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Driving Toward Sustainable Mobility: Exploring Factors Influencing Electric Vehicle Adoption Intentions in Indonesia

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Abstract. This research explores the factors influencing the willingness of consumers in Indonesia to adopt electric vehicles. The study combines government policy dimensions and IoV Technology aspects with an extended Unified Theory of Technology Acceptance model. Surveying 327 Indonesian consumers, the analysis reveals that positive attitudes towards electric vehicles, favorable government regulations, pricing value, pro-environmental orientation, and perceptions of ease of use significantly contribute to higher intentions of adoption. However, factors such as facilitating conditions, hedonic motivation and social influences did not emerge as influential drivers. These findings provide valuable insights for policymakers and industry leaders to develop strategies that promote the widespread adoption of electric vehicles in the Indonesian market. Specifically, the research suggests the importance of strengthening financial incentives, emphasizing the environmental benefits, and prioritizing positive consumer technology experiences to overcome barriers to adoption.

Keywords: Electric Vehicle, Internet of Vehicle, The Unified Theory of Acceptance and Use of Technology, Intention to Use, PLS-SEM

1. Introduction

Our society is moving more and more in the direction of increased environmental awareness, especially in terms of protecting our environment. Many people now perceive the effects of global climate change as being more personally relevant, which has increased awareness campaigns and raised public knowledge of environmental issues (Venghaus et al., 2022). According to a survey by Capovska & Ivanovska (2022), the majority of respondents are worried about climate change and how it will affect the quality of life for future generations, with air pollution being a key concern. Vehicle emissions and industrial waste both continue to be major sources of air pollution, making the need for more environmentally friendly transportation solutions necessary. The importance of adopting cleaner technologies like Electric Vehicles (EVs) to address climate change is further highlighted by the increase in greenhouse gas emissions, which are mostly caused by transportation (Yong et al., 2015).

Younger generations' willingness to adjust their habits to lessen the effects of climate change has recently helped the trend toward utilizing EVs tremendously (Bell et al., 2021). EVs have been around for a while, but due to improvements made to gasoline-based internal combustion engines, they have seen a downturn (Chan, 1993). However, new technology has enabled electric vehicles to surpass cars with internal combustion engines, sparking renewed interest in them. The rise in popularity of electric vehicles among drivers is further evidenced by the increasing number of public EV charging stations in places like the US, Europe, and China (Tridens Technology, 2023).

Given Farmer et al., research from 2022 showing the potential and demand for electric vehicles in Indonesia, the topic of electric vehicles in general is an intriguing one to address. Based on the same research, it is stated how Indonesia is anticipated to rank among the top emerging Asian nations in terms of the production of electric four-wheelers. It is was estimated that 400.000 vehicles will be produced annually in 2030 in Indonesia. By setting an aggressive goal of outlawing conventional internal combustion engines in 2050, the Indonesian government has also demonstrated a strong commitment to the implementation of a zero-carbon program.

Electric Vehicles (EVs) itself have become increasingly popular in society due to significant governmental influence. Globally, governments are encouraging the use of EVs. For example, The Indian government has begun to provide subsidies, incentives, and tax exemptions in the form of direct discounts on purchases and other incentives (Government of India, 2019). Another illustration comes from the United States of America, where it is stated on their International Revenue Service (2023) that more tax exemptions related to clean vehicle taxes will be granted. According to Karyza (2023), Indonesia is set to follow suit with the government offering tax breaks and buying incentives beginning in March 2023. Based on Presidential Decree No. 55 of 2019, Indonesia adopts a novel strategy that includes import relief, infrastructure planning, and research grants related to the EV development. According to Saraswati et al., (2023) sales of EVs in Indonesia are predicted to double from the previous year in 2022 and continue to climb up in 2023. Indonesia's commitment to EV adoption stems from addressing the transport sector's 28% contribution to national carbon emissions and also aligns with the Paris Agreement between nations (IESR, 2023). EVs also offer a solution to reduce fossil fuel reliance. Despite these regulations, research on their impact on EV adoption intentions remains limited within the nation, necessitating further investigation.

One important factor to take into account is the development of Internet of Vehicles (IoV), an integration of Internet of Things (IoT) with vehicle connectivity. In order to exchange data and information, IoV creates connectivity between cars, objects, and locations (Priyan & Devi, 2019). It is an essential concept in the development of Intelligent Transportation Systems (ITS), combining IoT and vehicle internet access. Because of its ability to enables traffic control, autonomous driving, and customized mobile travel services, the Internet of Vehicles (IoV) has enormous promise for the development of smart cities and sustainable energy (Danba et al., 2022).

IoV adoption in Indonesia has already started, as evidenced by the use of early-stage IoV technology by a well-known Chinese manufacturer in the MyWuling+ smartphone application. With capabilities

like fuel consumption estimation, car positioning, remote engine control, maintenance reminders, and entertainment-focused voice assistant functions, this application connects Wuling automobiles to the internet (Danba et al., 2022). The integration of IoV technology with automobiles represents a significant advance in the direction of improved connection and usefulness in the automotive industry which closely related to the Electric Vehicle.

While Indonesian customers perceive Wuling's mobile application, My Wuling+, as a distinguishing factor from its competitors, its performance has faced criticism. Despite garnering over 50,000 downloads across the Google Play Store and App Store, user reviews have awarded it low ratings of 3.5 and 2.3 stars out of 5, respectively. These ratings reflect concerns about malfunctioning IoV features, compatibility issues with iOS devices, and connectivity challenges. The potential impact of these issues on the choice of Wuling Air EV over competing options remains uncertain. This shows concerns regarding the IoV technology adoption within Indonesian landscape as it is currently the only commercially available IoV Technology in Indonesian Market.

Hence, the objective of this research aims to explore the influence of Governmental Regulations and other factors on customer intentions to adopt Electric Vehicles in Indonesia. Prior studies within Indonesia landscape have not fully covers aspects like Government Regulations and IoV Technology existence within EV Adoptions context. This research meant to further help relevant stakeholders to see which factors might be pivotal to further strengthen the EV adoption in Indonesia in a more comprehensive field. Drawing on prior research, the study will examine Government Regulations, Environmental Factor, Hedonic Motivation, Facilitating Conditions, Social Factors, Performance Expectancy, and Effort Expectancy. Additionally, it will assess user attitudes and perceptions of IoV technology through variables like Perceived Ease of Use, Perceived Usefulness, Perceived Risk, and Trust. Therefore, the research will answer questions which covered:

- Do Government Regulations and Environmental Factors affect EV usage intentions in Indonesia?
- What other variables affect the usage intentions of EV in Indonesia?
- Does the existence of IoV Technology affect the EV usage intentions in Indonesia?

