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Public Discourse on Sustainable Transportation: Case Study of Electrification of Transportation Modes in DKI Jakarta

Diskursus Publik Terhadap Transportasi Berkelanjutan: Studi Kasus Elektrifikasi Moda Transportasi di DKI Jakarta

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Abstract

The policy of electrification of transportation modes in DKI Jakarta has created debate among the public, especially on social media. The policy of creating an environmentally friendly electric transportation ecosystem is not accompanied by supporting aspects of sustainable transportation. This research explores this debate by linking it to aspects of sustainable transportation, such as the environment, society, and economy, to understand and assess the development of transportation electrification. The qualitative method used in this research is a Q-Das approach using NVivo 12 Plus as software that helps collect and analyze data found on social media. The study found that the public needs to view transportation electrification policies as fully sustainable. Firstly, in the social dimension, the public criticized the policy of transitioning transportation to electricity without being accompanied by an energy transition as a "false solution". This is based on the energy source for electric transportation originating from coal-fired power plants, which are also the main contributors to pollutants. Second, in the economic dimension, the public views that the massive electric transportation ecosystem still needs to be supported by supporting aspects such as the availability of SPKLU. The estimated time for recharging batteries, which is relatively long compared to refueling conventional transportation, is considered to hamper and influence public economic activities. In the environmental dimension, the public criticizes that if a massive transportation electrification policy is carried out, it will require excessive electricity use. This is seen as inefficient and creates new problems that previously stemmed from excessive fuel use.

Keywords

Sustainable Transportation; Electrification of Transportation; Public Discourse; Three Dimensions of Sustainability.

Abstrak

Kebijakan elektrifikasi moda transportasi di DKI Jakarta telah menghadirkan perdebatan di tengah publik khususnya di media sosial. Kebijakan dalam menciptakan ekosistem transportasi listrik yang ramah lingkungan tersebut dinilai belum dibarengi dengan aspek-aspek pendukung transportasi berkelanjutan. Penelitian ini mengeksplorasi perdebatan tersebut dengan mengaitkan pada aspek-aspek transportasi berkelanjutan seperti lingkungan, masyarakat dan ekonomi untuk mengetahui dan menilai perkembangan elektrifikasi transportasi di DKI Jakarta. Metode yang digunakan dalam penelitian ini adalah Kualitatif dengan pendekatan Qualitative Data Analytic Software (Q-Das) dengan memanfaatkan NVivo 12 Plus sebagai perangkat lunak yang membantu dalam mengolektifkan dan menganalisis data temuan di Media Sosial. Hasil penelitian menemukan bahwa publik belum sepenuhnya memandang kebijakan elektrifikasi transportasi telah bersifat keberlanjutan. Pertama pada dimensi sosial, publik mengkritisi kebijakan transisi transportasi ke elektrik tanpa dibarengi dengan transisi energi adalah "solusi palsu". Hal ini didasarkan pada sumber energi transportasi listrik yang berasal dari PLTU Batubara yang juga menjadi kontributor utama polutan. Kedua pada dimensi ekonomi, publik memandang bahwa ekosistem transportasi listrik yang masif belum ditunjang oleh aspek-aspek pendukung seperti ketersediaan SPKLU. Selain itu, estimasi waktu pengisian baterai yang relatif lama dibandingkan pengisian bahan bakar transportasi konvensional dianggap dapat menghambat dan mempengaruhi aktivitas perekonomian publik. Pada dimensi lingkungan, publik mengkritisi apabila kebijakan elektrifikasi transportasi secara masif dilakukan akan membutuhkan penggunaan listrik secara berlebihan. Hal ini dipandang tidak efisien dan menimbulkan persoalan

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baru yang sebelumnya berakar dari penggunaan BBM yang berlebihan.

Kata Kunci
Transportasi Berkelanjutan; Elektrifikasi Transportasi; Diskursus Publik; Tiga Dimensi Keberlanjutan.

1. Introduction

The background to this research is that poor air quality in the capital city is one of the reasons the government is transitioning transportation modes from conventional to electric. This was done as an effort to reduce the proportion of air pollution caused by the high intensity of users of oil-fueled transportation (BBM), which produces carbon monoxide (CO) emissions (Jenihansen, 2023). The conventional transportation sector contributes significantly to producing CO of 96.36% or 28,317 tons annually. Followed by electricity generation 1.76% or 5,252 tons per year and industry 1.25% or 3,738 tons per year (Praditya, 2023). The high CO is dominated by private transportation, such as motorbikes, with a percentage of 45%, followed by trucks at 20% and buses at 13% (Setiawan, 2023). The high percentage of motorbike users cannot be separated from the public's assessment that motorbikes are still an effective and efficient mode of transportation in accommodating public mobility in Jakarta (Fikri, 2023). So, it is not surprising that motor vehicle users in Jakarta always experience an increase of 2-3% every year and continue to have the potential to increase CO in Jakarta (Hidayah, 2023).

This problem is the background for the Indonesian Government to immediately tackle the impact of air pollution in the capital city in a preventive and repressive manner. One of the massive efforts currently being undertaken by the Government is electrifying public transportation to reduce carbon emissions produced by fuel-based transportation (Hanif, 2023). Various studies state that electric transportation is more environmentally friendly because it produces lower CO or Low Carbon Emission Vehicles than conventional fuel transportation (De Angelis et al., 2022). If this policy is implemented effectively, various studies, such as the Institute for Essential Service Reform (IESR), state that the average CO per kilometer will decrease by 25%. Furthermore, IESR estimates that 2030 CO will decrease by 33% per kilometer if the Government has wholly electrified transportation (Simanjuntak & Hasjanah, 2022). Of course, this aligns with the Indonesian Government's goal of targeting zero net emissions by 2060 and realizing a sustainable transportation climate (Kementerian Keuangan Republik Indonesia, 2022).

