

Lesson Learned in Developing and Implementing Global Business Strategy to Commercialize Battery Swap Technology: A Comparative Study

Era Febriana Aqidawati

Master Program of Industrial Engineering Department, Faculty of Engineering
Universitas Sebelas Maret
Surakarta, Indonesia
erafebrianaaqidawati@student.uns.ac.id

Wahyudi Sutopo

University Centre of Excellence for Electrical Energy Storage Technology
Universitas Sebelas Maret
Surakarta, Indonesia
wahyudisutopo@staff.uns.ac.id

Eko Pujiyanto

Industrial Engineering Department, Faculty of Engineering
Universitas Sebelas Maret
Surakarta, Indonesia
ekopujiyanto@ft.uns.ac.id

Abstract

This paper provides a study on developing and implementing global business strategy for commercializing battery swap technology, based on comparative study between two companies. The analysis was conducted by referring to the strategy management approach to determine the design of global business strategies by the two companies in order to obtain above-average returns. The paper highlights the resources, capabilities, and competitive advantage of both companies. This paper also described the attractive industry of commercializing battery swap technology and pointed out how both companies formulated their strategy in order to earn superior returns. This research is based on a comparative analysis based on a case study, so the conclusions drawn from these cases may be hard to generalize. The findings of the study could be developed lessons learned in the success of technology commercialization. Future research, including quantitative studies, will help examine the conclusions and provide a more in-depth understanding of global business strategy. This study provides recommendations regarding what can be learned by companies that want to develop business in the area of battery swap technology for electric vehicle applications. Managers can learn the strategies adopted by both companies in successfully commercializing their technology in the global market.

Keywords

battery swap technology, comparative analysis, global business strategy

1. Introduction

Taiwan has consistently been known as the scooter realm which has the most noteworthy density on the planet. There are about 14 million scooters situated on 36,000 square kilometers of the land (Xu, 2019). As of late, with the ascent of air of natural insurance and efficient power vitality in Taiwan, and furthermore the ceaseless advancement of government approaches, the market size of electric scooters has likewise developed. Before the finish of 2019, the all-out deals of electric scooters in Taiwan were evaluated to arrive at 150,000 units (Taiwan News, 2019). The notable scooters brands in Taiwan, for example, Kymco and Gogoro, have kept on developing their deals as of late. Both companies are competing to earn above average returns by implementing various global business strategies.

Gogoro, a Taiwanese eight-year - old electric scooter startup company, has been the pioneer on the selling of electric scooters in Taiwan (Forbes, 2019). The goal of Gogoro is to build adaptable and sustainable energy systems while allowing a new generation to choose a cleaner, more informed future with the aim of transforming power to create positive change. Gogoro is building the world 's most advanced, accessible and intelligent energy platforms, distribution network and exchangeable smart batteries that transform the way we use and share power by pioneering the innovation of accessible electric carburant and intelligent vehicles (Gogoro, 2017). Gogoro smartscooter is a city transmission electric scooter. It is powered by Gogoro's electric motor, which operates on 18650 batteries with swappable lithium ion (Wilson, 2015; Gogoro, 2015). The Gogoro Energy Network, a modular battery swapping system designed to be implemented in an urban area (Gogoro, 2015), is integrated into the product. In 2018, the electric motorcycle market share in Taiwan accounted for about 86.1% (Wong, 2019). In 2019, 160,000 of its quiet non-polluting vehicles have been sold by the company in scooter-mad Taiwan, claiming 97 percent of the battery swap stations in the island (Forbes, 2019).

But Gogoro has the challenger of the conventional petrol-powered engine motorscooters in Taiwan, Kymco. The mission of Kymco is to create personal vehicles that win consumers' hearts throughout the world. Kymco will also go above it and offer the most sophisticated daily riding experience to its customers. The current range of Kymco products includes motorcycles, scooters, mobility scooters, ATVs and utilities (Kymco, 2020). On a total of 10 million vehicles Kymco earns more than \$1 billion in sales each year (Forbes, 2019). Kymco 's global performance in 2019 was nearly positive, with 565,000 units at year's end and the second highest level of sales ever (Motorcyclesdata, 2020). In 2018, Kymco, the biggest two-wheeled maker in Taiwan, revealed that it will deploy 500,000 electric machines over three years, using a pair of all-electric scoots with swappable batteries, i.e. Ionex (electricmotorcycles, 2018). In addition, Kymco is developing a battery swap scheme by providing battery swap vending machines and proposing standard battery swap size. This scheme will be available in 20 countries (Forbes, 2019; motorbikewriter, 2018).