2. Literature Review

2.1. Government Regulations

Around the world, governments have been actively issuing policies and regulations to facilitate the adoption of Electric Vehicles (EVs) as part of their EV implementation programs, exemplified by Malaysia, the United States, South Korea, and Indonesia among many prominent nations (Adnan et al., 2018). Drawing from research in Norway, Bjerkan et al., (2016) employed various indicators aligned with country-specific regulations. These indicators encompassed exemptions from Purchase Tax, Value Added Tax (VAT), and Road Toll, along with discounts in vehicle license fees, complimentary parking and ferry tickets, and special lane access. Manutworakit & Choocharukul (2022) conducted a study in Thailand that focuses on the monetary and non-monetary policies aimed at encouraging the use of electric vehicles. The Chinese government additionally promotes the usage and purchase of electric vehicles by enacting various economic stimulus programs, such as preferential taxation, direct purchase incentives, and exemptions from highway use (Wang et al., 2018). Therefore, it is needed to look into the case further within Indonesian market context.

2.2. Extended UTAUT Framework

The Extended UTAUT Framework, an acronym for the Unified Theory of Acceptance and Use of Technology, integrates various acceptance models, including the Theory of Planned Behaviour and the Technology Acceptance Model (TAM) (Venkatesh et al., 2012). This comprehensive framework encompasses constructs such as Facilitating Conditions, Hedonic Motivation, Social Influence, Performance Expectancy, Effort Expectancy, Price Value, and Habit, all of which correlate with the

Behavioral Intention to use specific technology (Venkatesh et al., 2012). Notably, in the context of this study, the Habit construct is omitted from testing, recognizing that the habitual use of electric vehicles in Indonesia has not yet fully developed due to its new nature to the market (Khazaei & Khazaei, 2016; Nordhoff et al., 2020). It is recommended for the habit construct to be researched further in the future when the usage of Electric Vehicle in Indonesia is more wide-spread, and the prolonged-usage of EV in the society emerge (Nordhoff et al., 2020). Recent research within the EV adoptions in Indonesia also shown that the Habit construct does not have significant correlations to the Usage Intention of EV (Gunawan et al., 2022). For a more detailed understanding, the subsequent sections will elaborate on each construct and provide additional literature insights.

2.3. Facilitating Conditions

In the specific context of emerging technologies like Electric Vehicles, prior research by Khazaei & Khazaei (2016),suggests that Facilitating Conditions serve as an important indicator. Within the Electric Vehicle domain, these conditions can be subdivided into accessible learning and information tools, battery availability, charging and maintenance infrastructure, and post-sales support (Khazaei & Khazaei, 2016). These indicators reflect respondents' perceptions of how the aforementioned organizational and technical infrastructure influences their inclination to adopt Electric Vehicles. The application of facilitating conditions in this study aligns with the extended Unified Theory of Acceptance and Use of Technology proposed by (Venkatesh et al., 2012).

2.4. Price Value

The price value indicator employed in this study is rooted in the Unified Theory of Acceptance and Use of Technology (UTAUT), a framework that has been previously shown to align with research on the acceptance of emerging technologies such as electric transportation (Tran et al., 2019; Wolf & Seebauer, 2014). The assessment of products or services for their value is based on consumers' weighing of benefits against costs (Vafaei-Zadeh et al., 2022). In the specific context of this investigation, value is intricately linked to the benefits derived from the intention to purchase and utilize electric vehicles. Electric vehicles, powered by electricity, are perceived as offering a cost-efficient alternative compared to gasoline-fueled engines due to their heightened efficiency over conventional combustion engine cars (US Department of Technology, 2020). This perspective contributes to reduced transportation expenses and long-term cost-effectiveness associated with Electric Vehicle use (Vafaei-Zadeh et al., 2022). Such a prevailing notion enhances the perception of Price Value, particularly as the projected long-term savings become more pronounced (Zhang et al., 2020). As consumers recognize the potential for financial savings through Electric Vehicle usage, their perception of price value tends to be elevated, ultimately influencing the decision to adopt and employ Electric Vehicles significantly and favorably (Vafaei-Zadeh et al., 2022).

2.5. Hedonic Motivation

Hedonic Motivation, within the scope of this study, refers to the emotions and sensations of delight and entertainment experienced when utilizing a particular technology or system (Manutworakit & Choocharukul, 2022). Also termed as perceived enjoyment, this concept is rooted in the UTAUT2 theory by Venkatesh et al., (2012). In the context of behavioral exploration concerning Electric Vehicles, hedonic motivation is applied to gauge the overall driving experience of Electric Vehicles, encompassing elements of enjoyment and amusement, as well as the pleasurable aspects associated with acceleration and smooth driving (Khazaei & Khazaei, 2016). Similarly, the study conducted by Manutworakit & Choocharukul (2022) corroborates the positive influence of Hedonic Motivation as a variable on customer purchase and usage intentions within the Thailand Electric Vehicle market.

2.6. Social Factor

The social construct theory, as developed by Thompson et al., (1991), complements the theories by Venkatesh et al., (2012) and Joud et al., (2020), affirming that an individual's behavior and intentions can be influenced by societal perceptions after using a particular technology. It is incorporated into the Technology Acceptance Model 2 (TAM 2) and UTAUT. A further study emphasizes the impact of social aspects on how actions and intentions are perceived, particularly in terms of how one is regarded by others while adopting novel technologies or systems, which further supports this idea Manutworakit & Choocharukul (2022). These social determinants have a significant impact on the adoption and usage intentions of electric vehicles (Barth et al., 2016). By arguing that a greater number of electric vehicles on the roads encourages greater adoption, boosting user confidence, and forming a particular image associated with electric vehicle users, another research by DellaValle & Zubaryeva (2019) also support the hypotheses. Another perspective is that a lack of electric vehicles on the roads can negatively affect adoption and usage intentions (Barth et al., 2016).

