

A Strategy Comparison Between the Korean and Chinese Automotive Industries in the Indonesian Electric Market Using Porter's Five Forces Model

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Abstract - Government programs to reduce greenhouse gas emissions and dependence on fossil fuels provided a strong impetus for local and international automotive manufacturers to invest in the electric vehicle market in Indonesia. Currently, Hyundai and Wuling are leaders in the national electric car market. The dominance of Hyundai and Wuling in the Indonesian electric car market presents an ideal case to investigate. This study will analyze the strategies used by Hyundai and Wuling in the Indonesian electric car market using Porter's Five Forces approach. Based on the results of Porter's Five Forces analysis, two potential factors that contribute to the success of Hyundai and Wuling: bargaining power of suppliers and bargaining power of buyers. In terms of power of suppliers, Hyundai and Wuling have built a manufacturing facility in Indonesia to strengthen its supply chain network for electric car production. In terms of power of buyers, Hyundai and Wuling offer quality electric mobility solutions at affordable prices.

Keywords - Strategy, Electric Car, Porter's Five Forces

I. INTRODUCTION

Greenhouse gas emissions have emerged as a critical global challenge, directly contributing to climate change and its devastating environmental impact. These emissions are dominated by industrial and transportation activities, which cause an increase in the concentration of greenhouse gases in the atmosphere. One of the right policies to reduce greenhouse gas emissions and the use of fossil fuels is using electric vehicles (EV) [1]. It can potentially contribute to the decarbonization of the transportation sector and reduce climate change because electric vehicles produce fewer emissions than conventional vehicles [2]. This encourages many countries to develop electric vehicle technology [3].

The Indonesian government has taken significant steps to promote and regulate the development of electric vehicles in the country. In recent years, various policies and incentives have been introduced to encourage the adoption of electric vehicles and accelerate necessary infrastructure investments. The Indonesian government has made a strategy for the developing the national electric vehicle technology industry through Presidential Regulation Number 55 of 2019 concerning the Acceleration of the Battery-based Electric Motorized Vehicle Program (Battery Electric Vehicles) for Road Transportation. The government's commitment to reducing greenhouse gas emissions and dependence on fossil fuels has provided a strong impetus for automakers,

local and international, to invest in the electric vehicle market in Indonesia [4].

Based on data from the International Energy Agency (IEA), sales of electric cars in the world will reach 10.2 million units in 2022. The number has increased by 56.92% compared to the previous year, which was 6.5 million units [5]. Based on a report from the Association of Indonesian Automotive Industries (Gaikindo) for 2022, electric car sales in Indonesia total 15,437 units. This number has increased by 383.46% compared to 2021, with a sales value of 3,193 units. The Air EV and Ioniq 5 are electric cars with the highest sales value in Indonesia, with sales of 8,053 units and 1,517 units, respectively [6]. Based on this data, Hyundai and Wuling are electric car manufacturers that dominate the Indonesian market.

Hyundai Indonesia is a local subsidiary of the Hyundai Motor Company, a South Korean multinational automotive manufacturer. Hyundai's position in the global market has earned it a reputation as a manufacturer of high-quality vehicles in various segments. Hyundai Motor Indonesia was established in 2020 as the official distributor of Hyundai passenger cars in Indonesia. Hyundai offers various types of vehicles to meet the demands of the Indonesian market [7]. Wuling Indonesia is an automotive manufacturer commercializing its products in Indonesia since 2015. Wuling Indonesia is a subsidiary of SAIC Motor Corporation Limited, China's leading car manufacturer [8].

Japanese automobiles have dominated over 95% of the Indonesian automotive industry for almost 40 years [9]. Hyundai and Wuling as new players, have succeeded in capturing the electric car market in Indonesia. The dominance of Hyundai and Wuling in the Indonesian electric car market presents an ideal case to investigate. Currently, there is little research that discusses competitive assessment and strategy development in the electric car industry [4]. This creates the need to conduct review of the electric car industry market. This research uses the Porter's Five Forces model to analyze the competitiveness of Hyundai and Wuling in the Indonesian electric car market [10]. The Porter's Five Forces is a useful planning tool for analyzing its competitive environment, evaluating competitiveness, dealing with customers and suppliers, and providing helpful solutions to establish effective plans for industries [10]. The aim of this study is to investigate the main aspects in this model that influence the competitiveness of the electric car market in Indonesia.

