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Analysis of the Influence of Marketing Effort and Facilitating Condition on Purchase Intention using Customer Perceived Value Theory: An Empirical Study in Indonesia's Electric Vehicle Market

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Despite electric vehicles (EVs) offering a more sustainable transportation solution, their growth in Indonesia remains constrained, reflected in a market share of less than 1% in 2023. This study examines how marketing efforts and infrastructure support influence consumer decisions in considering EV purchases, taking into account their perceptions of benefits, risks, and overall value of electric vehicles. Through an in-depth survey of 215 potential buyers from various socioeconomic backgrounds and analysis using statistical modeling, this research reveals that effective marketing strategies not only enhance consumer understanding of EV benefits but also successfully reduce their concerns, while the availability of supporting infrastructure such as charging stations proves more effective in reducing consumer anxiety than directly increasing perceived benefits. Consumers' assessment of EVs' overall value emerges as the key factor driving purchase intention, explaining more than half the variation in consumer decisions. This research provides fresh insights into how Indonesian consumers evaluate new transportation technology requiring significant investment, while highlighting the importance of coordinated infrastructure development, balanced marketing communications, and business model innovations to address financial barriers in accelerating the transition toward more sustainable mobility in Indonesia.

1. Introduction

The global commitment to address climate change through the Paris Agreement has catalyzed significant policy developments in the transportation sector. The International Transport Forum (ITF) reports that road transport accounts for over one-fifth of global carbon dioxide emissions, making vehicle electrification a critical pathway for emissions reduction (ITF, 2021). This has led major economies to adopt regulations aligned with achieving 100% zero-emission vehicle (ZEV) sales for new light-duty vehicles by 2035, with initiatives like the ZEV Declaration and Global Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles now representing approximately one quarter of the global new vehicle market in 2023 (ICCT, 2023).

The implementation of ZEV policies has primarily manifested through the adoption of electric vehicles (EVs), which has seen remarkable growth driven by technological advances, policy support, and environmental awareness (ICCT, 2024). While significant increases in EV market shares have been observed across multiple regions, with notable growth in countries like Thailand and Vietnam for passenger cars, and Canada, the United Kingdom, and Chile for buses, regional disparities in policy implementation present ongoing challenges (ICCT, 2024). This is evident in emerging markets like Indonesia, which is striving to establish itself as a key player in the EV market within the Southeast Asian region (Budiono and Virgianita, 2024).

The adoption of electric vehicles (EVs) in Indonesia over the past five years also has shown a promising upward trajectory, driven by concerted government efforts and market dynamics (Kemenkomarves, 2023) . This growth is reflected by the numbers of electric vehicle sales in 2024 that shown in the figure 1 below.

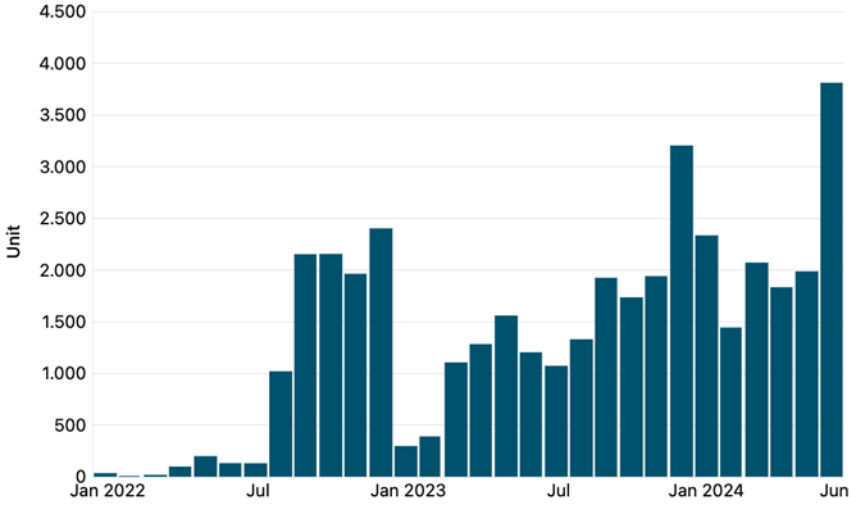

Figure 1. Monthly Wholesale Sales Volume of BEV Electric Cars in Indonesia

period January 2022 - Juni 2024

Source: (databoks, 2024)

In figure 1, we can see that the wholesale sales of BEV electric cars in Indonesia increased in 2024 compared to 2023 (month-on-month). The growth trajectory of BEV sales in Indonesia has been remarkable over the past few years. While there were no recorded wholesale BEV sales in the domestic market during 2018-2019, the market began to emerge in 2020 with a modest 120 units. From January to December 2023, the total wholesale sales reached 17,060 units, which is 65.2% higher than the 10,330 units sold during the same period in 2022 . This growth continued significantly, reaching approximately 13,400 units in Q2 2024 . This expansion has been supported by significant tax reductions, such as the reduction of the luxury tax for electric cars and a 1% tax incentive, making EVs more accessible to the average consumer. Based on IESR report in 2023, these subsidies and incentives have played a critical role in fostering a supportive ecosystem for EV adoption (IESR 2023) .

Despite these advancements, the EV market in Indonesia faces several challenges compared to global leaders. The country’s EV infrastructure, particularly charging facilities, remains underdeveloped, which hinders wider adoption. Moreover, while the government has introduced several incentives, there is a need for more comprehensive policy reforms to enhance their effectiveness. For instance, comparisons with neighboring Thailand reveal that Indonesia's policies are less aggressive, as Thailand offers more substantial incentives and has a more developed charging infrastructure (industry.co.id, 2024) . As Indonesia continues to expand its EV market, addressing these infrastructural and policy gaps will be crucial to sustaining its growth trajectory.