However, the development of electric transportation in Indonesia still has many challenges, such as the economics of electric transportation, which still needs to compete with conventional vehicles (Ravel, 2021). Based on the IESR study, the government must implement several conditions to increase electric vehicle penetration and contribute to the decarbonization of the land sector. Furthermore, IESR explained that decarbonization of electricity generation must be carried out simultaneously with the increase in electric vehicles and the readiness of public electric vehicle charging stations. So that the implementation of transportation electrification to reduce decarbonization works optimally (IESR, 2020). The development of electric transportation in Indonesia, especially in DKI Jakarta, has encountered various obstacles, such as providing fiscal and non-fiscal incentives, which still need improvement (Khaerunnisa, 2023). Apart from that, the readiness for providing battery charging or Public Electric Vehicle Charging Stations still needs to be more equal compared to the amount of electric transportation. This problem is reinforced by the data findings, which can be seen from Figure 1.

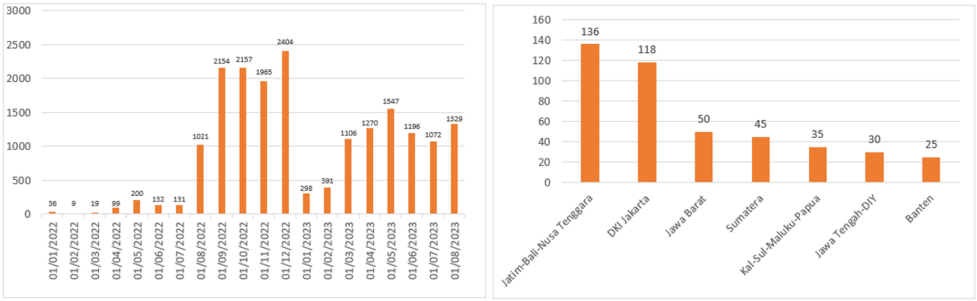

Figure 1. Comparison of the Number of Uses of Electric Transportation in Jakarta and the Number of Public Electric Vehicle Charging Stations

Source: Katadata Insight Center (KIC), 2023

Based on several problematic facts presented, the development of electric transportation is only partially optimal. This attracts researchers' attention to the public's perspective in assessing the development of transportation electrification, which the government is implementing to realize sustainable transportation. On the other hand, the government continues to encourage the electric transportation ecosystem, especially in DKI Jakarta. However, these efforts have yet to be accompanied by infrastructure as a supporting aspect, so efforts to develop transportation electrification have become a paradox. Of course, in this case, the transition from conventional transportation has negatively impacted the public's reluctance to switch to using electric transportation on the pretext of inadequate infrastructure. Public response significantly influences the development of the electric transportation ecosystem in DKI Jakarta because the image built from public responses will influence the priority choices in electric transportation.

This can be seen from several previous studies that have discussed how public response plays a vital role in assessing the implementation of transportation electrification policies in a region. Riyadi et al. (2021) research, for example, in measuring social sentiment toward electric technology, has shown that sentiment, perception, and understanding of electric vehicles influence public interest in electric transportation. According to Ramadhani and Yuliana (2023), the public's response to electric transportation on social media can also be influenced by the intensity of providing exciting information throughout omnichannel media regarding the advantages of electric transportation. Therefore, the collective role of electric vehicle technology companies and the government as policymakers must be more intense in providing information, especially on social media. Apart from the dissemination of information, field realities that have a direct impact on the public also influence public judgment (Kumar & Alok, 2020). This reality can only be assessed from several aspects of sustainable transportation.

Several previous studies have focused on the study of sustainable transportation electrification. Researchers with an ecological perspective view efforts to transition transportation from conventional to electric as the answer to the fuel crisis, which is currently causing environmental damage (Beaudet et al., 2020; Zhao et al., 2021). This view has received criticism from several researchers with an ecological perspective. These researchers explain that the negative impacts of large-scale transportation electrification can put the electricity grid under critical pressure (Kumar & Alok, 2020; Reinhardt et al., 2019; Skeete et al., 2020). This view has received support from economic researchers who explain that the electrification of transportation at its peak will drastically increase electricity demand. Therefore, economic researchers suggest a need for adaptive pricing rather than setting electricity price schemes, which are currently widely used (Adhikari et al., 2020; Feng et al., 2021; Sopjani et al., 2019). Social researchers express a similar opinion, namely that the decarbonization of electricity generation must be carried out simultaneously with the increase in electric vehicles. Furthermore, fiscal and non-

fiscal incentives must be given more attention in developing electric transportation (Austmann & Vigne, 2021).

Debates from several existing studies have concluded that previous research critically explored more and focused its studies on environmental and economic aspects. However, a comprehensive review that synthesizes and integrates findings such as public response and integrates them with dimensions of transportation sustainability such as social, environmental, and economic has yet to be identified. An in-depth review of public conversations on media platforms regarding the pros and cons of transportation electrification policies still needs to be included. Even though most Indonesian people use social media platforms to dig up the latest information, this statement is with data; the results of a survey by the Katadata Insight Center (KIC) and the Ministry of Communication and Information placed social media as the highest platform most accessed, reaching 73%. This number beats television at 59.7%, online media at 26.7%, and the official government website at 13.9% (Humaira, 2022). Unsurprisingly, social media platforms have given rise to various netizen opinions in response to the latest information.

