledge about the potential of Indonesia's natural resources and their use as a possible new source of renewable energy. This paper also gives exploratory knowledge regarding the conditions and potential of EV development and energy infrastructure that can open up many jobs for Indonesia. This paper, of course, still has limitations. As the company is relatively new there is no long-term record of the company of their success in implementing this approach. Therefore, in the next research, they can measure the level of their success by applying this approach.

Conclusion

The West Nusa Tenggara government has chosen NGEBUTS as the main provider of electric bicycles in their province due to their vision and bold innovative ideas that had never been carried out before. But also, their willingness to use and involve local resources as their core assets in running the business and their willingness to help educate people on how important our environment is. The Provincial Governor reflected them as “A company that lives in the future” and according to him their business model should be exemplified and applied
in all companies going forward. Social and environmental factors, it is something that must be considered if a company wants to survive in this competitive era.

REFERENCES