Gogoro is a brilliant example of an company using technology to disrupt the scooter industry. Their use of emerging technology (sensor, full digital dash-board, mobiles), creative ideas including a new business model (monthly subscription for battery charging instead of scooter selling), and the remote control of charging stations have transformed physical goods to smart products (i8.ventures, 2018). They've become more sophisticated. Kymco and Gogoro are also competing for a more viable rechargeable scooter battery scheme before they die. Scooters with Kymco Ionex batteries will run on a backup device for about an hour while the primary battery charges. An inner core battery is available for every Kymco Ionex scooter. The scooter uses the inner core battery for continuous operation while drivers charging their removable battery. Without being tied down, riders can do their business. Afterwards, the battery can be picked up at convenience (electricmotorcycles, 2018).

By implementing various strategies Gogoro and Kymco are vying for above-average returns. To achieve this aim, enterprises must develop an Industrial Organization Model (I/O), a resource development model, and a competence organizational capacity. Therefore, various aspects, e.g., finances, capability and competitive advantage, an attractive market and the development of strategies to achieve excellence, must be elaborated to study the strategies of the two companies.

There have been researches on developing and implementing global business strategy. Tirdasari et al (2019) reviewed related literature on family business and agriculture to describe the challenge and propose strategies that can bridge agricultural family business to become competitive. Lee & Eckhardt (2017) conducted comparative analysis of five case studies in the special issue on the emergence of Asian tobacco companies. Dimitriadi et al (2020) presented the results determine frequency of use leaders of modern Russian manufacturers pharmaceutical products basic approaches to organizing strategic planning (corporate planning, iteration planning, intuitive planning, chaotic planning). Masih et al (2019) provided a pathway to manufacturers of gluten-free foods to enter in the challenging markets of India and USA by using the PESTEL model. de la Hoz Hernandez et al (2020) highlighted the impact of logistics on SMEs by means of a qualitative/descriptive methodology and found that SMEs must incorporate to attend a world-class market. Yaprak et al (2011) offered a contingency framework of global strategy implementation effectiveness on firm performance. Based on previous researches, neither of them has studied on global strategy for commercializing technology. Thus, this paper provides a study on developing and implementing global business strategy for commercializing technology, based on comparative study between two companies. This study aims to provide insight to companies in Indonesia who want to start battery swap business. In addition, this study also provides

recommendations regarding what can be learned by companies in Indonesia based on case study that has been carried out, in order to achieve success in commercializing battery swap technology.

2. A comparative study approaches

2.1. Global business strategy concept

The global strategy encompasses three areas: regional, multinational and international. These three areas essentially refer to the strategies which enable an organization to achieve its international expansion objective. Differentiating between three forms of international expansion, arising from the resources, capacities and present international position in the development of a global strategy is helpful. The approaches outside its domestic markets may be considered to be international if the business is still based primarily on its home markets (Lynch, 2006).

The global strategy is important in at least four ways. Global expansion provides the potential for additional revenues and profits from a business point of view. In some cases, profits may even be so poor on the domestic market that international expansion is the only chance of profit. From a client point of view, international trade – at least in theory – should lead to lower goods and services prices as a result of economies of scale and scope derived from a wider world base. The recent prevailing thought from the perspective of international government organizations has been to remove barriers to global trade and to offer certain countries and industries some degree of protection. The international negotiation is also an important part of global strategy. From the perspective of some international NGOs, some – not necessarily all – multinational companies' global strategies are regarded with some suspicion. These companies have been accused of manipulating developed nations in ways which are harmful to those countries – for example in terms of their natural mineral wealth. A global strategy can provide companies with certain benefits such as economies of scale, scale economies, global brands recognition, global customer satisfaction, the lowest labor costs and additional input costs, R&D costs and development cost recovery across as many countries as possible and emergence of new markets (Lynch, 2018).