A gap in research on electric transportation is the background for this research to attempt to develop existing transportation studies. The novelty of this research is that it will review in-depth public conversation activities on social media in response to electric transportation policies through a sustainable transportation framework. This research uses Sustainable Transportation theory as a research approach to look at public responses based on three dimensions of a sustainable transportation system. The details of this statement can be seen in Figure 2.

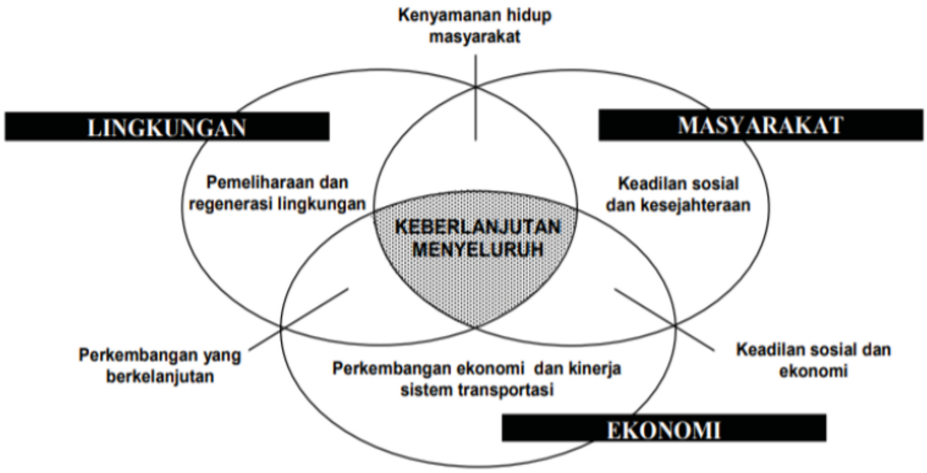

Figure 2. Interaction Between Dimensions in a Sustainable Transportation System

Source: Center for Sustainable Development, 1997

Referring to Figure 2, according to sustainable transportation theory, three dimensions need to be considered when developing electric transportation in DKI Jakarta: the environment, society, and economy. Furthermore, Sustainable Transportation theory explains that these three dimensions interact to produce output in the form of sustainable transportation. Based on this theory, transportation electrification can be sustainable if it supports environmental maintenance and regeneration, social justice and welfare, economic development, and transportation system performance. This research will link these three dimensions based on public response to transportation electrification in DKI Jakarta. The research results can show the public's assessment of transportation

electrification efforts, which are linked to the three dimensions of sustainable transportation: environment, society, and economy.

2. Methods

The method used in this research is qualitative, using a qualitative data analytics software (Q- Das) approach. Creswell and Creswell (2018) believes that qualitative research is a process of inquiry regarding understanding something to obtain data, information, text, and respondents' views using various methodologies on a problem or social phenomenon. In other words, qualitative research is a research approach that focuses on an in-depth understanding of complex phenomena in their natural context by exploring the perspectives and experiences of individuals or groups. The justification for using qualitative research is to make it easier for researchers to explore the public's response to transportation electrification policies more deeply within the scope of social media. The data collective technique in the research will utilize NVIVO 12 PLUS or qualitative research software, which helps identify public/ netizen conversations regarding specific issues on social media platforms. Three stages of data collection were carried out in this research. The first stage is to identify public conversations on all social media platforms as the primary data related to transportation electrification policies in this research. The second stage is sorting and mapping public conversation data according to platform sources and narratives built using the three dimensions of sustainable transportation theory. The third stage is mapping public conversation sentiment by referring to the results of sorting and mapping conversation data in the second stage.

After all the data has been collected, the next stage is the data analysis. In this research, data analysis techniques refer to continuous interactive analysis techniques or processes until the data becomes biased. The data analysis technique in this research was carried out in three stages. Firstly, reduction and public conversation data on social media that has been identified and mapped will be analyzed according to the three dimensions of sustainable transportation. Later, the analysis results in the first stage will produce the number, distribution, and narrative of public conversations on all social media platforms. In addition, sentiment analysis was carried out to determine the dominance of public emotions based on the three dimensions of sustainable transportation. Second, data presentation: the data that has been analyzed will be described comprehensively as results and discussed. The data presentation includes the results of analysis of the number of conversations, distribution, conversation narratives, and public/netizen sentiment, each of which has been mapped according to the three dimensions of sustainable transportation. The third conclusion is that the data analyzed and mapped according to the three dimensions of sustainable transportation will be interpreted to determine the public response to transportation electrification policies. Apart from that, the research results will see whether the public within the scope of social media views the electrification policy as sustainable in DKI Jakarta.

3. Results and Discussion

3.1. Public Responsiveness in the Social Dimension

The Indonesian Government's commitment to achieving zero net emissions by 2060 and realizing a sustainable transportation climate has encouraged the government to increasingly campaign for electric transportation at the central and regional levels, including DKI Jakarta (Parikesit, 2019). As one of the areas with a poor air quality index, transportation electrification seems to be a solution to overcoming air pollution caused by dense transportation activities (Parinduri et al., 2018). An ecosystem for the use of electric transportation is a goal that needs to be implemented as quickly as possible among the public of the capital city of Jakarta.