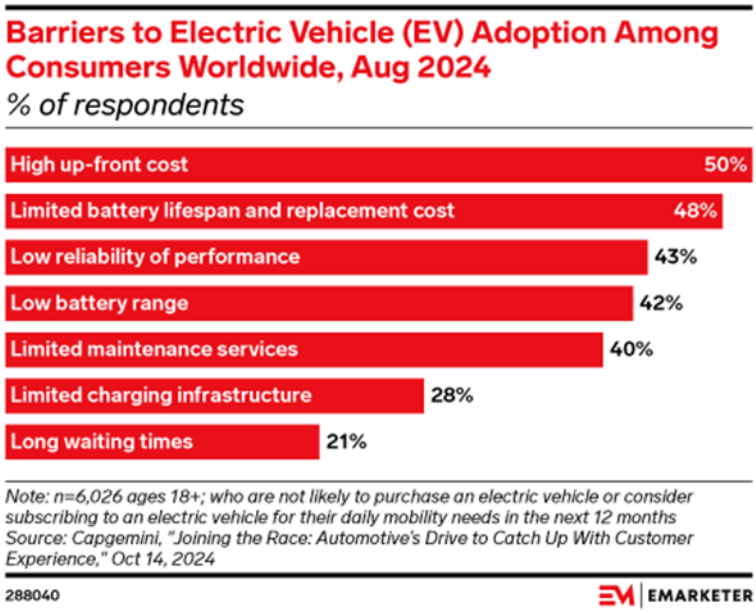

Figure 2. Barriers to EV Adoption among Consumers Worldwide

Source: EMARKETER, 2024

A global survey conducted by Capgemini in August 2024, involving 6,026 respondents aged 18 and above, reveals significant barriers to electric vehicle (EV) adoption among consumers worldwide, as shown in figure 2. above. The study identifies that financial considerations dominate consumer hesitation, with 50% of respondents citing high up-front costs as the primary barrier. Technical limitations also play crucial roles, as 48% express concerns about battery lifespan and replacement costs, while 43% worry about performance reliability. Infrastructure-related challenges persist, with 42% concerned about low battery range, 40% noting limited maintenance services, and 28% highlighting insufficient charging infrastructure (Capgemini, 2024).

Further analysis of the Indonesian market specifically reveals similar yet more pronounced adoption barriers. According to Indonesia Electric Vehicle Outlook (IEVO) 2023 by IESR, electric vehicle adoption in Indonesia showed remarkable growth in 2022, with both electric motorcycles (E2W) and electric cars (E4W) experiencing a 5-4 fold increase compared to 2021. However, despite this growth, adoption rates remain significantly below the Nationally Determined Contribution (NDC) targets set under the Paris Agreement for reducing transport emissions (IESR, 2023b).

A result of a survey by Databoks in 2023, as pictured in figure 3, shows that charging infrastructure availability is the primary concern, with 71.2% of Indonesian respondents citing difficulties in finding charging stations (SPKLU). The high purchase price remains a

significant barrier for 62% of potential buyers, while 52% express concerns about limited driving range. Battery-related issues, including replacement costs and maintenance, concern 46.6% of respondents, and charging duration is problematic for 32.4%. Performance and safety considerations affect 28.6% of potential adopters, while limited model choices influence 10.2% of respondents. These statistics align with the global trends while highlighting Indonesia's unique challenges, particularly in charging infrastructure development and accessibility.

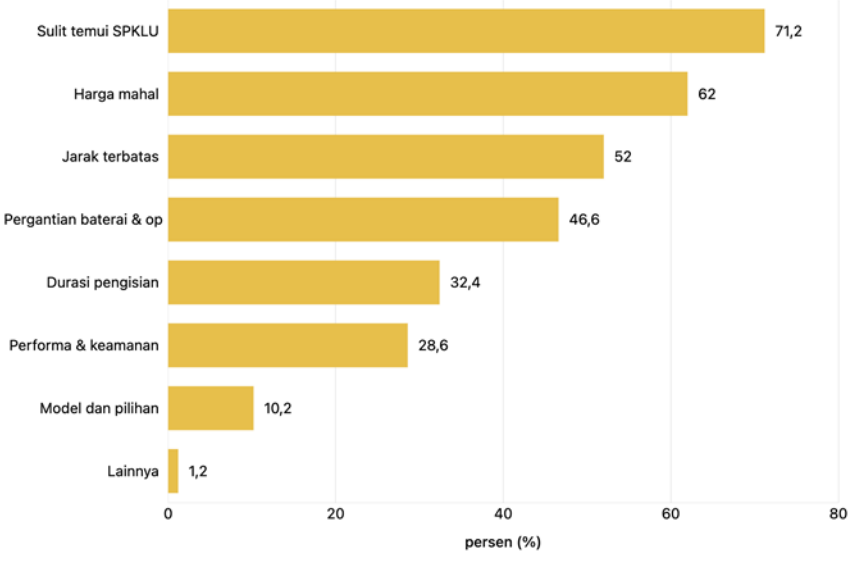

Figure 3. Barriers to Electric Vehicle Adoption in Indonesia (2022)

Source: databoks, 2023

With the concerning condition above, in this study, we will explore and analyze several key variables that are suspected to influence the purchase intention of electric vehicles (EVs) in Indonesia. Firstly, we consider the perceived benefits of EVs, which are the positive aspects that potential buyers can benefit from these vehicles. Benefits include environmental friendliness, reduced air pollution, and economic advantages such as lower running costs. Recent research has indicated that EVs can help reduce CO2 emissions even without rapid decarbonization of the energy sector globally (Schnell et al., 2021). The silent operation of EVs also contributes to a quieter urban environment, which is another appealing benefit for consumers. Widespread adoption of EVs could potentially lead to an increase in renewable power generation, thereby reducing the carbon intensity of the power system (He et al., 2019). Additionally, EVs often have lower running costs compared to conventional vehicles due to cheaper electricity prices and reduced maintenance needs (Boulanger et al., 2011; Rapson and Muehlegger, 2023).