2.2. Strategic management concept

The first stage in the strategic management is composing strategic input. At this stage, a firm analyses the conditions of the company's external and internal environment, so the vision and mission can be formulated. The second stage is the execution of strategic actions. This stage consists of two actions namely strategy formulation and strategy implementation, which is derived from the company's vision and mission. In the process of strategy formulation, the company formulates 6 types of strategies, namely business-level strategies, strategies for competitive and dynamic competition, company-level strategies, acquisition and restructuring strategies, international strategies, and cooperation strategies. After the strategy is finished, it is then implemented. In the implementation process, it is important to consider several important things, namely how the corporate governance, how the organizational structure and control, how the leadership and strategic entrepreneurship of the company. Thus, if the strategy is well formulated and implemented, it will produce an outcome in the form of strategic competitiveness, which is above-average returns. This is the main goal of the company. The final results of this management strategy will be feedback for the initial stages (Hitt et al, 2007). Meanwhile, the following are the steps in analyzing internal and external factors of the company in developing management strategies

2.2.1. External factors

There are two kinds of external environments that are analyzed, namely the general environment, industrial environment, and competitor environment. General environmental analysis looks at the macro elements that affect an industry and the company in it. The elements analyzed are demographics, economics, politics, social culture, and technology. The aim is to develop a long-term strategy so that the company continues to run in the future.

The industrial environment study focuses on the factors and conditions that influence a company's competitiveness in an industry. The following factors need to be examined that specifically affect the company and its competitive behavior and strategic responses: threat from new entrants, supplier strength, customer strength, substitution challenges and rivalry intensity between competitors.

The study of the world for competitors focuses on the nature of the behavior, reactions and goals of competitors. There are two major practices, 1) the gathering and interpretation of information about all companies competing with the company; 2) the understanding of the business environment of the company complements the observations of a general and industrial environment.

The company is expected to recognize the opportunities and threats it faces by conducting external assessments. Opportunity is a condition in the general environment that helps a company to attain strategic competitiveness if it is exploited, whereas the threat can hamper efforts of the company for strategic competitiveness in the overall environment. Companies can therefore determine what they want to do (Lynch, 2006; Lynch, 2018).

2.2.2. Internal factors

There are 3 main components that must be analyzed, namely resources, company capabilities and core competencies. Resources are company assets, including people, brand values and are an input from the company's production process. There are two types of resources, namely tangible and intangible.

The willingness to use resources in an organized way to accomplish those goals represents the capability. It is an association between material and incorporeal resources. Production by means of information exchange and knowledge of human resources. The special skills and expertise of the employees of the organization as well as the practical know-how of the employees are sources of the competitive advantage for the company. Core competences are activities that are specific for the company (as opposed to the competitor) and that provide a company with a unique (and valuable) value added over a long period to a company's products or services.

The organization will be able to identify its strengths and limitations through an internal environment analysis so that businesses can decide what they can and should do. By examining the above three components, the company can find its core competences to determine its competitive advantage with 4 value, rarity, unfit to imitate and cannot be replaced. And businesses can perform strategically (Lynch, 2006; Lynch, 2018).

2.3. Literature review

Succeeding in the global market is undoubtedly every company's goal. Given the current resources and capabilities, companies must manage them accordingly to create its own core competence and achieve competitive advantage. To nobody surprise, competing in the global market requires more effort as to the uncertainty in its environment. Zámorský (2020) highlighted the importance of developing capabilities and built a framework to develop capabilities in order to thrive and prosper amid global uncertainty. Sensing the context, driving the market and redesigning the business are the three core capabilities identified which companies should build. Meanwhile, developing a global business model requires a clear understanding of the market conditions (Oyedele, 2016). Analyzing the conditions of battery swap technology market is a critical thing to do to commercialize the product as it is not only an innovation in the automotive industry, but also an attractive business in current time. It's becoming attractive because an organization would remain successful and sustainable if it use innovation to achieve competitive advantage (McKinley et al., 2014; Martin-Rios and Parga-Dans, 2016).

In order to analyze the condition of the current market, several tools can be utilized. Hou et al (2019) conducted cluster analysis to analyze the inventory allocation strategy of three smartphone brands among their overseas warehouses. Shahri and Sarvestani (2020) conducted a comparative study on four firms to analyze the business model innovation to overcome a decline. Matarazzo et al (2017) analyzed the impact of cross border acquisitions on R&D activities in the Italian red biotech industry by comparative study. In addition, Gupta (2017) discussed the global competitiveness for Indian business and Chinese business in terms of innovation, manufacturing, marketing, distribution and service.