2.7. Environmental Factor

According to research findings, customers' intentions to purchase and use hybrid or electric vehicles are significantly correlated with environmental factors (Razak et al., 2015). Additionally, a different study highlights how environmental effects affect consumers' intentions to buy green products like electric vehicles, where they show a more positive propensity to buy and are less price-sensitive in their purchasing behavior (Hansla et al., 2008; Tanner & Wölfing Kast, 2003). These social determinants have a significant impact on the adoption and usage intentions of electric vehicles (Barth et al., 2016). DellaValle & Zubaryeva (2019) also argues that a greater number of electric vehicles on the roads encourages greater adoption, boosting user confidence, and forming a particular image associated with electric vehicle users. Barth et al., (2016) further support that a lack of electric vehicles on the roads can negatively affect adoption and usage intentions.

2.8. Effort Expectancy

Effort expectancy is a measure of how easily people use technology (Venkatesh et al., 2012). According to Rogers (2020), the perception of TAM's usability and how easy or difficult it is to understand and apply an invention are directly related. According to numerous prior studies, there are some correlations between the effort expectancy and the behavioral intention to use (Vafaei-Zadeh et al., 2022). Clear and understandable, easy to adjust to or learn, and easy to use are a few indicators that can be inferred from earlier study (Chawla & Joshi, 2019; Davis, 1989). Another study also demonstrates that effort expectancy has a certain effect on attitude in that it creates the physiological components of intentions toward something (Kaplan et al., 2017). Within the Electric Vehicle context, the effort expectancy has been used to decide the overall effect of the effort needed to use the technology to the user acceptance (Gunawan et al., 2022; Vafaei-Zadeh et al., 2022).

2.9. Performance Expectancy

Performance expectancy, which is similar to the idea of perceived usefulness in the Technology Acceptance Model (Rogers, 2020), describes the degree to which the use of technology results in advantages for users in carrying out specific tasks (Venkatesh et al., 2012). Given that EV technology is still relatively new in society, its relevance in the context of the Indonesian Electric Vehicle (EV) industry is essential, much like the incorporation of Effort Expectancy within the acceptance model (Yousif & Alsamydai, 2019). A significant link between Performance Expectancy and behavioral intention through attitude has also been shown in earlier studies (Chen & Lu, 2016; Davis, 1989). Furthermore, previous research within EV context has shown performance expectancy as way to measure the user behavioral intentions within the degree of how it will benefit the user (Gunawan et al., 2022; Vafaei-Zadeh et al., 2022). Numerous more research also highlight the relevant relationships between Performance Expectancy as a predictor of Behavioral Intention in the setting of emerging

technologies provide additional support to this relationship (Gao et al., 2019; Kamal et al., 2020; Sharma, 2019).

2.10. Attitude Toward Using Electric Vehicle

People who have a positive outlook on buying an electric car are more likely to take the required actions to utilize (Vafaei-Zadeh et al., 2022). The theory of planned behavior also emphasizes the connection between positive attitudes and the propensity to engage in a certain behavior (Collins et al., 2011). Ajzen (2002) and Taylor & Todd (1995) both claim that attitude greatly affects behavioral intention, proving a strong connection between the two. Previous studies have shown that attitudes support the notion that attitude and intention are positively correlated (Joshi & Rahman, 2019; Li et al., 2017; Shalender & Sharma, 2021).

2.11. Perceived Usefulness

The term "useful" in this context can be further defined as "capable of being used advantageously" (Yousif & Alsamydai, 2019). Perceived usefulness measures how strongly one believes that utilizing a particular system or piece of technology would improve the quality or outcome of the job(Mou et al., 2017). Work quicker, make job easier, increase job performance, and be valuable are a few indicators that can be extracted from earlier research (Chawla & Joshi, 2019; Davis, 1989). Previous research from the fields of mobile learning (Shorfuzzaman & Alhussein, 2016), smart homes (Baudier et al., 2020), and mobile health (Duarte & Pinho, 2019) has amply confirmed the impact of perceived usefulness on behavior intention.

2.12. Perceived Ease of Use

Moslehpour et al., (2018)offer a different interpretation of perceived ease of use, describing it as a gauge of the degree of difficulty one faces when using a technology. Even if potential users think a system is helpful, they could also think it is difficult to use and that the work involved in using it outweighs the advantages. In essence, the acceptance of IoV-based services could suffer if users thought they were challenging to use, as complexity could serve as a real barrier (Yuen et al., 2020). Additionally, it has been shown in numerous situations, including mobile learning, that perceived ease of use is relevant (Shorfuzzaman & Alhussein, 2016). Due to the additional system characteristics, the use of IoV-based services provides drivers with increased flexibility and efficiency (Zhu et al., 2020).

2.13. Perceived Risk

Although multiple surveys showed that many of them also recognised the potential benefits of the technology, consumers have expressed grave concerns about the safety and privacy threats associated to the acceptance of IoV-based services (Wu et al., 2020). The category of safety risk includes the possibility that a device will malfunction as a result of a virus attack, an operating system malfunction, or a lack of Internet access (Talebian & Mishra, 2018). The possibility that travels information, behavioral data, or personal information could be exposed to other organizations without consent for unlawful use or could be compromised by third parties is what gives rise to the privacy risk (Herrenkind et al., 2019; Zhang et al., 2019). Users of IoV-based services can be concerned with how service providers manage data in terms of information collection, storage, and use (Walter & Abendroth, 2020). The adoption of IoV-based services is thought to be hindered most by these risks (Talebian & Mishra, 2018; Zhu et al., 2020). Therefore, it is important to assess the level of risk acceptance that the consumers willing to take, which will influence the attitude to IoV-based services.

2.14. Trust

Under risky or unpredictable conditions, trust is seen as an essential component of a connection (Liu et al., 2019). The impact of trust on consumer adoption of a range of technology services, including mobile

banking (Oliveira et al., 2014), e-government (Xie et al., 2017), IoT in agriculture (Jayashankar et al., 2018), and particularly autonomous vehicles (Choi & Ji, 2015; Zhang et al., 2019), has been thoroughly investigated in a number of studies. People are more likely to adopt innovations if they trust that doing so would help them achieve their goals (Mcknight et al., 2011). If there is a lack of trust, even those who are willing to adopt may start to delay adoption or take a wait-and-see attitude until the market for radical innovation like IoV-based services matures (Liang et al., 2020). In order to raise expectations for the successful application of IoV-based applications and services, avoid perceptions of risks and uncertainties, and develop a positive attitude towards it, potential customers must establish enough trust during the early stages of the marketization of IoV-based services and vehicles (Mcknight et al., 2011; Zhang et al., 2019).