Purchasing products like EVs which contain relatively new technology requires customers to consider the risks more carefully. Perceived risk associated with EV's are the concerns or potential downsides that buyers might worry about. Common risks include the limited driving range of EVs, which can cause "range anxiety" for drivers concerned about running out of power (Lim et al., 2015; Pevec et al. 2020; Shrestha et al. 2022). The availability of charging infrastructure is another major concern, as insufficient charging stations can make it difficult for owners to charge their vehicles conveniently (Salah and Kama, 2016; Nguyen et al., 2022). Moreover, the higher investment and upfront cost of EVs compared to traditional vehicles can be a deterrent for many consumers (Hardman et al., 2021).

With perceived risk came into assessment, perceived benefits as a critical variable that balances against the perceived risks, will shape customers' perceived value of EVs. This assessment of perceived benefits takes into account the current advancements in EV technology, such as improvements in battery life and charging speed (Asfani et al., 2020). It also considers the increasing foreign investments in the Indonesian EV market and the positive news coverage about EV usage, which can enhance consumer confidence and interest in EVs (Damayanti et al., 2020; Wicaksono et al., 2021). As more people experience the benefits of EVs and share their positive experiences, the overall perceived value of these vehicles increases.

Another factor that is included in the consideration is facilitating conditions which are the external factors that support the adoption of EVs. In Indonesia, the development of the EV market faces several challenges. These include the need for a widespread and reliable charging infrastructure, government policies and incentives to make EVs more affordable, and public awareness campaigns to educate consumers about the benefits of EVs (Syamnur et al., 2019; Yuniza et al., 2021). The readiness of the local automotive industry to produce and support EVs is also a critical facilitating condition (Kar et al., 2013; Deng et al., 2020; Yozwiak et al., 2022).

Understanding the suggested factors that can influence consumer interest in purchasing EVs is crucial for the successful adoption of these vehicles. Studies by Liao et al. (2017) shows that various variables such as incentives, environmental concerns, and technological advancements play a significant role in shaping consumer preferences towards EVs. This result is also supported by research from Utami et al. (2020), which found that adoption intention of EVs in Indonesia is influenced by various factors, including incentives, business opportunities, and the overall perception of electric vehicles.

Lastly, as the EV market grows, consumers are seeking more information and reassurance

about the benefits and practicality of EVs. The marketing efforts of automotive companies play a significant role in attracting potential EV buyers. Kendall Smith, Senior Director Business Development of Nielsen Auto Team highlights the need for innovative marketing strategies to drive the adoption of electric vehicles (EVs) as marketing efforts. While companies are investing heavily in marketing campaigns to highlight the benefits of EVs and address consumer concerns like, for example, by offering test drives to allow potential buyers to experience the performance and convenience of EVs firsthand. according to Smith, effective marketing must also address key concerns such as cost, charging infrastructure, and environmental impact. He then continued that to succeed, marketers should leverage digital platforms, provide clear and compelling information, and focus on building trust and awareness among potential buyers. Engaging and educating consumers through targeted campaigns and partnerships will be crucial in accelerating the EV revolution (Nielsen, 2021) . By investigating these variables, this study aims to understand the factors that influence the intention to purchase EVs in Indonesia and provide insights into how to effectively promote EV adoption in Indonesia.

Despite the growing trend in electric vehicle (EV) adoption, the purchase intention for EVs in Indonesia remains relatively low compared to other countries. As shown in Table 1. below, in 2022, Indonesia's EV sales reached over 15,000 units, marking a significant increase from previous years and followed by consistent growth in the following years, but still representing a small fraction of the global market (below 1%).

Table 1. Global EV Sales vs Indonesia EV Sales

Year	Global EV Sales	Indonesia EV Sales	%
2021	6.774.000	3.159	0,05%
2022	10.524.000	15.427	0,15%
2023	14.194.000	69.625	0,49%
2024Q2	6.202.947	38.259	0,62%

Source: Data compile by author, 2025

In contrast, according to IEA's Global EV Outlook 2023 (IEA, 2024b) and EV Volumes (2024) , global electric vehicle (EV) sales continued to grow, with a 22% year-on-year increase in combined BEV and PHEV sales during the first half of 2024, as shown on Figure 4 below. According to EV Volumes, China remains the global leader, accounting for 60% of global EV sales in the first half of 2024, with BEVs and PHEVs representing 46% of the Chinese new-car

market in June 2024.