II. METHODOLOGY

This study uses a case study approach to examine the electric car sector in Indonesia by focusing on two automotive manufacturing companies, namely Wuling and Hyundai. The case study methodology allows in-depth exploration of specific cases, in this case Hyundai and Wuling's strategy in the electric car market [11]. This study will utilize Porter's Five Forces framework as an analytical tool to understand the competitive dynamics and market forces that shape the company's operations and strategy. Porter's Five Forces model includes the bargaining power of suppliers, the bargaining power of buyers, the threat of new entrants, the threat of substitute products, and the intensity of competitive competition [10]. Through applying this framework, studies will assess the competitive landscape of companies and evaluate the strategic choices taken in response to these strengths. The collection process was obtained from secondary sources, including scientific articles, news articles, company publications, and government reports. These sources will provide rich and varied information on company strategy, market dynamics, the competitive landscape, consumer behavior, the regulatory environment, and other relevant factors. By utilizing secondary data, this study can analyze various pieces of information and comprehensively understand the study topic [11].

III. RESULTS

A. Brief Overview of Hyundai and Wuling in The Electric Car Sector

PT. Hyundai Motors Indonesia is the official sales and distributor subsidiary of Hyundai Motor Company, which was established in 2020. The company's vision, "Progress for Humanity", is the foundation of the company's dedication to providing product lines with technology that help build solutions for a more sustainable future. Hyundai Motor Indonesia plays an important role in Indonesia's transition towards sustainable innovation by helping maintain Indonesia's EV ecosystem and contributing to the quality of life of its people with its leadership in pollution-free mobility technology. Hyundai is investing USD 1.55 billion to develop a manufacturing center that will be operated by PT Hyundai Motor Manufacturing Indonesia (HMMI). The Government has appointed HMMI to become an electric car manufacturer in Indonesia. The Hyundai factory is directed to form the largest upstream-to-downstream electric car industry ecosystem in the Southeast Asia region [7].

PT. SGMW Motor Indonesia (SAIC General Motors Wuling Motor Indonesia, or Wuling Motors) is a wholly owned subsidiary of SAIC-GM-Wuling Automobile (SGMW), a joint venture between SAIC Motor, General Motors, and Liuzhou Wuling Motors Co. Ltd. to handle its business in Indonesia. The company is

the first Chinese automaker to establish a factory in Indonesia. Wuling invests \$1 billion to set up a manufacturing center in Indonesia. Wuling also supports the vehicle electrification acceleration program by signing a memorandum of understanding with the Indonesian Coordinating Ministry for Maritime Affairs and Investment. Currently, Wuling has also developed an electric car battery due to Gotion Hi-Tech collaboration, which is produced domestically. This is Wuling's commitment to developing the ecosystem and battery-based electric motor vehicle industry from upstream to downstream [8].

B. Bargaining Power of Suppliers

The bargaining power of suppliers in the national electric car industry is low due to the abundant availability of raw materials. Indonesia has natural resources in the form of large nickel ores. Nickel ore is the main material used for the production of lithium-ion batteries. Lithium-ion is an essential component of electric cars as a power source and battery material. Based on data from the Directorate General of Mineral and Coal (DJMB) in 2013, Indonesia has lithium resources reaching 3,565 million tons, while total reserves reached 1,168 million tons. [12]. On the other hand, Indonesia's first electric vehicle battery raw material factory has been operating in the Obi Region, North Maluku. Mixed Hydroxide Precipitate (MHP) Nickel Purification by Hydrometallurgy This HPAL has an MHP production capacity of 365 thousand tons annually [13].

Hyundai has built a manufacturing facility in Indonesia to strengthen its supply chain network for electric car production there. Hyundai has also started constructing an electric car battery cell factory with LG Energy Solution Ltd. The battery factory was built in Karawang and will operate in 2024. The factory is projected to produce 10 gigawatt-hour battery cells per year, which can supply more than 150,000 units of electric cars [7]. Wuling also did the same by localizing the manufacturing and electric car batteries. Wuling cooperates with PT. Gotion Green Energy Solutions Indonesia (Gotion Hi-Tech), a global company investing in Indonesia for the electric vehicle battery manufacturing sector. Through this partnership, Wuling's commitment to producing electric vehicles with quality local supplies can be realized. In developing its electric car production in Indonesia, Wuling cooperates with various global companies as supply chain partners [8].