This goal can be seen from the massive efforts made by the government, such as building supporting infrastructure for SPKLU and providing subsidies for the purchase of electric transportation (Hartawan, 2023). In addition, efforts to accelerate the electric transportation ecosystem have encouraged the DKI Jakarta Government to require DKI officials and appeal to ASN to transition their transportation to electricity (Kurniawan & Ferdian, 2023). The massive campaign carried out by the government has given rise to various pro and con opinions from various groups as a response to policies to reduce air pollution in the capital city of Jakarta (Efendi, 2020).

Pros and cons debates occur in the public sphere; some of the public think optimistically that electric transportation can reduce air pollution by producing a lower carbon footprint compared to transportation with an internal combustion engine (Lesmana et al., 2021). So, the environmental impact of electric transportation, according to the Institute for Essential Service Reform (IESR), can potentially reduce the average CO per kilometer by 25% (Hasjanah & Simanjuntak, 2023). However, this policy is viewed by some of the public with skepticism, even by WALHI National, which believes that the government is only looking "downstream" without paying attention to the energy source for electric transportation which comes from the Batu Baru Steam Power Plant (PLTU). WALHI criticized efforts to overcome poor air quality through electric transportation policies as a "false solution" if transportation electrification is carried out without being accompanied by an energy transition (BBC News Indonesia, 2023). This view is not without reason; PLTU is the second largest contributor to poor air quality in the capital city after the transportation sector. This is because there are 10 PLTUs spread across Banten and West Java Provinces or close to the capital city.

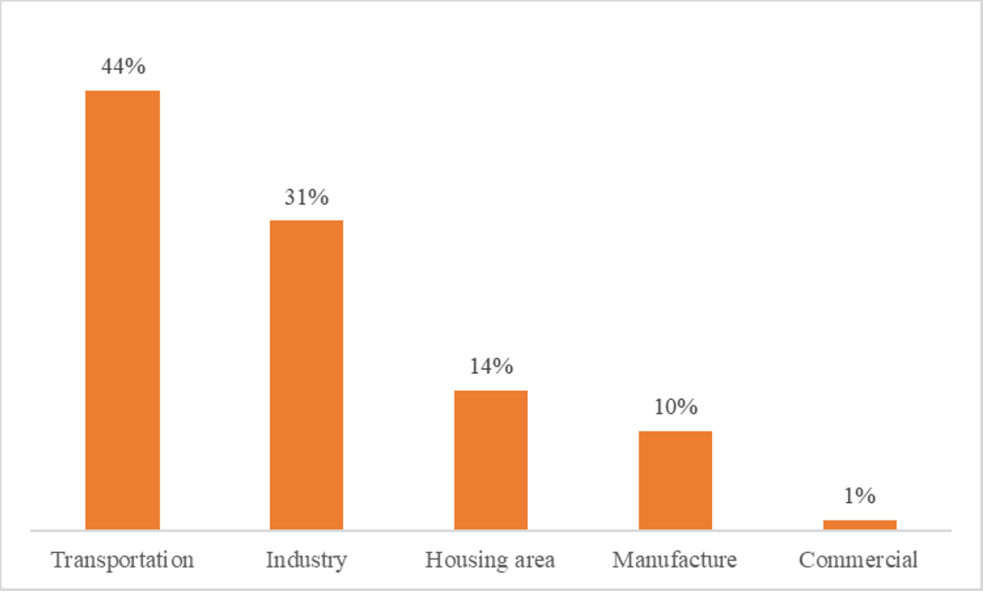

Figure 3. Distribution of Coal-Fired Power Plants and Sources of Pollution in the Capital City of Jakarta

Source: Katadata Insight Center (KIC)

The distribution of PLTU data and pollutant sources in the Capital City in the picture above is concrete evidence that the energy source for electric transportation is the second largest contributor to air pollution in the Capital City. This is a paradox in the policy itself; instead of reducing air pollution through electric transportation, the government is opening up the potential for increasing pollutants produced by the coal-fired power plant industry. This is what Walhi National calls a "false solution" if an energy transition does not accompany the transportation transition. Other observers, such as IESR, advised the government not to use electric transportation

as the only solution to reduce air pollution in the capital city. The fuel transition from Euro 2 to Euro 4 is recommended as an alternative to reduce air pollution because it only has a minimum RON of 91, is lead-free, and has a maximum sulfur content of 50 ppm (Haryanto, 2022). This fuel is considered to have very low emissions compared to Euro 2, which is currently still widely used for transportation in the capital city, which has relatively high emissions (Aziz et al., 2020; Parinduri et al., 2018). The various public views in the capital city of Jakarta will be the most discussed on social media until the end of 2023 (Iscahyono & Kusumantoro, 2023; Risalbi et al., 2021; Yasa et al., 2021). This can be seen from the total number of public activities on social media related to electric transportation and its impact on the social dimension, amounting to 36,985 posts. This number makes DKI Jakarta the highest area discussing electric transportation issues.

Referring to the distribution data above, the public in DKI Jakarta dominates the conversation about transportation electrification policies more than other regions in Indonesia. This cannot be separated from environmental issues that have encouraged the government to transition from conventional to electric transportation as a response to overcoming poor air quality in the capital city (Azizah et al., 2019; Rahim et al., 2022; Raksodewanto, 2020). This indicates that the response to electric transportation policy is not only widely discussed at the elite and observer level, but at the public level, electric transportation policy has become an attraction for discussion, especially on social media. In the following discussion, this research will analyze the public response to DKI Jakarta by dividing the discussion according to other dimensions of sustainable transportation, namely economic and environmental dimensions. Later, we will see the public's perspective and monitor and evaluate electrification policies in the capital city that fulfill environmental transportation elements. The following discussion that will be analyzed is the public response in the economic dimension.