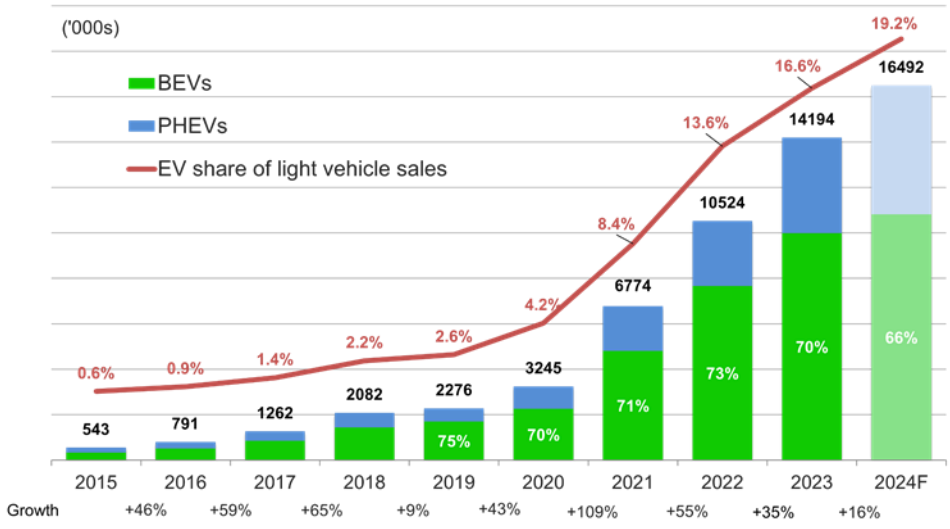

Figure 4. Global Sales of New EV (2015 - 2024 Forecast)

Source: EV-Volumes, 2024

Although Indonesia's EV market shows promising growth, global EV markets have shown varying trends in 2024. Europe has experienced stagnating EV sales, with just a 1% increase compared to last year, due to reduced subsidies and a shift in focus toward charging infrastructure development. Meanwhile, the U.S. market demonstrated stronger performance with a 12% rise in EV sales during the first half of 2024. According to EV Volumes forecasts, global EV sales are expected to reach 16.5 million units in 2024, with China leading at 10 million units, followed by Europe at 3.3 million units, and North America at 2 million units. When comparing these figures to the data shown in Table 1.1, Indonesia's relatively modest sales numbers highlight several key challenges that need to be addressed to accelerate local EV adoption and enhance consumer purchase intention, including infrastructure development, cost considerations, and prevailing consumer perceptions and purchase intention.

Based on the above discussion, this research addresses two distinct types of gaps in the context of EV adoption in Indonesia. First, a significant business gap exists between current EV adoption rates and international sustainability targets, as evidenced by IEA data showing that global EV sales need to reach 60% by 2030 compared to current rates of 14% (IEA, 2023:42). This gap is particularly pronounced in Indonesia, where low purchase intention for EVs presents a critical challenge for meeting international sustainability standards. Second, several research gaps persist in understanding EV adoption barriers, as conceptualized by

Adu and Miles (2023:75-77), including evidence gaps in establishing causal relationships between adoption factors, methodological gaps in approaching the problem comprehensively, and theoretical gaps in understanding the interplay between various adoption barriers. While existing surveys by Milieu Insight and Deloittee have provided descriptive insights into factors such as charging infrastructure, costs, and consumer awareness, there remains a critical need for research that investigates the causal relationships between these factors. This study aims to address both the business and research gaps by examining these causal relationships to better understand and address the barriers to EV adoption in Indonesia, ultimately contributing to both practical solutions for increasing EV adoption and theoretical understanding of adoption barriers in emerging markets.

This study aims to examine the factors that influence electric vehicle (EV) purchase intention in Indonesia. Using the Consumer Perceived Value Theory framework, this study highlights the role of perceived benefits and perceived risks, and adds facilitation conditions from UTAUT and marketing mix elements to evaluate the effectiveness of EV marketing. This study aims to determine whether marketing efforts and facilitation conditions are able to shape consumers' perceptions of benefits and risks. In addition, this study also investigates whether perceived benefits, perceived risks, and perceived value act as mediators in the relationship between marketing efforts and facilitation conditions on EV purchase intention.

2. Method

A research paradigm is a philosophical framework that guides how researchers understand and examine a phenomenon (Collis & Hussey, 2021). This paradigm determines the approach, method, and way of interpreting data (Radjab & Jam'an, 2017; Bell et al., 2019). This study uses a positivist paradigm, which considers reality to be objective and measurable. This approach is appropriate because this study analyzes the causal relationship between factors that influence electric vehicle (EV) purchase intentions in Indonesia using quantitative methods such as surveys and statistical analysis (Creswell, 2019).

Research Object and Subject

This study focuses on the behavior, perception, and purchase intention of Indonesian consumers towards electric vehicles (EVs). The objects of study include key factors such as perceived benefits and risks, marketing effectiveness, and the role of facilitating conditions in the EV market in Indonesia. The subjects of the study are vehicle users in Indonesia who have

not yet purchased an EV, but have the financial ability to do so. They come from various demographic backgrounds, with an emphasis on the middle to upper segments that are in line with the cost of EV ownership. The selection of these subjects aims to explore relevant understanding of EV adoption factors in the Indonesian automotive market.

Population and Sample of the Study

The population in this study includes all consumers in Indonesia who have the financial ability to purchase electric vehicles (EVs). They come from various age groups and backgrounds, with a focus on the middle to upper class segment who have an interest in environmentally friendly transportation technology and access to EV charging facilities.

The sample was drawn from the population using a stratified random sampling method, based on characteristics such as age, income, and geographic location. To ensure valid results and proper generalization, this study refers to the sample size guidelines from Hair et al. (2022) and Cohen (1992), with a minimum recommendation of 124 respondents to meet the statistical power of 80% in the PLS-SEM analysis.

PLS-SEM was chosen because it is suitable for exploratory research with many latent variables and focuses on prediction. This study uses purposive sampling, which is the deliberate selection of respondents based on certain criteria, namely consumers who do not yet have an EV but have the ability to buy.