This study aims to provide insight to battery swap business in Indonesia regarding strategies that can be implemented based on lessons learned from the comparative study. Battery swap is a new product that is still under development in Indonesia. Researchers in Indonesia have published research results in developing lithium battery products for electric vehicle applications. Sutopo et al (2013) analyzed the value chain of battery technology for electric vehicles. Purwanto et al (2013), Rahmawati et al (2013) and Rahmawati et al (2014) studied the battery anode material and its performance. Nizam et al (2019) and Nizam et al (2020) developed a battery management system. Sutopo et al (2018) conducted a review of the electric vehicle charging system in Indonesia. Meanwhile, Wardayanti et al (2018), Yuniaristanto et al (2017) and Mursid & Sutopo (2019) successively developed models for supplier selection, production scheduling and market pre-test schemes for lithium batteries. Sutopo et al (2013) and Sutopo et al (2016) conducted an estimated cost analysis for a battery factory. Cost estimation analysis and feasibility studies for battery development have also been studied (Sutopo et al, 2013; Sutopo et al, 2016; Aristyawati et al, 2016; Sutopo et al, 2014; Kurniyati et al, 2016). The commercialization model of lithium battery technology and its feasibility has been developed by Sutopo et al (2013), Kurniyati et al (2017) and Atikah et al (2014). Furthermore, battery testing

standardization has been developed through research of Sutopo & Kadir (2017), Sutopo et al (2018), Sutopo & Kadir (2018), Rahmawatie et al (2017), Prianjani et al (2016). In addition, a model to launch a spin-off company for battery mini plant was proposed (Astuti et al, 2014) and the sustainable supply chain planning for battery swap system was also proposed (Prianjani et al, 2019).

2.4. Framework selection

In this study, we conducted a comparative study of two companies in commercializing swap battery-powered electric vehicle technology, with Gogoro and Kymco as the case study. We employed the strategic management concept as a framework to analyze the formulation of their global business strategy. There are 5 stages that we used as the approach in analyzing both companies. First, we identified the companies’ resources by studying their strengths and weaknesses compared with the competitors. Then, we determined the companies’ capabilities which allow the companies to do better than their competitors. After that, we determined the potential of the companies’ resources and capabilities in terms of competitive advantage. Furthermore, we located an attractive industry of both companies. Finally, we identified the strategies selected by the companies that best allow to utilize their resources and capabilities relative to opportunities in the external environment. The strategy formulation and implementation become the key success of the companies to earn their above-average returns. Figure 1 represents the framework employed in this study.

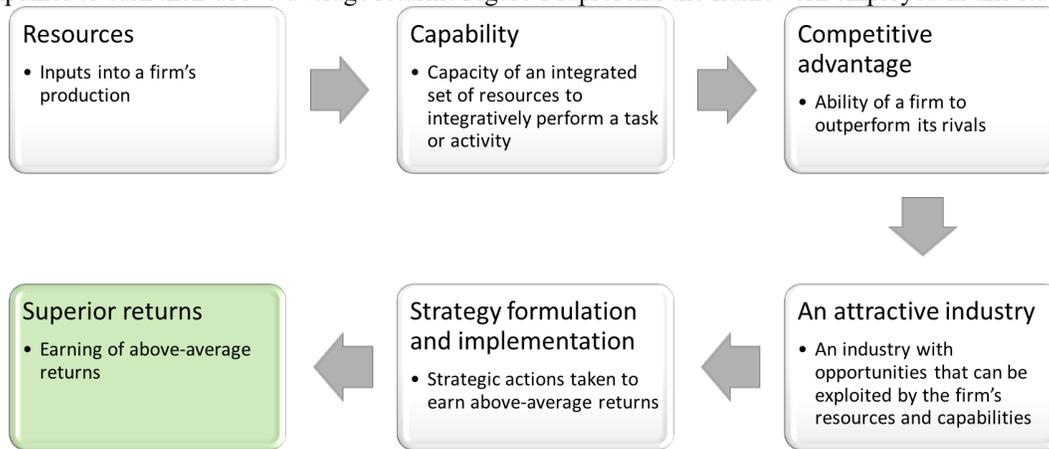


Figure 1. Comparative study framework

Data collection was done using Google's search engine by typing the keywords "Gogoro" and "Kymco". Based on each search result, more than 6 million results related to Gogoro and more than 48 million results related to Kymco were identified. Based on the search results, we chose the relevant literature to be used as a discussion in this case study.