3.2. Public Response in Economic Dimensions

The transition from conventional to electric transportation not only aims to have a positive impact on the environment through the advantages of electric transit but is also expected to have a positive impact on the economic sector and increase welfare (Trinko et al., 2023). The government is of the view that the acceleration of electric transportation will have a positive impact on optimizing the use of nickel, which is abundant in Indonesia, as a raw material for batteries. With large nickel reserves,

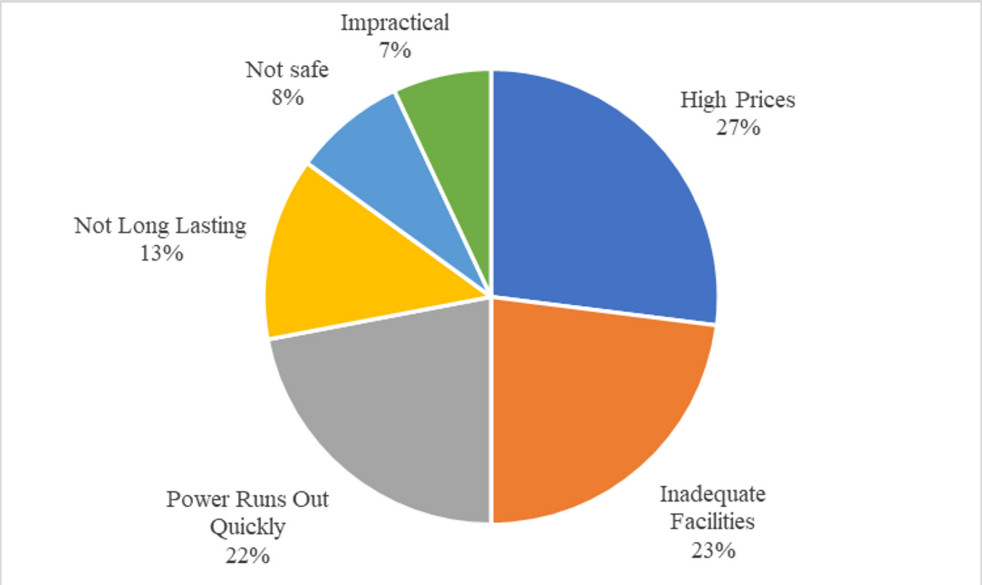

Figure 4. Justification for the Use of Electric Transportation in DKI Jakarta

Source: Katadata Insight Center, 2022

Indonesia is highly attractive to global battery cell and electric car manufacturers (Ginastiar, 2024). In its development, Indonesia needs foreign investment to obtain capital or capital for domestic growth and uses foreign technology. The process of accelerating electric transportation in Indonesia has challenges; the battery processing process, which requires high-tech processing and costs a lot of money, has implications for the high price of electric transportation and its components (Muhammad & Maulana, 2024). The impact influences the public to transition from conventional to electric transportation. This is proven by the results of a public opinion poll conducted by KIC, which found that the high price of electric transportation is still the reason the public uses electric transportation in DKI Jakarta.

Based on Figure 4, it is evident that the high price of electric transportation is the main factor that the public in the capital city of Jakarta still needs to transition from conventional to electric transportation. The issue has attracted the government's attention, which shares the view that one of the obstacles to electricity transportation is the significant price disparity that hinders people's purchasing ability (Rayanti, 2023). This problem encourages the government to explore solutions to accelerate the electric transportation ecosystem. One of the efforts provided is providing incentives for electric transportation through the legal umbrella of Presidential Regulation No. 79/2023 (Aszhari, 2023). Providing this incentive is expected to boost sales and use of electric transportation in Indonesia. Technically, in the first year, the government provided incentives for purchasing new electric motorbikes that amounted to Rp7 million for 200,000 motorbikes. Then, incentives were also given to 7 million for 50,000 units of petrol motorbike conversion to electric. The government provides incentives and a series of other programs to accelerate the electric transportation ecosystem (Sari & Djumena, 2023).

Apart from that, acquiring capital goods in the form of machinery, fiscal incentives such as tax holidays and factory equipment for the motor vehicle industry, and tax incentives with zero percent PPnBM are alternative government efforts besides providing incentives for purchasing electric transportation (Dewi et al., 2022; Luqman Sayoko et al., 2023; Pusparini et al., 2023). PLN also plans to give discounts on electricity rates for electric transportation owners (Sari & Djumena, 2023). These various programs align with the Paris Agreement, which limits the increase in global air temperature to a maximum of 1.5 degrees Celsius so that the world can avoid the impacts of global warming by building an electric vehicle ecosystem (Gota et al., 2019). In the economic aspect of Indonesia, a number of these programs aim not only to realize low-emission transportation but also to reduce