Data Collection Method

Data collection method refers to the process of gathering relevant information to answer the research questions (Bell & Waters, 2018). In this study, data were collected through a structured questionnaire designed to measure variables such as perceived benefits, perceived risks, facilitating conditions, marketing efforts, perceived value, and purchase intention related to electric vehicles (EVs). The questionnaire used closed-ended questions and a 5-point Likert scale to make it easier for respondents to answer while generating quantitative data that can be analyzed statistically. This scale was chosen because it is quite simple but still able to capture variations in attitudes well (Hair et al., 2022).

The distribution of the questionnaire was carried out online and in person to reach more respondents. Digital platforms such as social media and EV forums were used, while direct distribution was carried out at car dealerships, charging stations, and technology events. This approach is expected to produce representative and varied data from various consumer

segments. This method aims to produce reliable data to test hypotheses and provide insights for EV market players in Indonesia.

Data Analysis Method

The data analysis method in this study was carried out quantitatively using software such as SmartPLS. The analysis began with descriptive statistics to understand the characteristics of the respondents, then continued with an inferential test using PLS-SEM to evaluate the relationship between variables such as perceived benefits, perceived risks, facilitating conditions, and marketing efforts on perceived value and purchase intention.

The measurement model was tested to ensure the validity and reliability of the instrument through outer loading analysis, AVE, Composite Reliability, and Cronbach's Alpha. After that, the structural model was tested by looking at the R^2, f^2, Q^2 values, and multicollinearity tests through VIF. Hypothesis testing was carried out by looking at the t-statistic and p-value values (declared significant if $t > 1.96$ and $p < 0.05$).

This study also uses Multi-Group Analysis (MGA) to see the differences between respondent groups based on age, gender, and economic level, so that it can provide deeper insight into variations in consumer behavior in the adoption of electric vehicles in Indonesia.

3. Result and Discussion

Instrument Testing

Instrument testing was conducted to ensure that the questionnaire in this study could measure variables accurately and consistently (Putka & Sackett, 2010). This test includes validity and reliability testing using the SEM PLS approach, focusing on outer loading, Composite Reliability, and Average Variance Extracted (AVE) (Hair et al., 2017).

In the pretest stage, data were collected from 27 respondents with adequate economic backgrounds. The results of the analysis showed that some indicators, such as ME4, ME7, PR7, and PR8, had outer loading values below 0.6, indicating weaknesses in representing their constructs. These indicators were then reviewed and refined. Overall, the Cronbach's Alpha value for all variables was above 0.7, indicating high reliability. However, the AVE for several variables such as Facilitating Condition, Marketing Efforts, and Perceived Risks was still below the standard of 0.5, indicating that the indicators needed to be improved to increase

convergent validity.

In the main test stage, the questionnaire was updated based on the pretest results and input from the supervisor, including replacing the income question with monthly expenses based on the Socio-Economic Status (SES) category. The survey was then distributed more widely, resulting in 227 respondents, which after the screening process became 215 valid respondents. Only respondents from SES categories A1, A2, and B were analyzed further because they were considered to have purchasing power for electric vehicles. The final analysis was carried out using SEM PLS to ensure the validity and reliability of the data, while strengthening the credibility of the research results related to the factors that influence the intention to purchase electric vehicles in Indonesia.

Descriptive Analysis

Descriptive analysis is used to present and summarize research data in order to understand the characteristics of respondents and the patterns in their answers (Sugiyono, 2019). In this study, data were analyzed using descriptive statistics such as frequency, mean, and standard deviation with a 5-point Likert scale.

1. Respondent Profile

This study involved 215 respondents who were screened based on the Socio-Economic Status (SES) categories A1, A2, and B to ensure purchasing power for electric vehicles (EVs). The majority of respondents were male (80.47%), aged 26–45 years (88.38%), highly educated (79.07% D3/S1), and domiciled in Jabodetabek (90.7%). All respondents used conventional vehicles and most were familiar with EVs (94.42%). This profile reflects a potential early adopter group that represents the educated, financially stable, and urban consumer segment.

2. Respondent Characteristics & Key Variables

    a. Marketing Effort

    A mean score of 3.94 indicates a positive perception of EV marketing efforts, especially in traditional promotions and integrated services. However, digital strategies such as influencers still need to be improved.

    b. Facilitating Condition

    A mean score of 3.81 indicates that respondents are quite satisfied with supporting conditions such as infrastructure and government policies, although aspects such as

public infrastructure are still considered low.

c. Perceived Benefits

With an average score of 4.14, respondents have a very positive perception of the benefits of EVs, both in terms of economy, environment, and convenience.

d. Perceived Risks

A mean score of 2.70 indicates a relatively low risk perception, although there are still concerns regarding price, range, and battery safety.

e. Perceived Value

A score of 3.98 indicates that respondents consider EVs to have high value overall, both in terms of financial, emotional, and environmental benefits.

f. Purchase Intention

A mean score of 3.56 indicates a fairly positive purchase intention, although there are still doubts, especially regarding price factors and infrastructure readiness.

Overall, the results of the descriptive analysis show that respondents tend to be open to EV adoption, with positive perceptions of the benefits and value of EVs, and moderate purchase intentions. However, attention to risk reduction and increased facility support are still needed to increase the conversion of interest into purchase decisions.

Discussions

Impact of Marketing Efforts on EV Adoption in Indonesia

1. Statistical Results

Marketing efforts have a positive effect on perceived benefits ($\beta = 0.253$; $p = 0.014$) and a negative effect on perceived risks ($\beta = -0.221$; $p = 0.001$). These effects indicate that current marketing strategies have succeeded in improving the image of EVs and reducing consumer concerns, although the effect is still moderate ($f^2 < 0.06$), indicating room for improvement.