2.15. Intention to Use Electric Vehicle

The degree of intent to engage in a specific behavior is what is meant by "intention to use" (Moons & De Pelsmacker, 2012). The intention to use factors, which include considerations for using, plans to use, readiness to use, impulses of desire, and imagining using, include a variety of indicators that will be confirmed (Gunawan et al., 2022; Lee, 2009; Venkatesh et al., 2012). Accordingly, it can be concluded that Intention to Use Electric Vehicle (EV) can be further defined as people's willingness to buy electric vehicles starting from the point at which they become aware of the product, are willing to evaluate it, to the point at which they decide to buy and use it (Febransyah, 2021; Moons & De Pelsmacker, 2012; Oliveira et al., 2022). In addition, a number of studies have focused on and investigated the emotional aspects of electric vehicle usage intentions (Moons & De Pelsmacker, 2012), the deconstructed theory of planned behavior (Oliveira et al., 2022) and UTAUT 2 (Gunawan et al., 2022).

2.16. Attitude Toward Using IoV Technology

It has been noticed that people's views about new technology, whether favorable or negative, can slow down or speed up adoption (Uğur & Turan, 2019). According to Baek (2013), attitude is a good indicator of how much effort people are likely to put into engaging in a particular behavior. Additionally, another study by (Negm, 2023) emphasizes how a person's perspective on a given object has a huge impact on their behavior and inclination to accept various technologies (like IoV Technology). The results of the same study show that a good attitude about adopting a certain technology has a beneficial impact on behavioral intentions to use IoT-related technology (Negm, 2023). Previous research also confirms the strong link between attitude toward utilization and the behavioral intention to use mobile applications, which lends support to this hypothesis (Baek, 2013).

3. Methodology

The research was conducted by looking at previous study related to the acceptance of Electric Vehicle and Internet of Vehicle (IoV), The data gathered for this process are collected through questionnaire distributed using Google Form within Likert scale (5 points interval). The respondent itself consisted of Indonesian citizen who have the intention or have use the Electric Vehicle and already have experience or prior knowledge regarding the IoV applications (My Wuling+). The following table describes the scale:

Table 1. Likert Scale

	SDA	DA	N	A	SA
Score	1	2	3	4	5

Notes:

SDA = Strongly Disagree
DA = Disagree
N = Neutral
A = Agree
SA = Strongly Agree

The overall population sample for this study is 8.053 based on the premise that all users at least have knowledge of or interest in My Wuling+ applications or other IoV Technology and its features. This assumption is based on data of Wuling Air EV sales in 2022. There are currently no reliable data provided for the specific 2023 Electric Vehicle sales in Indonesia, hence the data from 2022 were used. Based on Cochran (2007) sampling methodology, a minimum of 262 respondents will be required for this study, with a confidence level of 90% and a precision level of 5%. However, due to the nature of the respondent, it should be noted that there is a possibility of common method bias with respondents' self-reporting perceptions and intentions.

The sampling method used in this research was the probability sampling using simple random method. Each population unit is chosen randomly with an equal likelihood of being sampled, but due to the vast size of the target population, purposive sampling is employed. In purposive sampling, the selection of samples is based on specific predetermined characteristics, acting as filters from the start (Schindler & Cooper, 2014). The purpose of the method itself was to get quality samples from fit the criteria based on the research objectives. This study used PLS-SEM for data analysis, and SmartPLS 3 was the program used. According to Hair & Babin, (2018), the evaluation of PLS-SEM outcomes can be divided into two categories: inner model (structural) evaluation and exterior model (measurement) evaluation. The hypotheses outlined in section 3.2 will also be subjected to hypothesis testing.

3.1.Research Model

To achieve the goals of this study, the conceptual framework that is outlined below will be created. In terms of intention to use electric vehicles, this conceptual framework will explain the relationship between independent and dependent variables. The overall variables and models are based on research done by (Oliveira et al., 2022; Gunawan et al., 2022; Khazaei & Khazaei, 2016; Liang et al., 2020; Manutworakit & Choocharukul, 2022; Tanuwijaya & Balqiah, 2022; Vafaei-Zadeh et al., 2022). Hereby below is the following research model proposed in this research:

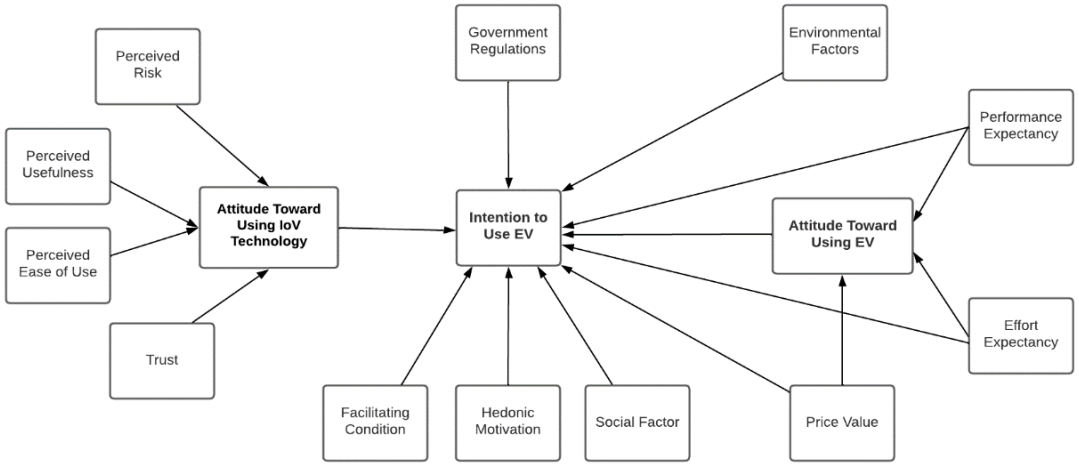

Fig.1: Research Model

The following are the indicators used based on the research model proposed:

Table 2. Indicators

Variable	Code	Indicator	Source
Intention to Use	INT1	If I were to purchase a vehicle within the next 5 year, I would buy and use an EV.	(Buranelli de Oliveira et al., 2022; Febransyah, 2021; Gunawan et al., 2022; Manutworakit & Choocharukul, 2022)
	INT2	I would recommend using the electric car to other people	
	INT3	There is a high probability that my next Vehicle will be EV.	
	INT4	I prefer to buy and use EV rather than traditional vehicle.	
	INT5	I intend to drive an electric car in the near future	
	INT6	I look forward to the introduction of various electric vehicle brands on the market.	
Government Regulations	GR1	The Purchase Subsidy able to persuade me to use EV.	(Bjerkan et al., 2016; Manutworakit & Choocharukul, 2022; Thilina & Gunawardane, 2019; Wang et al., 2018)
	GR2	The Tax Rebates and Exemption able to persuade me to use EV.	
	GR3	The non-monetary regulations Odd-Even Policy Exemption able to persuade me to use EV.	
	GR4	The Special Parking Spot able to persuade me to use EV.	
	GR5	The Free Electricity Upgrade able to persuade me to use EV.	
	GR6	The Free Charging Facilities able to persuade me to use EV.	
Facilitating Conditions	FC1	If there exist necessary facilities, I would use EV.	(Khazaei & Khazaei, 2016; Manutworakit

Variable	Code	Indicator	Source
	FC2	I have the necessary knowledge that made me want use and buy EV.	& Choocharukul, 2022; Venkatesh et al., 2012)
	FC3	EV is compatible with other technology that I use.	
	FC4	Other people can help me when I have difficulties in using EV.	
	FC5	I will drive EV if there is enough guidance and instructions on how to use it	
Price Value	PV1	EV are reasonably priced	(Manutworakit & Choocharukul, 2022; Vafaei-Zadeh et al., 2022)
	PV2	Using and buying EV will benefit me in the long-term in the context of expense	
	PV3	EV offer value for money	
	PV4	Price is important factor when it comes to buying and using EV	
	PV 5	EV price is the most important factor when deciding to buy EV or not.	
Hedonic Motivation	HM1	Driving EV is fun	(Avcilar & Ozsoy, 2015; Khazaei & Khazaei, 2016; Manutworakit & Choocharukul, 2022)
	HM2	Driving EV is enjoyable	
	HM3	Driving EV is entertaining due to the its smooth acceleration.	
	HM4	To me, driving EV is stimulating	
	HM5	To me, driving and EV is an adventure	
Social Factor	SF1	EV have positive image in the society.	(Joud et al., 2020; Khazaei & Khazaei, 2016; Manutworakit & Choocharukul, 2022)
	SF2	I will use EV if many people see lot of them on the street.	
	SF3	People who is opinion I care about believe that EV is good.	
	SF4	Driving EV will attract attention of others to me.	
	SF5	Having EV will reflect my personality.	
	SF6	Having EV will increase my status symbols to others.	
Environmental Factor	EF1	By using and buying EV I can Preserve the Environment.	(Khazaei & Khazaei, 2016; Manutworakit & Choocharukul, 2022; Razak et al., 2015)
	EF2	I want to buy use because of the high air pollution crisis.	
	EF3	By using and buying EV I can contribute to help preserve the environment for next generation.	
	EF4	I want to use EV because it can help with reducing overall pollution.	
	EF5	By using EV I believe I can help reduce global warming effect.	

Variable	Code	Indicator	Source
Attitude Toward Using EV	AT1	In general, I think it is good to use EV	(Uğur & Turan, 2019; Vafaei-Zadeh et al., 2022)
	AT2	In general, I think it is wise to use EV	
	AT3	In general, I think it is very satisfying to use EV	
	AT4	I am among the first to adopt EV as new technologies.	
	AT5	I look forward to using EV	
Performance Expectancy	PE1	Using EV will increase my productivity.	(Chawla & Joshi, 2019; Davis, 1989; Vafaei-Zadeh et al., 2022)
	PE2	Using EV will increase the travel efficiency	
	PE3	Using EV enhance my living quality	
	PE4	Using EV makes it easier to do my activities.	
	PE5	I find EV are useful.	
Effort Expectancy	EE1	I can easily understand how to use EV.	(Buranelli de Oliveira et al., 2022; Chawla & Joshi, 2019; Davis, 1989; Vafaei-Zadeh et al., 2022)
	EE2	I think it would be easy for me to use EV wherever I want to go.	
	EE3	I find it easy to recover from the errors encountered when using EV.	
	EE4	It is easy for me to remember to remember how to perform EV easily.	
	EE5	Interacting with EV required a lot of my mental effort.	
	EE6	Becoming skilled and proficient in using electric vehicles is not difficult for me.	
Attitude Toward Using IoV Technology (My Wuling+)	ATI1	I think using IoV Technology (ex: My Wuling+) is a good idea.	(Uğur & Turan, 2019)
	ATI2	I like to use IoV Technology (ex: My Wuling+).	
	ATI3	I am eager to use IoV Technology (ex: My Wuling+).	
	ATI4	I am among the first to try IoV Technology (ex: My Wuling+).	
	ATI5	I look forward to using IoV Technology (ex: My Wuling+)	
Perceived Usefulness	PU1	Using IoV Technology (ex: My Wuling+) will increase my productivity.	(Liang et al., 2020; Venkatesh et al., 2012)
	PU2	Using IoV Technology (ex: My Wuling+) will increase the travel efficiency.	
	PU3	Using IoV Technology (ex: My Wuling+) enhance my living quality.	
	PU4	Using IoV Technology (ex: My Wuling+) makes it easier to do my activities.	
	PU5	In general, I think IoV Technology (ex: My Wuling+) will be useful	

Variable	Code	Indicator	Source
Perceived Ease of Use	PEU1	I can easily understand how to use IoV Technology (ex: My Wuling+).	(Liang et al., 2020; Venkatesh et al., 2012)
	PEU2	I think it would be easy for me to use IoV Technology (ex: My Wuling+) wherever I want to go.	
	PEU3	I find it easy to recover from the errors encountered when using IoV Technology (ex: My Wuling+).	
	PEU4	It is easy for me to remember to remember how to perform IoV Technology (ex: My Wuling+) easily.	
	PEU5	In general, I think it is to easy to use the features within the IoV Technology	
Perceived Risk	PR1	I believe in the general safety of IoV Technology (ex: My Wuling+).	(Lim, 2015; Liu et al., 2019)
	PR2	I'm not worried about the failure or malfunctions of IoV Technology (ex: My Wuling+) which may cause accidents.	(Lim, 2015; Liu et al., 2019)
	PR3	I believe IoV Technology (ex: My Wuling+) will not collect too much personal information from me.	
	PR4	I believe IoV Technology (ex: My Wuling+) will not use my personal information for other purposes without my authorization.	
	PR5	I believe IoV Technology (ex: My Wuling+) will not share my personal information with other entities without my authorization.	
Trust	TR1	IoV Technology is dependable.	(Koufaris & Hampton-Sosa, 2004; T. Zhang et al., 2019)
	TR2	I believe in the information that IoV Technology (ex: My Wuling+) provides me.	
	TR3	I can trust IoV Technology (ex: My Wuling+) features and safety.	
	TR4	I do not doubt the honesty of IoV Technology (ex: My Wuling +).	
	TR5	Overall, I can trust IoV Technology (ex: My Wuling+).	