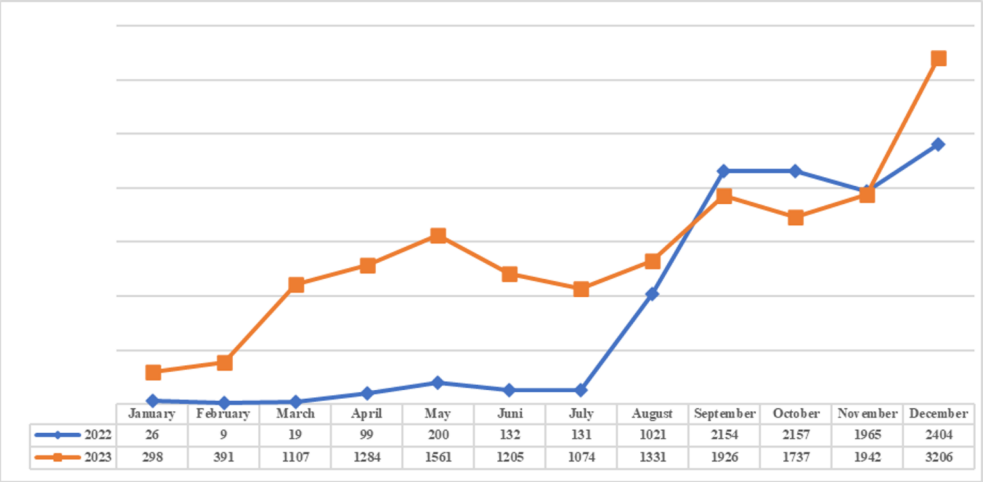

Figure 5. Sales of Electric Transportation in DKI Jakarta 2022–2023

Source: Katadata Insight Center (KIC), 2023

petroleum imports, make the APBN healthy, and support sustainable development policies (Padhilah, 2023). After implementing these various programs, positive influences began to be seen from the trend of increasing purchases of electric transportation in the capital city of Jakarta until the end of 2023.

Referring to Figure 5, after the government gave incentives at the beginning of 2023, a trend of increasing sales of electric transportation began to be seen until the end of 2023. At the end of 2022, the number of sales was only 2404 units. However, after the incentives were given in 2023, increasing sales increased until the end of 2023 with a total of 3206 units. This indicates rising public interest in DKI Jakarta's switching to electric transportation. Even so, significant questions arise regarding the government's readiness to prepare other supporting aspects of electric transportation, such as the distribution of the number of SPKLU, the durability of electric batteries, and the availability of electric transportation services and spare parts. Moreover, these supporting aspects not only influence public interest but also the smooth running of activities that directly impact the economy and public welfare. Starting from this problem, researchers tried to analyze public conversation activities via social media by linking these aspects as a reference in viewing the results of public conversations. As a result, the dominant public still questions SPKLU and inadequate battery charging estimates with a tone of negative sentiment that dominates.

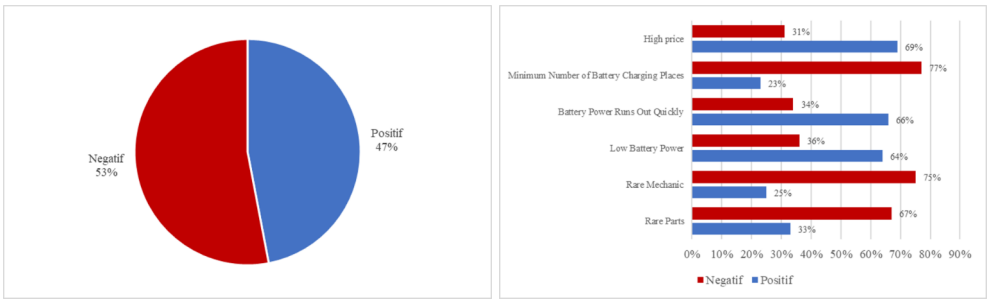

Figure 6. Public Conversation Sentiment on the Economic Dimension and Number of SPKLU in Indonesia

Source: NVivo 12 Plus, 2024

Referring to Figure 6, negative sentiment dominates public conversation in the capital city via social media. The public dominates in questioning the inadequate SPKLU in the capital city, with negative sentiment or public dissatisfaction with existing facilities at 77% compared to positive sentiment at 23%. Apart from that, it is known that by 2023, there will be 113 SPKLU spread across 43 locations in DKI Jakarta. This number had increased compared to 2022, when there were only 110 SPKLU spread across various locations in the capital city of Jakarta. However, the public considers that the number of SPKLUs has contributed little to filling the energy source for electric transportation. Even though there are other charging alternatives, such as battery exchange, this has yet to contribute much as an alternative method for charging the battery. Another complaint that can be identified in public conversations via social media is that the battery charging time is relatively longer than conventional fuel charging, namely, 1 hour to 15 hours to charge the battery, depending on the battery capacity entirely.

This problem certainly has a direct influence on public economic activities. It cannot be denied that the role of transportation has become very vital in accommodating public economic activities. Even the increase in fuel prices for conventional transportation has significantly contributed to the rise in the prices of necessities. This is an example of how transportation is essential in activities and accommodating the economy (Apriyani, 2023). The transition phase of transportation from conventional to electric will not only transition transportation as an effort to overcome poor air quality. Still, it can also accommodate all public

economic activities whose role has long relied on conventional transit. The discovery of problems such as the limited number of SPKLUs and estimated charging times is one of the obstacles that the government needs to pay attention to accelerate the creation of an electric transportation ecosystem in the capital city of Jakarta.

3.3. Public Response in Environmental Dimensions

Since the issue of electrification began to be raised by the government in 2022, it was recorded that until the end of 2023, the number of exposures related to environmental issues (air pollution) and efforts to overcome them through electric transportation in the capital city had been discussed by the public on social media with 28,954 posts on all social media platforms. In 2022, the number of public conversations on social media will reach 33,358 posts, with details for the first semester (January-June 2022) reaching 18,175 posts and the second semester (July-December) reaching 15,183 posts. Discussions about the electrification of transportation and environmental issues in the capital city will continue to be discussed on social media in 2023. However, the number of conversations in 2023 tends to decrease compared to the previous year, namely only 13,411 posts on all social media platforms. Details of public discussions in 2023 in the first semester (January-June 2023) reached 6,623 posts, and in the second semester (July-December), reached 6,788 posts.