2. Effective Marketing Instruments

   a. Modern design & technology (ME1) and integrated service networks (ME3, ME12) have the most influence.

   b. Cost-efficient communication (ME2, ME6) is effective in increasing perceived value.

   c. Easy distribution (ME5, ME4) and battery guarantee (ME8) are also important.

d. Digital promotion (ME11) is more effective than physical exhibitions (ME10).

3. Cost Effectiveness

Cost-efficient communication has proven to be effective, but the biggest challenge remains the high initial price of EVs (PR1 = 0.853). PLN and IESR data show EV TCO is cheaper in 3-4 years, but concerns about initial costs and resale value are still high.

4. Current Market Context

Although EV sales grew 351% from 2022 to 2023, Indonesia's EV market share is still <1%. Countries like Thailand have been more successful due to aggressive marketing strategies and infrastructure support. In Indonesia, brands like Hyundai and Wuling have succeeded through a digital approach and an emphasis on after-sales service.

5. Case Studies and Implications

a. Hyundai Ioniq 5 is successful in the premium segment, while Wuling Air EV is successful in the entry-level segment.

b. The failure of several brands was due to inappropriate pricing strategies and weak service support.

c. Keys to success: service network, cost of ownership education, integrated campaigns, and clear warranty programs.

6. Business Model Innovation

Conventional models are considered less suitable for EVs. Innovations such as subscriptions (South Korea) and Battery-as-a-Service (China) are able to lower the barriers to EV adoption. Indonesia has the opportunity to adopt this model gradually, starting from large cities with more mature infrastructure. Recent policy support supports this innovation (IESR, 2024).

Marketing efforts play a significant role in shaping consumer perceptions of EVs in Indonesia. To increase adoption, strategies should focus on cost efficiency, service infrastructure, business model innovation, and integrated digital promotion.

The Role of Facilitating Conditions on EV Adoption in Indonesia

1. Statistical Results

Facilitating conditions do not have a significant effect on perceived benefits ($\beta = 0.045$; $p = 0.322$; $f^2 = 0.001$), but have a strong and significant effect on reducing perceived risk ($\beta = -0.435$; $p = 0.000$; $f^2 = 0.169$). This means that consumers see infrastructure and government

support as risk mitigation tools, not added value.

2. The Most Influential Instruments

    a. Public infrastructure (FC1 = 0.782) and government support for SPKLU (FC3 = 0.878) have the most influence.

    b. Home installation support (FC2 = 0.816) and government incentives (FC6 = 0.714) are also important.

    c. The help center (FC8) has a lower influence, indicating that consumers' main focus is on infrastructure access and reliability.

3. Business Implications

Strategies that focus on risk reduction (rather than benefit promotion) are more effective. Brands like Hyundai and Wuling have succeeded by building their charging and after-sales service networks before expanding sales.

4. Current Infrastructure Conditions

As of early 2024, Indonesia has ±1,200 SPKLUs, 60% of which are concentrated in Jabodetabek. Outside of major cities, infrastructure coverage is still low, affecting low EV adoption in the regions. The government's target of 3,500 SPKLUs by 2025 still faces challenges in regional equality.

5. Case Studies and Policies

Countries like Thailand and Singapore have succeeded thanks to aggressive policy support and city planning. In Indonesia, EVs sell better in areas with SPKLUs <5km away. These areas recorded 150% higher sales than areas without adequate infrastructure.

6. Recommendations

    a. Focus on developing SPKLUs in high-traffic corridors.

    b. Strengthen public-private partnerships for SPKLUs.

    c. Standardize the charging payment system.

    d. Provide incentives for SPKLU operators in disadvantaged areas.

Facilitating conditions are very effective in reducing consumer risk perception towards EVs, especially through infrastructure availability. Strategic investment in SPKLU and government support will accelerate EV adoption nationwide.

Dynamics of Perceived Risks and Perceived Benefits in EV Adoption

1. Statistical Analysis Results

Perceived benefits have a significant positive effect on perceived value (β = 0.424; p = 0.000; f^2 = 0.249), while perceived risks have a significant negative effect on perceived value (β = -0.366; p = 0.000; f^2 = 0.185) and perceived benefits (β = -0.375; p = 0.000; f^2 = 0.134).

This means that risk not only reduces perceived value, but also reduces perceived benefits. However, benefits still have a stronger influence on value than risks.

2. Main Risk & Benefit Factors

    a. Main risks: high cost (PR1 = 0.853), limited charging infrastructure (PR6 = 0.880), battery safety (PR8 = 0.822), and range (PR4 = 0.809).

    b. Key benefits: cost savings (PB8 = 0.907), driving pleasure (PB7 = 0.801), and environmental impact (PB4 = 0.777).

3. Operational Cost Analysis

EVs are much more economical: cost IDR150–200/km vs conventional vehicles IDR800–1,000/km. With household electricity of IDR1,445/kWh and fuel of IDR12,500/liter (PLN, 2024), the break-even point is reached in 3–4 years (IESR, 2023). Long-distance users (>25,000 km/year) get ROI in 2–3 years (Bluebird, 2024).

4. Recommendations

    a. Create a transparent TCO (Total Cost of Ownership) calculator.

    b. Provide innovative financing schemes to overcome high initial prices.

    c. Implement a warranty & battery buyback program.

    d. Expand charging infrastructure with clear and stable prices.

The economic benefits of EVs are compelling, but perceived risk remains a major barrier. Clear communication and practical solutions are critical to increasing EV adoption in Indonesia.