3. Result and discussion

We summarized the collected data into a table highlighting the comparisons between two companies based on the framework. We identified six aspects including resources, capabilities, competitive advantage, attractive industry, strategy formulation and superior returns garnered. Table 1 presents the comparison between Gogoro and Kymco, whereas Table 2 and Figure 2 present a brief comparison of each company’s product.

Table 1. Summary of both companies’ comparison

Aspect	Gogoro	Kymco
Resources	<ul style="list-style-type: none"> 1,200 employees (Gogoro, 2015) Assigned 106 patents and regarding their electric vehicles and charging system (Justia, 2020) Standardized battery swap system, including testing, technical and safety standards 6 investors including Samuel Yin, ENGIE, Generation Investment Management, National Development Fund, Panasonic Ventures, Temasek, and Sumitomo Corporation (Cheng, 2015; Lorenz, 2015; Forbes, 2015; Bloomberg, 2017) 	<ul style="list-style-type: none"> 3,650 employees

Capabilities	<ul style="list-style-type: none"> Build a smart connected infrastructure and battery swapping system through Gogoro Energy Network Ignite the mass market shift to sustainable energy A unique hardware start-up with smart scooters, smart batteries, phone app, and charging stations (Kymco, 2019). Better energy management: battery stations can operate for as long as 48 hours without power 1710 battery swapping stations located across convenience stores, supermarkets and parking lots Continuous improvement of its artificial intelligence (ectasia, 2018) 	<ul style="list-style-type: none"> Provide a compatible network of battery swap stations, plus a new standard of universal removable and swappable batteries Provide battery vending machines (motorcyclesdata, 2020) Automatic production process using computer-integrated manufacturing (CIM) Total quality control management (TQM) and Total product management (TPM) Environmental management standards in the entire production process, distribution and support after sale (Kymco, 2020)
Competitive advantage	<ul style="list-style-type: none"> Value innovation: offering electric motorcycles priced in the range of their gas-powered counterparts while providing an infrastructure network available for people to conveniently and quickly replenish their batteries Overall lower cost compared to other electric motorbike companies (Sundararajan & Polkowski, 2020) 	<ul style="list-style-type: none"> Universal removable battery standards (FAMI, 2018) Global market: exporting to 88 countries (Kymco, 2020) Overseas network and worldwide locations: sales channels available in 107 countries around the world (Kymco, 2020)
An attractive industry	<ul style="list-style-type: none"> The global electric vehicle (EV) battery swapping market is currently is estimated to grow significantly during 2020–2030. Several companies are taking initiatives to integrate battery swapping technology in two-wheeler EV category. The EV battery swapping market is driven by several growth factors such as elimination of wait time for battery charging, reduction in the upfront cost of an EV, increasing vehicle demand, improved battery life and performance, and increased run-time and improved remunerative opportunities for shared e-mobility drivers (P&S Intelligence, 2020) 	
Strategy formulation and implementation	<ul style="list-style-type: none"> Value innovation creation (Sundararajan & Polkowski, 2020): <ul style="list-style-type: none"> ✓ ELIMINATE: permanent batteries mounted to the motorbike and infrastructure that enables quick charging of depleted batteries ✓ REDUCE: Investment in stand-alone, high-tech battery stations; in-house development of all key motorbike components, including batteries ✓ RAISE: Cool and trendy design, smart monitoring system ✓ CREATE: Large network of battery-swapping stations and battery subscription model Partnership with DHL, Yamaha, established scooter sharing business in Berlin and Paris (Forbes, 2019) Sell products in its own stores 	<ul style="list-style-type: none"> exporting more the 50% of the production to Argentina, Brazil, United States, Canada, Colombia, China, Japan, Malaysia, Philippines, Vietnam, Egypt, Iran and Europe (Forbes, 2019) Sell products through dealerships
Superior returns	<ul style="list-style-type: none"> Captured over 80% of the electric scooter market Attract nearly USD500 million in investments On the path of becoming Taiwan’s first ever unicorn (Sundararajan & Polkowski, 2020) 	<ul style="list-style-type: none"> Global brand position Leading position in the local market share steadily over 30% (Kymco, 2020) Annual sales revenue exceeding USD 1 billion (motorcyclesdata, 2020)