C. Bargaining Power of Buyers

The bargaining power of national automotive consumers is enormous. Indonesia had a population of 275 million in 2020. Indonesia is the largest economic center in Southeast Asia and controls one-third of the automotive market share in Southeast Asia, with a contribution of USD 1 trillion in 2018 [12]. This makes the prospects for the electric car industry in Indonesia

huge. Hyundai and Wuling have made significant strides in promoting electric mobility in Indonesia. For the Indonesian market, PT. Hyundai Motors Indonesia has launched 3 cars (BEV), namely the Hyundai Kona Electric (November 2020), Hyundai Ioniq Electric (November 2020), and Hyundai Ioniq 5 (March 2022). Wuling Motors Indonesia only has 1 electric car product,

the Wuling Air EV (September 2022). Several electric cars developed by Hyundai and Wuling have different specifications, models, and prices. The bargaining power of consumers is strongly influenced by low product prices and high product quality levels [10]. Table 1 describes the models, specifications, and prices of each electric car released by Hyundai and Wuling.

TABLE I
MODEL, SPECIFICATION, AND PRICE ELECTRIC CAR OF HYUNDAI AND WULING

Model	Specification	Charging Time	Reach	Price
Hyundai Kona Electric	Lithium ion polymer 39,2 kWh battery Max power 135 PS Max torque 395 Nm	6 hours 10 minutes (standard charging), 57 minutes (50kW fast charging up to 80%), 54 minutes (100 kW fast charging up to 80%)	345 km	IDR 750 million
Hyundai Ioniq Electric	Lithium ion polymer 38,3 kWh Max power 134 PS Max torque 295 Nm	6 hours 5 minutes (standard charging), 57 minutes (50kW fast charging up to 80%), 54 minutes (100 kW fast charging up to 80%)	373 km	IDR 723 million
Hyundai Ioniq 5	Liquid-cooled lithium ion 58 – 72,6 Kwh battery Max power 170 – 217 PS Max torque 350 Nm	31 hours (standard charging), 56 minutes 50 kW fast charging up to 80%), 17 minutes (350 kW fast charging up to 80%)	384 – 481 km	IDR 748 – 859 million
Wuling Air EV	Lithium Ferro-Phosphate 17,3 – 26,7 kWh Max power 40 PS Max torque 110 Nm	11 hours (2.0 kW charging), 4 hours (6.6 kW charging)	200 – 300 km	IDR 238 – 311 million

The Hyundai KONA Electric has a crossover concept with an electric motor drive powered by a polymer lithium-ion battery with a capacity of 39.2 kWh. The main driver of this car is a motor with a power output of 135 PS and a torque of up to 395 Nm. This car has an energy storage device that is regulated by a charging system and can absorb energy up to 80% in 54 minutes. This car can travel 345 kilometers on a single charge [14]. Besides that, Hyundai also has an electric car variant called the Ioniq Electric with a hatchback concept. This electric car was officially sold in November 2020, together with the Hyundai Kona Electric. This car uses a powertrain system powered by a polymer lithium-ion battery with a capacity of 38.3 kWh. This electric car uses a single electric motor, has a power of around 134 PS, and is equipped with 295 nm of torque, which will be channeled to the front wheels. This car can travel up to 373 kilometers on a single charge. Hyundai Kona and Ioniq have the same battery charging time, which is 6 hours using standard charging, 57 minutes using 50 kW fast charging, and 54 minutes using 100 kW fast charging. The Hyundai Kona Electric is sold at 750 million rupiahs, while the Ioniq Electric is 723 million rupiahs [14].

In 2022, Hyundai will introduce its newest model, the Hyundai Ioniq 5. This car is the first BEV to be mass-produced in Indonesia. The Ioniq 5 has an SUV concept with a futuristic design. This car is made using the electric-global modular platform (E-GMP), a platform developed by Hyundai to produce several high-quality electric car models at once. The main driver of this car is a motor with a power of 170–217 PS and a torque of up to 350 Nm. Charging takes up to 31 hours for the long-range

type with standard charging, 50 minutes with 50 kW fast charging, and 17 minutes with 350 kW fast charging. This electric car can cover a distance of 384–481 km on a single charge. The Ioniq 5 is equipped with a new feature, the Vehicle to Load (V2L) technology, which is presented for the first time in a Hyundai electric car. This feature is not related to driving activities, but this feature can change the function of the car into a power source with a maximum power of up to 3.6 kW. This power source can be distributed to various electronic items inside and outside the car. The Hyundai Ioniq 5 is positioned as an electric car in a segment above the Kona Electric and Ioniq Electric models. This car is sold at prices between 748 and 859 million rupiah [15].