Perceived Value as the Main Factor

1. Statistical Analysis Results

Perceived value has a positive and significant effect on purchase intention (β = 0.760, t = 21.992, p < 0.001). This means that every 1 point increase in perceived value increases EV purchase intention by 76%. This effect is very large (f^2 = 1.367), indicating that perceived

value is the most crucial factor in EV purchase decisions.

In other words, the higher the consumer's perception of the value of an EV (such as cost-effective, environmentally friendly, or advanced technology), the more likely they are to buy. Therefore, companies need to focus on building value perception through long-term benefit education and incentives.

2. Perceived Value Indicator Analysis

The strongest indicators are PV2 (EV is considered a good purchase) and PV3 (EV provides good value overall). Consumers highly value cost savings (PB8 = 0.907) and environmental impact (PB4 = 0.777), as well as technological innovation (PV5 = 0.716).

Marketing strategies that emphasize cost efficiency, government incentives, and advanced technology features have proven effective in increasing purchasing interest.

3. Current Market Conditions

The Indonesian EV market is growing rapidly, driven by various segments. Luxury brands such as BMW emphasize prestige and technology, while brands such as Wuling focus on cost efficiency for the mass segment. Hyundai and Toyota target the middle class with a balance of price and quality.

Statista (2024) noted that the Indonesian EV market is growing at 35% per year. Marketing strategies need to be tailored to each segment—for example, luxury emphasizes prestige, while entry-level emphasizes cost-effectiveness and practicality.

4. Business Implications

EV market segmentation allows for a more targeted marketing approach. Campaigns for premium consumers should focus on innovative features and sustainability, while those for the middle and lower segments should highlight cost efficiency and practicality. Countries with this approach, according to BloombergNEF (2024), are experiencing accelerated EV adoption.

Purchase Intention and EV Market Prospect

1. Statistical Analysis Results

EV purchase intention shows high reliability with three indicators (PI2, PI3, PI4) having outer loading >0.9. PI1 was removed due to its instability. Perceived value explains 57.8% of the variation in purchase intention (R^2 = 0.578), confirming that perceived value is the main

driver of EV purchase decisions in Indonesia.

2. Purchase Intention Indicator Analysis

PI3 ("recommend EV") has the highest loading (0.926), followed by PI4 and PI2. This indicates that EV purchase intention is strong, long-term, and consistent. This finding is supported by the Nielsen report (2024) which highlights the importance of social influence in EV adoption decisions.

3. Market Projection

GAIKINDO projects EV sales to reach 95,000 units in 2024 and more than 150,000 in 2025, with annual growth of 36% and 58%. The driving factors include government incentives, improved charging infrastructure, and falling battery costs. BloombergNEF estimates EV price parity with conventional cars will be achieved by 2025 for some segments.

4. Segmentation and Business Implications

Cohort analysis shows:

   a. Younger consumers are more sensitive to environmental issues.
   b. Older consumers focus on long-term cost efficiency.
   c. The conversion rate of purchase intention to actual purchase is higher in the premium segment (35-40%) compared to the mass segment (15-20%).

5. Practical recommendations:

   a. Develop financing according to segment.
   b. Tailor marketing messages based on age and location.
   c. Conduct EV demos in potential areas.
   d. Expand dealer network.
   e. Educate consumers about total cost of ownership (TCO).

With the right segmentation strategy, high purchase intention can be converted into actual sales significantly in the Indonesian market.

Additional Factors Influencing EV Adoption

1. Business Model Innovation

The traditional vehicle ownership model is a major barrier to EV adoption in Indonesia, mainly

due to high initial costs and long-term commitments. Despite ambitious targets, EV sales are still <1% of total vehicle sales (Budiono & Virgianita, 2024). Global alternatives such as subscriptions in Korea and Battery-as-a-Service (BaaS) in China have proven effective in lowering cost barriers and range anxiety, and increasing adoption.

2. Political Pressure and Policy

Government policies have a significant influence through facilitating conditions ($\beta = -0.435$, $p < 0.001$). However, Indonesia's policies are considered not as aggressive as Thailand's, which has achieved a 2.3% EV market share thanks to strong incentives and supportive infrastructure (industry.co.id, 2024). The effectiveness of the policy is more pronounced in urban areas, supporting the finding that financial and infrastructure incentives can increase adoption by up to 300% (Wang et al., 2023).

Theoretical Contributions

1. Development of UTAUT

This study extends the UTAUT model by integrating perceived risk and benefits as mediators between facilitating conditions and EV purchase intention. The results show that facilitating conditions not only have a direct impact, but are stronger through risk reduction ($\beta = -0.435$, $p < 0.001$). This adapts UTAUT to the consumer context and major purchase decisions such as EVs, different from its original application to work technologies.

The revised model improves the predictive ability of purchase intention to 57.8%, higher than the standard UTAUT model (~30–40%) (Venkatesh et al., 2016).

2. Development of Customer Perceived Value Theory

This study advances the theory of perceived value by showing that consumer value is directly influenced by perceived benefits ($\beta = 0.424$) and risks ($\beta = -0.366$), as well as indirectly through the reduction of perceived benefits ($\beta = -0.375$). These findings emphasize the importance of assessing value in two dimensions: short-term and long-term, and financial and environmental value (loadings = 0.896 and 0.716). This extends the traditional value model, as described by Kim et al. (2018) and Hu et al. (2023).

3. Contribution to Marketing Theory

This study introduces a new approach to the marketing mix for technology products such as EVs. ‘Product’ now includes after-sales service support (ME12 = 0.820) and technological superiority (ME1 = 0.787). Marketing also plays a role in simultaneously lowering perceived

risk (β = -0.221) and increasing perceived benefits (β = 0.253)—something that has not been accounted for in traditional marketing models.