Figure 2. Product comparison

Table 2. Product comparison

	KYMCO Many 110 EV	GOGORO (general type)
Motor Max. power	3200W	6400W
Max. HP	4.29HP	8.58HP
Durability	About 200km (extra equipped 3 spare batteries)	About 110km (constant speed of 40km/h)
Re-charging mode	Parallel with charging & swapping	Swapping assistive with charging
Battery capacity	10.5Ah(core battery) 13Ah(removable battery)	30.3Ah(single battery)
Re-charging time	Standard charge-4Hrs Quick charge-1 Hr (can rent another removable battey)	Swap immediately (plug-in charging at home in 6 hours to reach 82% electricity)
Warranty	Core battery-5 years Removable battery-lifetime	Lifetime warranty for battery
Rental fee	NT299(self-use battery)	NT699(no limitation)
Sales price	NT42,800 (launched in Aug. 2018)	NT39,800 (Gogoro 2)

Based on Table 1, we can identify points of difference regarding how each company carries out global business strategy design. Gogoro has successfully run its business and is in the process of being the only unicorn in Taiwan, although in fact it is a new player in the electric vehicle industry. This is because Gogoro can read market opportunities and make good use of them. Gogoro initially saw the opportunity that there was a discourse of creating smart cities in Taiwan along with its rapid growth, so that it needed a renewable energy consumption mechanism that could be accessed throughout the city. From there, Gogoro created an innovative battery swap technology in the form of battery exchange infrastructure, which is called GoStations and over time spread to various points in Taiwan, which later came to be known as the Gogoro Energy Network. In addition, Gogoro also became the first producer to make zero emissions two-wheeled electric vehicles. Gogoro's courage to become a pioneer and create innovation despite its young age is what led Gogoro to become a leading player and has enormous prospects in the electric scooter and battery swap industry.

Meanwhile, Kymco is making more use of its global brand position. Kymco's decades of experience playing in the motor vehicle sector has created a network of production and sales of its products in hundreds of countries throughout the world. This makes it easier for Kymco to differentiate into the electric vehicle business because new products can be immediately launched to various countries that are Kymco's business channels. In addition, it can also increase customer value because the brand is already global and leads the local market. This mechanism is proven effective by achieving annual revenues in excess of USD 1 billion. Thus, Kymco has considerable financial opportunities to develop the electric scooter business.

Gogoro's strategy in creating value innovation is an effective step. Through offering vehicle prices that are equivalent to oil-based vehicle products and providing battery exchange stations in various locations, it has proven to attract consumer interest and has succeeded in making Gogoro control 80% of the electric scooter market. Of course, this also cannot be separated from planning in the initial phase, including product planning and battery swap standardization. Standardization of battery swap technology plays a major role for Gogoro's success in dominating the market because basically battery swap technology as an innovation needs to be supported by standardization.

Behind the success of the two companies in commercializing this technology, of course there are weaknesses. From Gogoro's side, the international network has not been formed enough because Gogoro still focuses on the local market and only has a cooperation contract in the form of scooter sharing business in Berlin and Paris. This is a challenge for Gogoro to expand its business in the form of product exports and the construction of distribution channels to various countries that have a large electric scooter market prospect. Meanwhile, Kymco also has a weakness in terms of competition with the local brand Gogoro which has become a leader in the electric scooter market (controlling 80%

of the market). It will require more extra effort to break this competition. However, with its competitive advantage, Kymco has the opportunity to build strength in the electric scooter sector.

Lesson learned from the analysis

The implication of this article is that Indonesia can learn from the case study that has been carried out. Companies that want to develop business in the area of battery swap technology for electric vehicle applications can learn the strategies adopted by Gogoro and Kymco in successfully commercializing their technology in the global market. Based on the comparative analysis that has been done, we can see that strategic entrepreneurship is an important factor in the success of both companies mastering the market both domestically and internationally. Strategic entrepreneurship is a simultaneous behavior in looking for opportunities (opportunity-seeking) and at the same time looking for advantages (advantage-seeking) superior company performance (Ireland et al, 2003). Gogoro saw the opportunity for rapid growth of megacities and the need for smarter technologies to make energy consumption more meaningful innovation. Then Gogoro sought its competitive advantage through blue ocean strategy, which is the simultaneous pursuit of differentiation and low cost to open up a new market space and create new demand, so that Gogoro successfully created value innovation for overall lower cost compared to its competitors. Meanwhile, Kymco has an extensive international network that includes research and development facilities, manufacturing facilities, and marketing channels that are spread throughout the world. The extent of this overseas network has made Kymco's competitive advantage, creating a huge opportunity for Kymco to commercialize its electric vehicles to the global market. In addition, the advantage of global brand position also creates opportunities for Kymco to lead the market share of electric vehicles in both the domestic and international markets.