3.2.Hypothesis

The following are the research's hypotheses, which are based on the research model in Figure 1.
H1: There is a significant positive relationship between Government Regulations to Intention to Use Electric Vehicle.

H2: There is a significant positive relationship between Facilitating Conditions to Intention to Use Electric Vehicle.

H3: There is significant positive relationship between Price Value to Attitude Toward Using Electric Vehicle

H4: There is significant positive relationship between Price Value to to Intention to Use Electric Vehicle.

H5: There is significant positive relationship between Hedonic Motivation to to Intention to Use Electric Vehicle.

H6: There is significant positive relationship between Social Factor to to Intention to Use Electric Vehicle.

H7: There is significant positive relationship between Environmental Factor to Intention to Use Electric Vehicle.

H8: There is significant positive relationship between Effort Expectancy to Intention to Use Electric Vehicle.

H9: There is significant positive relationship between Effort Expectancy to Attitude Toward Using Electric Vehicle.

H10: There is significant positive relationship between Performance Expectancy to Intention to Use Electric Vehicle.

H11: There is significant positive relationship between Performance Expectancy to Attitude Toward Using Electric Vehicle.

H12: There is significant positive relationship between Attitude to Intention to Use Electric Vehicle.

H13: There is significant positive relationship between Attitude Toward Using IoV Technology to Intention to Use Electric Vehicle.

H14: There is significant positive relationship between Perceived Usefulness to Attitude toward Using IoV Technology.

H15: There is significant positive relationship between Perceived Ease of Use to Attitude toward Using IoV Technology.

H16: There is significant negative relationship between Perceived Risk to Attitude Toward Using IoV Technology.

H17: There is significant positive relationship between Trust to Attitude toward Using IoV Technology.

4. Result & Discussion

Looking at the result of the questionnaire, the data that has been collected from Indonesian citizen who have the intention or have use the Electric Vehicle and already have experience or prior knowledge regarding the IoV applications (ex: My Wuling+). There were 327 respondents who filled the questionnaire and most of the respondent are men which covers 60% of the total respondents. Looking at the age of the respondents, most of the respondent are within the age range of 25 – 35 years old with 57% percentage, while 94.5% of the respondents has already got at least bachelor degree educations. From occupational side, the result is dominated by private employees (30.9%) and businessmen / self-employed with (29.7%) of the total result. 39.1% of the respondents have monthly income ranging from IDR 10.000.000,- to IDR 20.000.000,- noted with 26% of them having income between IDR 20.000.000,- to IDR 40.000.000,-. The result also shows that 81.3% of the respondents already own at least 1 car or more.

According to Hair & Babin (2018), convergent validity may be assessed by looking at the values of each variable's Average Variance Extracted (AVE) and each indicator's loading factor. For the questionnaire to be declared legitimate, the minimum AVE value for each variable and the minimum loading factor for each indication must be greater than 0.5 and 0.7(Sujarweni, 2015). Based on the theory, some of the indicators within this research were not valid as they did not meet the loading factor

value (> 0.7) and AVE (> 0.5). The result of the accepted indicators from each variable can be seen on Table 3 below:

Table 3. Validity test

Variables	Indicator	Loading Factor	AVE	Description
Attitude toward Using Electric Vehicle	AT1	0.752	0.593	Valid
	AT2	0.765		Valid
	AT3	0.757		Valid
	AT4	0.798		Valid
	AT5	0.777		Valid
Attitude toward Using IoV Technology	ATI1	0.737	0.581	Valid
	ATI2	0.754		Valid
	ATI3	0.80		Valid
	ATI4	0.724		Valid
	ATI5	0.794		Valid
Effort Expectancy	EE3	0.802	0.656	Valid
	EE4	0.838		Valid
	EE5	0.789		Valid
Environmental Factor	EF1	0.76	0.617	Valid
	EF2	0.757		Valid
	EF3	0.764		Valid
	EF4	0.795		Valid
	EF5	0.779		Valid
Facilitating Conditions	FC1	0.72	0.643	Valid
	FC2	0.745		Valid
	FC3	0.748		Valid
	FC4	0.768		Valid
	FC5	0.754		Valid
Government Regulation	GR1	0.768	0.682	Valid
	GR2	0.778		Valid
	GR3	0.745		Valid
	GR4	0.789		Valid
	GR5	0.791		Valid
	GR6	0.772		Valid
Hedonic Motivation	HM1	0.767	0.654	Valid
	HM2	0.792		Valid
	HM3	0.8		Valid
Hedonic Motivation	HM4	0.781	0.654	Valid
	HM5	0.743		Valid
Intention to Use Electric Vehicle	INT1	0.854	0.673	Valid
	INT2	0.83		Valid
	INT3	0.816		Valid
	INT4	0.821		Valid
	INT5	0.82		Valid
	INT6	0.779		Valid
	PE1	0.829	0.666	Valid

Variables	Indicator	Loading Factor	AVE	Description
Performance Expectancy	PE2	0.80		Valid
	PE3	0.822		Valid
	PE4	0.783		Valid
	PE5	0.844		Valid
Perceived Ease of use	PEU1	0.77	0.603	Valid
	PEU2	0.774		Valid
	PEU3	0.773		Valid
	PEU4	0.763		Valid
	PEU5	0.745		Valid
Perceived Risk	PR1	0.767	0.627	Valid
	PR2	0.742		Valid
	PR3	0.856		Valid
	PR4	0.788		Valid
	PR5	0.801		Valid
Perceived Usefulness	PU1	0.773	0.666	Valid
	PU2	0.808		Valid
	PU3	0.793		Valid
	PU4	0.778		Valid
	PU5	0.757		Valid
Price Value	PV2	0.744	0.644	Valid
	PV3	0.757		Valid
	PV4	0.803		Valid
	PV5	0.786		Valid
Social Factor	SF1	0.766	0.658	Valid
	SF2	0.746		Valid
	SF3	0.782		Valid
	SF4	0.768		Valid
	SF5	0.747		Valid
	SF6	0.777		Valid
Trust	TR1	0.824	0.655	Valid
	TR4	0.808		Valid
	TR5	0.795		Valid