One of Wuling's important milestones is introducing the Air EV electric car. This car is a significant innovation in providing transportation solutions that are environmentally friendly and technologically advanced. The Air EV has compact dimensions and a 4-seat configuration that prioritizes driver comfort. The main driver of this car is a motor with a power of 40 PS and a torque of up to 110 Nm, which is sourced from lithium ferro-phosphate with a capacity of up to 26.7 kWh. This car has several modern technology and innovation facilities, namely an intelligent tech-dashboard, a multifunction steering wheel, an integrated floating widescreen, and a futuristic center console. Wuling Indonesia's first electric car has smart features, such as the Wuling Remote Control App via the Internet of Vehicles and the Wuling Indonesian Command. Air Ev was released in two types: the standard range, which can cover a distance of 200 km, and the long range, which can cover

a distance of 300 km. The Air EV has a charging time of 11 hours with 2.0 kW charging and 4 hours with 6.6 kW charging. Unlike Hyundai, the Air EV is sold for 238–311 million rupiah [16].

D. Threat of New Entrances

During several years, Japan dominated the automotive industry in Indonesia. Toyota and Honda are the two strongest automotive brands in the Indonesian market. The threat of new entrants into the domestic electric car industry is limited, but the presence of Chinese automotive businesses should be monitored. Currently, China has the largest electric car population, accounting for 60–70% of the electric vehicle market share. This achievement makes China the country with the world's largest development of electric cars. The largest Chinese automotive company is BYD Auto. This brand will become the electric car with the highest sales value in the world in 2022, beating Tesla. BYD Auto's sales of electric cars were 641,350 units, while Tesla only sold 564,000 units. BYD Auto is part of BYD Company, an automotive company located in Shenzhen, Guangdong, China. BYD Auto offers high-tech electric cars at low prices. Although most of BYD's sales are still in the Chinese market, BYD is developing markets worldwide. This company already has factories in China, America, Brazil, and Hungary. According to Gaikindo, BYD is planning to enter the Indonesian market [17].

E. Threat of Substitute Products

The threat of substitute products in the national electric car market is high, especially given the dominance of conventional cars. Gaikindo data shows that the electric car market share in 2022 will be only around 1.13% [18]. Although electric vehicles offer environmental benefits and lower operating costs, conventional cars dominate the market. Factors such as high prices, a lack of charging station infrastructure, and the relatively short range associated with electric cars make conventional cars the main substitute. The availability of a wide range of conventional cars in various price segments poses a significant threat to the electric car market in Indonesia [19]. In addition, technological advancements in the automotive industry have introduced potential products to replace electric cars in the future, namely alternative fuel cars and autonomous driving. Alternative fuel cars, like hydrogen have long been developed for urban transportation. The Toyota Mirai and Honda Clarity are hydrogen-fueled cars released in 2014 and 2018, respectively [20]. An autonomous car is a car that is supported by the latest technology in sensing, computing, tracking, and controlling, including computer vision, LIDAR (Light Detection and Ranging), laser, and sonar technology for obstacle detection and avoidance. This technology makes travel safer, saves fuel, and saves time. Several brands, such as Tesla Model 3, Mercedes GLE, BMW 3 Series,

and Audi Q8, are autonomous brands with autopilot features [21].

F. Intensity of Competitive Rivalry

The intensity of competition between Wuling Indonesia and Hyundai in the electric car sector is high. Gaikindo data for 2022 shows that Wuling and Hyundai electric cars have the highest sales value compared to other brands. The electric car market continues to grow, and the intensity of competition can fluctuate based on market dynamics and consumer preferences [9]. Several automotive companies, such as Toyota and Honda, will also enter the electric car market in Indonesia. Toyota is increasing its investment in Indonesia by USD 2 billion until 2024. Toyota is also preparing 10 types of EVs to be produced for the Indonesian market within five years. Honda is also committed to investing IDR 5.2 trillion until 2024 and will relocate its factory. Honda Motor Co. and Yuasa Corp. plan to build a lithium-ion battery factory for electric vehicles with a planned investment of around 434 billion yen [22].