Furthermore, the standardization of battery swap technology in the earlier phase of product planning is one of the key success of commercializing new technology. Development of standards can help emerging technological ecosystems to overcome problems thereby helping to successfully commercialize new products (The British Standards Institution, 2020). Standards for product measurement and testing help companies to show customers that innovative products that are sold actually have features according to company claims (Swann, 2000). In addition, standards can contribute to trust in technology and innovation products by reducing various types of risks, both for users and for the community, including health, safety and environmental risks. Standards not only reduce the time to market (time to market) of innovative inventions and technologies, but also enable marketing in its initial appearance, for example by gathering support from all relevant stakeholders. Standards also help accelerate the diffusion of innovation (Blind, 2016).

4. Conclusion

Comparative analysis of the swap battery-powered electric vehicle company has been carried out. The analysis was conducted by referring to the strategy management approach to determine the design of global business strategies by the two companies in order to obtain above-average returns. Gogoro managed to achieve above average returns by emphasizing the value of innovation and overall lower cost compared to other electric motorbike companies. Meanwhile Kymco achieved above average returns by emphasizing universal removable battery standards and extensive overseas networks and worldwide locations. The two companies successfully recognized in the world are evidenced by the existence of electric scooter sharing businesses in overseas markets owned by Gogoro and the development of Kymco as a global brand expanded to worldwide market, and its products which continued to win recognition for its overseas quality. Lesson learned for companies in Indonesia is that companies must have strategic entrepreneurship in order to successfully commercialize their innovations. In addition, standardization of battery swap technology, including the testing and safety standards become a challenge for stakeholders in Indonesia in order to commercialize this technology.

There are some limitations to this study. The data collected in this study are only based on literatures, so it may not cover some details. In addition, there were difficulties in analyzing the actual internal conditions of the companies, so the internal analysis can only be done based on existing literature. Future studies are expected to be more specific in analyzing the internal environment of the company, including its resources and capabilities. In addition, quantitative studies, will help examine the conclusions and provide a more in-depth understanding of global business strategy.

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Biographies

Era Febriana Aqidawati is a student at Master Program of Industrial Engineering Department, Universitas Sebelas Maret, Surakarta, Indonesia. She is also a research assistant in the Laboratory of Logistics System and Business in the Department of Industrial Engineering, Faculty of Engineering, Universitas Sebelas Maret. She obtained her Bachelor of Engineering degree in Industrial Engineering from Universitas Sebelas Maret in 2018. Her research interests are techno-economics, logistics and supply chain management, operation research, and business strategic management. She has published 7 articles, 4 of them are Scopus indexed.

Wahyudi Sutopo is a professor in industrial engineering and coordinator for the research group of industrial engineering and techno-economy (RG-RITE) of Faculty Engineering, Universitas Sebelas Maret (UNS), Indonesia. He earned his Ph.D. in Industrial Engineering & Management from Institut Teknologi Bandung in 2011. He has done projects with Indonesia endowment fund for education (LPDP), sustainable higher education research alliances (SHERA), MIT-Indonesia research alliance (MIRA), PT Pertamina (Persero), PT Toyota Motor Manufacturing Indonesia, and various other companies. He has published more than 130 articles indexed Scopus, and his research interests include logistics & supply chain management, engineering economy, cost analysis & estimation, and technology commercialization. He is a member of the board of industrial engineering chapter - the institute of Indonesian engineers (BKTI-PII), Indonesian Supply Chain & Logistics Institute (ISLI), Society of Industrial Engineering, and Operations Management (IEOM), and Institute of Industrial & Systems Engineers (IISE).

Eko Pujiyanto is a teaching staff at the Department of Industrial Engineering, Faculty of Engineering, Universitas Sebelas Maret. He obtained his Bachelor of Science degree in Mathematics from Institut Teknologi Bandung in 1993. In 1998, he successfully completed his master study from Institut Teknologi Bandung in the field of science: Industrial Engineering. Then, in 2012, he obtained his Doctoral degree from Gadjah Mada University in the field of science: Mechanical Engineering (Biomaterials).