After the removal some indicators that did not meet the criteria to ensure the validity, the next step that will be done is the reliability test. The Reliability test will be done by looking at the composite reliability and Cronbach Alpha of each variable which should be no lower than 0.7 (Ghozali, 2018). The overall result of the reliability test can be seen in Table 4 below:

Table 4. Reliability test

Variable Construct	Cronbach's Alpha	rho_A	Composite Reliability
Attitude toward Using Electric Vehicle	0.828	0.832	0.879
Attitude toward Using IoV Apps	0.819	0.822	0.874
Effort Expectancy	0.739	0.746	0.851
Environmental Factor	0.794	0.8	0.866

Variable Construct	Cronbach's Alpha	rho_A	Composite Reliability
Facilitating Conditions	0.717	0.726	0.843
Government Regulation	0.767	0.767	0.865
Hedonic Motivation	0.735	0.736	0.85
Intention to Use Electric Vehicle	0.903	0.904	0.925
Performance Expectancy	0.875	0.88	0.909
Perceived Ease of use	0.781	0.781	0.859
Perceived Risk	0.852	0.858	0.894
Perceived Usefulness	0.749	0.758	0.856
Price Value	0.723	0.723	0.844
Social Factor	0.74	0.741	0.852
Trust	0.739	0.748	0.85

According to the reliability test results in Table 4, each variable is reliable because its Composite Reliability and Cronbach Alpha values are both above 0.7. Furthermore, p-value analysis is used to perform hypothesis testing. If the p-value is less than 0.05, a hypothesis is accepted and the significance of the association between the variables is determined. The findings of the hypothesis test are displayed in Table 5.

Table 5. Hypothesis result

Hypothesis	Path Coefficient	T-statistics (|O/STDEV|)	P-value	Result
H1: Government Regulation → Intention to Use	0.138	2.739	0.006	Accepted
H2: Facilitating Condition → Intention to Use	-0.079	1.297	0.195	Rejected
H3: Price Value → Attitude Toward Using Electric Vehicle	-0.060	1.762	0.079	Rejected
H4: Price Value → Intention to Use	0.123	2.175	0.030	Accepted
H5: Hedonic Motivation → Intention to Use	0.117	0.929	0.353	Rejected
H6: Social Factor → Intention to Use	-0.124	0.892	0.373	Rejected
H7: Environmental Factor → Intention to Use	0.157	2.509	0.012	Accepted
H8: Effort Expectancy → Intention to Use Electric Vehicle	0.133	2.560	0.011	Accepted
H9: Effort Expectancy → Attitude Toward Using Electric Vehicle	0.216	4.361	0.000	Accepted

Hypothesis	Path Coefficient	T-statistics (|O/STDEV|)	P-value	Result
H10: Performance Expectancy → Intention to Use	-0.024	0.570	0.569	Rejected
H11: Performance Expectancy → Attitude Toward Using Electric Vehicle	0.195	3.260	0.001	Accepted
H12: Attitude Toward Using Electric Vehicle → Intention to Use	0.137	2.385	0.017	Accepted
H13: Attitude Toward Using IoV Technology → Intention to Use	0.409	7.073	0.000	Accepted
H14: Perceived Usefulness → Attitude Toward Using IoV Technology	0.155	3.571	0.000	Accepted
H15: Perceived Ease of Use → Attitude Toward Using IoV Technology	0.247	4.502	0.000	Accepted
H16: Perceived Risk → Attitude Toward Using IoV Technology	0.321	5.311	0.000	Accepted
H17: Trust → Attitude Toward Using IoV Technology	0.143	2.018	0.044	Accepted

Based on the hypotheses testing using by referring to the path coefficient and statistical significance, there are 12 hypotheses that were accepted, and 5 hypotheses that are rejected which includes H2 (Facilitating Conditions → Intention to Use), H3 (Price Value → Attitude Toward Using Electric Vehicle), H5 (Hedonic Motivation → Intention to Use), H6 (Social Factor → Intention to Use), H11 (Performance Expectancy → Attitude Toward Using Electric Vehicle). The 5 hypotheses were rejected due to the fact that the T-Statistic Value (should be higher than 1.96) and P Value (should be lower than 0.05) did not meet the minimum requirements.

Table 6. R-Square Result

	R Square	R Square Adjusted
Attitude Toward Using Electric Vehicle	0.256	0.250

	R Square	R Square Adjusted
Attitude Toward Using IoV Technology	0.475	0.468
Intention to Use Electric Vehicle	0.678	0.667

Looking at the results in Table 6, Performance Expectancy, Effort Expectancy, and Price Value collectively explain 25% of Attitude Toward Using Electric Vehicle, leaving 75% to other factors outside of this research. On the other hand, Perceived Risk, Perceived Usefulness, Perceived Ease of Use, and Trust accounted for 46.8% in defining Attitude Toward Using IoV Applications, with 53.2% attributed to external variables. Finally, the Intention to Use Electric Vehicle is clarified by 66.7%, including Government Regulations, Facilitating Conditions, Hedonic Motivations, Social Factor, Environmental Factor, Price Value, Performance Expectancy, Effort Expectancy, Attitude Toward Using EV, and Attitude Toward Using IoV Technology, leaving 33.3% to other variables outside of this study.