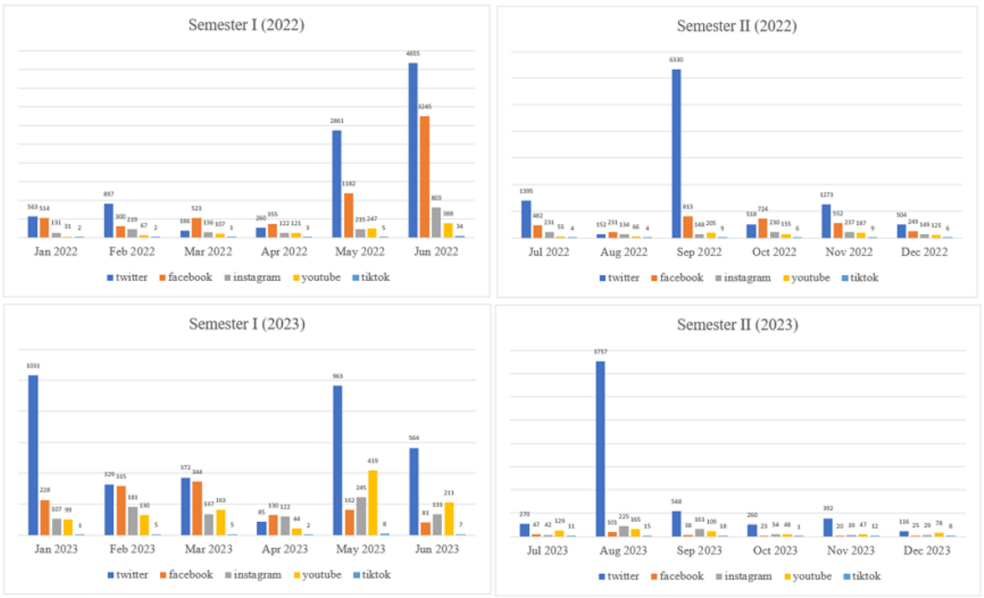

Figure 7. Number of Public Exposures Related to Transportation Electrification and Environmental Issues (Air Pollution)

Source: NVivo 12 Plus Analysis Results, 2024

Referring to Figure 7, the Twitter platform is one of the five social media platforms most actively used by the public to provide views on transportation electrification policies and environmental issues in the capital city of Jakarta. The growth of conversations on the Twitter platform is different every year and semester. In the first semester of 2022, the highest number of conversations was in June, with 4,655 posts, while in the second semester, the number increased to 6,330 posts. In 2023, public discussions regarding transportation electrification policies and environmental issues will decline in the following year. In the first semester, the highest number of conversations was in January, with 1,031 posts, and the number continues to fluctuate every month. However, in the second semester, conversations increased in August. However, the number of conversations continues to decline in the following months until the end of 2023.

Furthermore, in this research, all the various public views have been summarized into five issues often discussed by the public regarding the environment, and these issues are grouped into two positive and negative groups (Chaharani & Nurjaman, 2022; Maulida, 2021). Positive issues usually addressed by the public on social media are the positive impacts of using electric transportation, such as low emissions, minimal air pollution, minimized fuel use, instant torque, and reduced air pollution (Morton et al., 2017). Meanwhile, negative issues that are often discussed by the public are the negative impacts of using electric transportation, such as increased air pollution resulting from PLTUs, excessive use of electricity sources, electric transportation batteries that cannot be recycled, the impact of tailings waste and the ecological impact that resulting from nickel production.

Figure 8. Pros and Cons of Public Conversation Regarding Transportation Electrification Policy and Environmental Issues in the Capital City of Jakarta

Source: NVivo 12 Plus Analysis Results, 2024

Figure 8 above shows the differences in the dominance of pro and con conversations regarding transportation electrification policies and environmental issues in the capital city of Jakarta. The public who views the electrification of transportation as a pro is more dominant in discussing the advantages of electric transportation, such as low emissions with a percentage of 50%. One of the conversations quoted and sourced on the Twitter platform narrates the potential contribution of electric transportation in overcoming air problems in the capital city. An account called @piotrj provides data evidence to strengthen its argument by calculating and comparing CO2/KM emissions produced by electric transportation with conventional/fuel transportation. A different conversation was shown by the public, who were against the transportation electrification policy in the capital city. The dominant issue that is most frequently discussed is related to the negative impact resulting from the energy source for electric transportation via coal-fired power plants, with a percentage of 69%. One of the conversations quoted and sourced on a Twitter platform called @msaid_didu narrates his criticism of the government regarding the ambiguity of the policy of reducing air through electric transportation, whose energy source is also a significant contributor to pollution in the capital city of Jakarta.

The public's comprehensive pros and cons can also be seen in the results of sentiment analysis to determine the public's emotions towards air pollution prevention policies and the government's commitment to protecting the environment through the transition to electric transportation. Public sentiment is measured by the potential impacts of electric transportation on the environment, such as low exhaust emissions, energy efficiency, reduced carbon emissions, low noise, no fluid leaks, and renewable energy incentives (Farzaneh et al., 2019). So, the results comprehensively look at the public's assessment of electric transportation policies in the capital city. As a result, the public gave an upbeat assessment of the transportation electrification policy in the capital city, and only a tiny portion of the public gave a negative evaluation. Specifically, five of the six indicators of the impact of electric transportation on the environment are assessed as positive by the public, and only one indicator is evaluated as unfavorable by the public.