IV. DISCUSSION

Based on the results of Porter's Five Forces analysis, there are two potential factors that contribute to the success of Hyundai and Wuling's national electric car market strategy: Bargaining Power of Suppliers and Bargaining Power of Buyers. In terms of power of suppliers, Hyundai and Wuling have built a manufacturing facility in Indonesia to strengthen its supply chain network for electric car production [12][8]. In terms of power of buyers, Hyundai and Wuling offer quality electric mobility solutions at affordable prices. The growth potential of the automotive business market in Indonesia is quite significant. Currently, the ratio of car ownership is only 90 cars per 1000 people. Although there is room to increase car ownership, Indonesia's GDP per capita is only USD 3870 [23]. Compared to the European market, the largest EV consumer, their GDP per capita is nearly ten times that at USD 33,927 [23].

Hyundai and Wuling have different strategies for penetrating the national electric car market. Based on Porter's five generic strategies, Hyundai implements a focus - low costs strategy. Hyundai produces electric cars with crossover and SUV models for the upper middle-class segment, but at prices that are not too expensive [7]. Wuling implements a cost leadership - best value strategy where Air EV products have prices adjusted to the purchasing power of people in Indonesia. The projected selling price of EVs following the purchasing power of the Indonesian people is USD 20,000, or around 300 million rupiahs per car [23]. This is what causes Wuling to lead the electric car market in Indonesia. Besides the low price, Air EV also provides facilities with modern technology and innovation. Manufacturers of EV must also develop business strategies by considering marketing [8].

V. CONCLUSION

The success of Hyundai and Wuling in dominating the EV market proves that the EV market in Indonesia has great potential. The low EV tax policy as well as government subsidies for purchasing EVs are an opportunity for EV manufacturers to invest in the Indonesian EV market. EV manufacturers must take the initiative to develop EVs at affordable prices so that they are more attractive to consumers. Apart from that, investment in public charging stations is also needed to create a bigger EV market. The government also needs to ensure sufficient electricity supply to support the EV ecosystem.