This study also introduces a new segmentation framework based on technological readiness and risk tolerance, which proves to be more relevant than traditional demographic segmentation. For example, young consumers are more responsive to environmental messages, while urban consumers are more influenced by infrastructure.

4. Conclusion

Indonesia's electric vehicle (EV) market has seen impressive growth, with sales jumping by 351%, from 15,427 units in 2022 to 69,625 units in 2023. However, EVs still account for less than 1% of total vehicle sales, indicating substantial growth potential. The market is concentrated in urban areas, particularly the Greater Jakarta region, which holds over 60% of sales and charging infrastructure. Despite these promising figures, EV adoption in Indonesia lags behind ASEAN leaders like Thailand, where coordinated efforts in marketing and infrastructure have led to a market share of 2.3%. Our research highlights three key drivers for EV adoption: perceived value, adequate infrastructure, and effective marketing. To accelerate EV adoption, Indonesia must address infrastructure gaps, lower upfront costs, and increase marketing efforts.

The study shows that the presence of charging stations significantly reduces concerns like range anxiety but does not necessarily make consumers perceive greater benefits in EVs. Marketing efforts vary in effectiveness, with traditional methods like service centers and exhibitions proving more successful than digital channels. Younger consumers are more motivated by environmental benefits, while older consumers focus on long-term savings. Word-of-mouth also plays a critical role, suggesting that creating positive experiences for early adopters will drive broader acceptance.

The EV market shows varying opportunities across segments. Premium EVs (>Rp 800 million) have higher purchase intent than mass-market models (<Rp 400 million). To capitalize on these opportunities, manufacturers must tailor their offerings for each segment. Expansion of charging infrastructure, especially outside urban centers, and the development of targeted financing solutions are crucial. Additionally, customer education and risk mitigation should be prioritized in both marketing and support systems.

a. Manufacturers: Develop segment-specific value propositions based on consumer preferences.

b. Infrastructure Providers: Strategically place charging stations using data-driven approaches.

c. Policymakers: Implement targeted incentives, particularly for underserved regions.

d. Financial Institutions: Offer innovative financing options to make EVs more accessible to mass-market consumers.

Recommendations

Practical Recommendations

For the government, the research suggests a phased approach to EV infrastructure and policy support. In the short term (6-12 months), the focus should be on expanding charging infrastructure beyond the Jabodetabek area, particularly along intercity corridors where range anxiety is most pronounced. Data shows that areas with charging stations within 5 km have 150% higher EV adoption rates, making strategic placement crucial. Over the next 1-2 years, standardizing charging protocols and offering tax incentives for middle-market EVs would address the price sensitivity identified in the research. In the long term (2-5 years), integrating EVs into public transportation and developing battery recycling infrastructure should be prioritized.

For EV manufacturers, the research highlights the importance of balancing marketing messages that address both immediate cost concerns and long-term economic benefits. Manufacturers should strengthen their digital channels and after-sales services, which were found to have a greater impact than traditional advertising. They should also tailor their value propositions to different segments, with premium models focusing on technology and performance, while mass-market models emphasize total cost of ownership. Additionally, manufacturers should establish comprehensive dealer networks in regions showing high purchase intention and prioritize demonstration programs to influence first-time buyers.

For ecosystem players, financial institutions should develop innovative financing products, especially for the mass market, where conversion rates are currently low. Charging infrastructure providers should focus on partnerships with commercial properties and workplaces, which significantly reduce range anxiety. Energy providers must ensure that the grid is ready in high-potential adoption areas, with fast-charging capabilities in commercial zones. These efforts should be coordinated through a centralized platform to improve user experience and service delivery.

Strategic Product Policy for EV Acceleration

To accelerate EV adoption, Indonesia should implement a targeted product policy strategy. This should focus on market segmentation, technology development, and manufacturing capabilities. The country should prioritize the development of locally manufactured entry-level EVs, while also attracting premium brands to drive technology adoption. This dual-track approach, seen in Thailand, addresses both price sensitivity and consumer interest in advanced technology. Furthermore, Indonesia's natural resources, particularly in battery production, should be leveraged to reduce EV costs by 30-40%. Standardizing charging technology will also address infrastructure concerns that influence consumer purchase decisions. In manufacturing, Indonesia should adopt a phased approach, starting with assembly operations and gradually expanding to full vehicle development, similar to successful strategies in other ASEAN countries.

Theoretical Recommendations

In terms of methodology, the research acknowledges limitations in treating Likert scale data as interval-level measurements. Future studies should explore non-parametric approaches, such as Ordinal Logistic Regression or Partial Least Squares Path Modeling (PLS-PM), to better account for the ordinal nature of Likert scale responses. The study also highlights gaps in understanding the relationship between facilitating conditions (like infrastructure) and perceived benefits. Future research could explore moderating variables in this relationship and investigate how business model innovation influences technology adoption. Furthermore, the influence of word-of-mouth on adoption should be studied in greater depth, particularly how social influence mechanisms drive consumer decisions.

Methodologically, future studies could benefit from incorporating longitudinal data to observe how perceptions evolve over time. More sophisticated segmentation approaches combining demographics with psychographics and behavioral variables would also improve the understanding of consumer decision-making. Mixed-method approaches should be considered to capture the qualitative aspects of adoption.

Finally, the research suggests enhancing existing theoretical frameworks, particularly the UTAUT model, to account for high-involvement technology purchases like EVs. Incorporating risk-benefit analysis as a core component could improve understanding of the adoption process. Additionally, exploring business model innovation within the context of EV adoption offers a promising direction for theory development, particularly in understanding how different ownership models affect consumer behavior and how cultural factors influence adoption patterns.

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