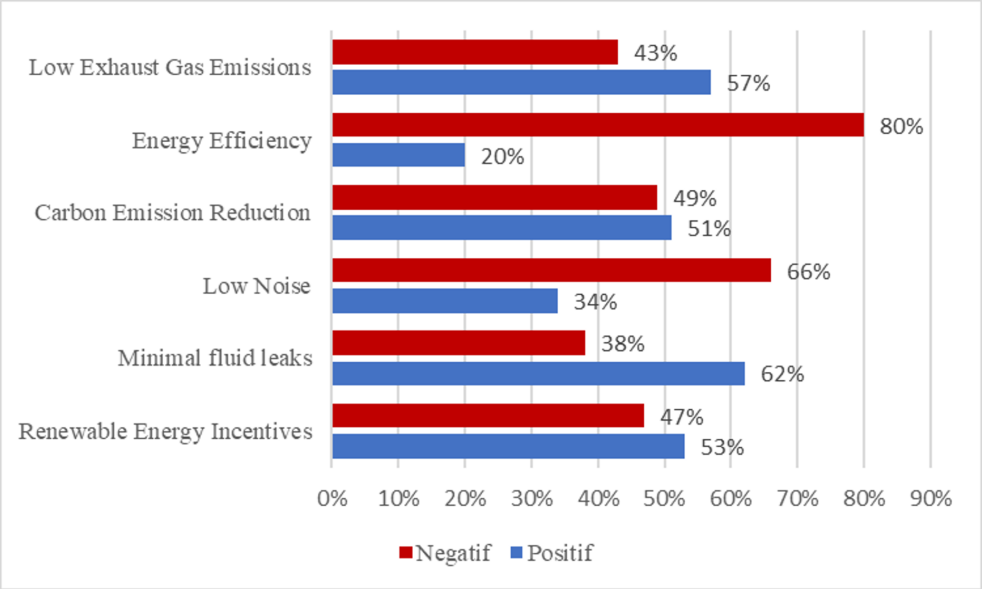

Figure 9. Results of Sentiment Analysis of Electrical Transportation Policy in the Capital City of Jakarta

Source: NVivo 12 Plus Analysis Results, 2024

Based on the analysis above, the five indicators that dominate positive sentiment include low exhaust emissions, reduced carbon emissions, low noise, no fluid leaks, and renewable energy incentives. The results of these five indicators indicate and provide public validation of the positive impacts resulting from electric transportation. More than that, these results also show the public's optimistic attitude towards the transition to electric transportation as a step towards realizing sustainable transportation and an effort to overcome the problem of poor air quality in the capital city. Despite receiving relatively dominant positive assessments, negative assessments were also given by the public to energy efficiency indicators. The public criticizes that if a massive transportation electrification policy is implemented, it will require excessive electricity use. This is seen as inefficient and creates new problems that previously stemmed from excessive fuel use.

Thus, public discourse on electric transportation as sustainable transportation has included many aspects and points of view, such as performance reliability, which can be seen from the public debate, which responds skeptically that the presence of electric transportation does not yet have adequate reliability and performance, such as battery charging times tend to be long and charging infrastructure such as SPKLU has not accommodated much. Other advantages, such as environmentally friendly transportation, are believed by the majority of the public to reduce pollution in the capital city compared to conventional transit. However, most environmental observers believe that the energy sources used to produce electricity are among the most significant pollutants in the capital city. Furthermore, the electrical energy used has received public attention because it is considered inefficient and creates new problems due to excessive electricity use. A joint role is needed by policymakers and other stakeholders, such as the automotive industry, to consider electric transportation's opportunities, challenges, and potential to shape public policy and the direction of sustainable technological development.

4. Conclusion

Based on the analysis described in the results and discussion, the public does not fully view the transportation electrification policy in DKI Jakarta as sustainable. It refers to three dimensions of sustainable transportation: social, environmental, and economic. In the social dimension, the public criticizes the policy of transitioning

transportation to electricity without being accompanied by an energy transition as a "false solution." This skeptical response is based on the fact that electric transportation energy sources are the second largest contributor to air pollution in the capital city. This is a paradox in the policy itself; instead of reducing air pollution through electric transportation, the government is opening up the potential for increasing pollutants produced by the coal-fired power plant industry. Skeptical responses are also seen in the economic dimension, closely related to the social dimension. However, there has been a positive trend or increase in the purchase of electric transportation since the government provided the incentives. The public views that the massive electric transportation ecosystem built by the government has yet to be supported by supporting aspects such as the availability of SPKLU in DKI Jakarta. In addition, the estimated battery charging time, which is relatively long compared to refueling conventional transportation, is considered to hamper and influence public economic activities. In the environmental dimension, the public criticizes that if a massive transportation electrification policy is carried out, it will require excessive electricity use. This is seen as inefficient and creates new problems that previously stemmed from excessive fuel use. Even though the majority received negative or skeptical responses, the public remains optimistic that electric transportation, through its advantages such as low exhaust emissions, energy efficiency, reduced carbon emissions, low noise, no fluid leaks, and renewable energy incentives, has the potential to realize sustainable transportation and efforts to overcome problems—poor air quality in the capital city. The various negative public assessments that have been described need to be a special note for policymakers to find solutions for alternative energy sources that are more effective and efficient and support aspects that are friendlier to the environment. Future research could look at factors influencing public acceptance of electric vehicles, including consumer preferences, perceptions of reliability and range, and infrastructure preferences. This research agenda will help address some of the critical challenges currently hindering the widespread adoption of electric vehicles and accelerate progress towards more environmentally friendly and economically efficient sustainable transportation.

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