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REFERENCES

- [1] J. Li, Z. Qiao, A. Simeone, J. Bao, and Y. Zhang, "An activity theory-based analysis approach for end-of-life management of electric vehicle batteries," *Resour. Conserv. Recycl.*, vol. 162, Nov. 2020, doi: 10.1016/j.resconrec.2020.105040.
- [2] J. Malinauskaitė, L. Anguilano, and X. S. Rivera, "Circular waste management of electric vehicle batteries: Legal and technical perspectives from the EU and the UK post Brexit," *Int. J. Thermofluids*, vol. 10, May 2021, doi: 10.1016/j.ijft.2021.100078.
- [3] Y. Choi and S. W. Rhee, "Current status and perspectives on recycling of end-of-life battery of electric vehicle in Korea (Republic of)," *Waste Manag.*, vol. 106, pp. 261–270, Apr. 2020, doi: 10.1016/j.wasman.2020.03.015.
- [4] T. Konewka, J. Bednars, and T. Czuba, "Building a competitive advantage for Indonesia in the development of the regional EV battery chain," *Energies*, vol. 14, no. 21, pp. 1–13, 2021, doi: 10.3390/en14217332.
- [5] R. Mustajab, "China Rajai Penjualan Mobil Listrik Dunia pada 2022," 2023. <https://dataindonesia.id/sektor-riil/detail/china-rajai-penjualan-mobil-listrik-dunia-pada-2022>
- [6] A. M. Sukma, "Rapor Penjualan Mobil Listrik RI pada 2022 Meroket 383 Persen." <https://otomotif.bisnis.com/read/20230113/46/1617910/rapor-penjualan-mobil-listrik-ri-pada-2022-meroket-383-persen>
- [7] E. S. Darmawan, "Komitmen Hyundai dalam Mendukung Ekosistem Mobil Listrik di Indonesia." <https://otomotif.kompas.com/read/2021/11/19/132200615/komitmen-hyundai-dalam-mendukung-ekosistem-mobil-listrik-di-indonesia>
- [8] I. E. Alamsyah, "Wuling Perkuat Komitmen Ekosistem Mobil Listrik dengan Lokalisasi Baterai di RI." <https://ekonomi.republika.co.id/berita/rtvhdo349/wuling-perkuat-komitmen-ekosistem-mobil-listrik-dengan-lokalisasi-baterai-di-ri>
- [9] I. Veza *et al.*, "Cause and Effect of the Emerging Chinese Car in the Indonesian Automotive Industry," *J. Adv. Veh. Syst.*, vol. 2, no. 2, pp. 21–30, 2021.
- [10] F. R. David, *Strategic Managements: Concepts and Cases*. New Jersey: Pearson Education, 2011.
- [11] R. E. Stake, *The Art of Case Study Research*. Thousand Oaks, CA: SAGE Publications Ltd, 1995.
- [12] A. Ismail¹ and D. Mulyaman², "Hyundai Investment on Electric Vehicles in Indonesia: a Push and Pull Factors Analysis," *J. Int. Stud. e-ISSN.2503-443X*, vol. 5, no. 2, pp. 375–394, 2021, [Online]. Available: <https://doi.org/10.24198/intermestic.v5n2.11>
- [13] A. Kusumawardhani, "Ini Pabrik Bahan Baku Baterai Kendaraan Listrik Pertama di RI." <https://ekonomi.bisnis.com/read/20210623/257/1409212/ini-pabrik-bahan-baku-baterai-kendaraan-listrik-pertama-di-ri>
- [14] H. Indonesia, "Jarak Tempuh Mobil Listrik Hyundai KONA Electric dan IONIQ Electric." <https://www.hyundai.com/id/en/hyundai-story/articles/jarak-tempuh-mobil-listrik-hyundai-kona-electric-dan-ioniq-electric-0000000033>
- [15] R. Arifin, "Spesifikasi Hyundai Ioniq 5 Mobil Listrik Buatan Indonesia." <https://oto.detik.com/mobil/d-6012684/spesifikasi-hyundai-ioniq-5-mobil-listrik-buatan-indonesia>
- [16] W. Jakarta, "Interior dan Teknologi Wuling Air EV Ditampilkan secara Virtual ke Rekan Media." <https://wuling.id/id/blog/press-release/interior-dan-teknologi-wuling-air-ev-ditampilkan-secara-virtual-ke-rekan-media>
- [17] T. Detikcom, "Siapa BYD, Pabrikan China yang Gusur Tesla jadi Raja Mobil Listrik Dunia." <https://oto.detik.com/mobil/d-6178438/siapa-byd-pabrikan-china-yang-gusur-tesla-jadi-raja-mobil-listrik-dunia>
- [18] A. M. Sukma, "Mau Dikasih Subsidi, Ini Pertumbuhan dan Pangsa Pasar Mobil Listrik di Indonesia." <https://otomotif.bisnis.com/read/20221221/46/1610627/mau-dikasih-subsidi-ini-pertumbuhan-dan-pangsa-pasar-mobil-listrik-di-indonesia>
- [19] T. A. Setyoko, R. Nurcahyo, D. Sihono Gabriel, and M. Habiburrahman, "Policy, Supporting Infrastructure and Market of Electric Cars in Indonesia," in *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 2022, pp. 363–372.
- [20] K. Turoń, "Hydrogen-powered vehicles in urban transport systems-current state and development," *Transp. Res. Procedia*, vol. 45, no. 2019, pp. 835–841, 2020, doi: 10.1016/j.trpro.2020.02.086.
- [21] J. Iskander *et al.*, "From car sickness to autonomous car sickness: A review," *Transp. Res. Part F Traffic Psychol. Behav.*, vol. 62, pp. 716–726, 2019, doi: 10.1016/j.trf.2019.02.020.
- [22] W. Wibowo, "Honda Siapkan Strategi Baru untuk Rebut Pasar Mobil Listrik." <https://otomotif.sindonews.com/read/1084103/183/honda-siapkan-strategi-baru-untuk-rebut-pasar-mobil-listrik-1682748283>
- [23] A. H. Pandiyaswargo, A. D. Wibowo, M. F. N. Maghfiroh, A. Rezqita, and H. Onoda, "The emerging electric vehicle and battery industry in Indonesia: Actions around the nickel ore export ban and a SWOT analysis," *Batteries*, vol. 7, no. 4, 2021, doi: 10.3390/batteries7040080.