4.1. Government Regulations to Intention to Use

The hypothesis testing results reveal a positive significant effect of Government Regulations on the Intention to Use Electric Vehicles (EVs) with p-value of 0.006 and a T-statistic of 2.739. This finding contrasts with a prior study by Manutworakit & Choocharukul (2022), which reported that policy measures by the Thai government had no significant impact on EV intentions within the Thai market. The research suggests that although the Thai population expressed interest in government policies, there was a lack of government ability to convince consumers of the stability and certainty of these regulations. Additionally, the exemption of taxes for EVs emerged as a crucial aspect that consumers sought. The researchers posit that the significant result regarding Government Regulations may be attributed to direct tax exemptions introduced by the Indonesian government, along with other factors like exemptions from odd-even road policies, which can directly affect respondents' daily activities. The results also have important policy implications, highlighting the necessity for governments to create and disseminate policies that provide real advantages to consumers. A further layer of complexity is added by the integration of these government regulations with Internet of Vehicle (IoV) technology within the UTAUT framework. This integration calls for additional investigation to fully understand the ways in which regulatory support and technological acceptance work together to promote the adoption of electric vehicles.

4.2 Facilitating Conditions to Intention to Use

In contrast, Facilitating Conditions were found to have no significant influence on the Intention to Use Electric Vehicles (p-value: 0.195, T-statistic: 1.297), aligning with Manutworakit & Choocharukul (2022) previous research. This consistency in results may be linked to the limited experience of EV consumers with the necessary infrastructure in both Indonesia and Thailand, such as charging stations and service centers. The EV ecosystem in these countries remains underdeveloped compared to more advanced nations, where consumers have more experience with supportive facilities. This finding is corroborated by research in the Malaysian market, which emphasized the difficulty of receiving technical support due to inadequate infrastructure, including charging stations and after-sales services in developing countries like Malaysia and Indonesia (Khazaei, 2019). This collective evidence indicates that in order to improve the entire user experience and promote the widespread adoption of electric vehicles in these growing markets, it is imperative that technological developments and the supporting infrastructure be developed simultaneously.

4.3 Price Value to Intention to Use

A positive significant correlation is observed between Price Value and the Intention to Use Electric Vehicles, supported by a low P-value of 0.045 and a T-statistic of 2.012. This finding aligns with previous research, including Khazaei (2019) and a study in the Malaysian market by Vafaei-Zadeh et al., (2022), which also reported a positive relationship between Price Value and behavioral intention toward Electric Vehicles. However, this contradicts Manutworakit & Choocharukul (2022) research, where they suggested that the higher prices of Electric Vehicles might not significantly influence the intention to use them in Thailand. The discrepancy may stem from respondents' early awareness and understanding of the greater initial cost of new technology, or their belief in the long-term cost-efficiency and effectiveness of Electric Vehicles compared to traditional combustion engine cars.

4.4 Hedonic Motivation to Intention to Use

The study found no significant relationship between Hedonic Motivation and the Intention to Use Electric Vehicles, as indicated by a T-statistic of 0.929 and a P-value of 0.353. This contradicts prior research by Curtale et al., (2022) and Manutworakit & Choocharukul (2022), both of which identified significant links between hedonic motivation and the behavioral intention of Electric Vehicles. The researchers suggest that this disparity may be due to the majority of respondents not perceiving a substantial difference in the enjoyment and excitement of driving an Electric Vehicle compared to a traditional combustion engine vehicle. This discovery calls for more research into the particular elements of driving that are essential for the adoption of electric vehicles (EVs), as well as the contextual and cultural elements that can influence how different people perceive hedonic incentive in the adoption of sustainable transportation solutions. Comprehending these intricate relationships can be crucial in customizing strategies to successfully encourage the extensive integration of electric vehicles in Indonesia.

4.5 Social Factor to Intention to Use

The hypothesis testing indicates no significant relationship between the Social Factor and the Intention to Use Electric Vehicles, with a T-statistic of 0.892 and a P-value of 0.373. This contrasts with previous research findings by Khazaei (2019), Manutworakit & Choocharukul (2022), and Vafaei-Zadeh et al., (2022) which showed significant associations between these variables. Researchers suggest that the respondents in this study may not give significant weight to others' opinions and perspectives when deciding to use Electric Vehicles. Additionally, YenYuen & Yeow (2009) proposed that younger demographics are more influenced by peer opinions, which might explain the differing result, as 83 percent of the respondents in this research are over 25 years old, with almost half of them (n: 158) being older than 31 years, leaving only 17 percent (n: 56) in the younger than 25 years old demographic group. This age distribution suggests that the influence of social factors, particularly peer opinions, may be less pronounced among the surveyed population, contributing to the observed non-significant relationship.

4.6 Environmental Factor to Intention to Use

The findings indicate a significant positive relationship between the Environmental Factor and the Intention to Use Electric Vehicles, with a T-statistic of 2.509 and a P-value of 0.012. This aligns with previous research by Hu et al., (2023), Manutworakit & Choocharukul, (2022), Tanuwijaya & Balqiah, (2022), Vafaei-Zadeh et al., (2022), and Wu et al., (2019), all of which have also established a substantial connection between the Environmental Factor and the behavioral intention to use Electric Vehicles. This suggests that many respondents consider environmental concerns when contemplating Electric Vehicle usage, with growing awareness through social media and the internet highlighting Electric Vehicles as a promising solution to pressing environmental issues (Manutworakit & Choocharukul, 2022). As the nation grapples with increasing environmental challenges, these research

findings offer valuable insights for stakeholder to encourage the widespread adoption of Electric Vehicles as part of a broader strategy to address ecological concerns.

4.7 Effort Expectancy and Performance Expectancy to Intention to Use

The result reveals divergent results between Effort Expectancy and Performance Expectancy in relation to the Intention to Use Electric Vehicles. Effort Expectancy shows a significant positive relationship (T-statistic: 2.560, P Value: 0.011), supported by research by Hoang et al., (2022), Jain et al., (2022), and Manutworakit & Choocharukul, (2022), suggesting that respondents highly prioritize the ease-of-use aspect when deciding to adopt Electric Vehicles. The findings suggest that the Performance Expectancy does not significantly influence the Intention to Use Electric Vehicles. Another research by Vafaei-Zadeh et al., (2022) discovered in the Malaysian population that Performance Expectancy has no direct relationship with the Intention to Use Electric Vehicles. Instead, it shows a significant positive relationship with the Attitude to Use Electric Vehicles. This aligns with the present study, suggesting that Performance Expectancy indirectly affects the Intention to Use Electric Vehicles (T-statistic: 3.260, P Value: 0.001) through its strong relation to Attitude, potentially influenced by other variables such as Price Value, Environmental Factor, and the mediating effect of Attitude covering the majority of the overall effect. These results highlight the necessity of a comprehensive grasp of user attitudes and perceptions that takes into account both the real-world and experiential factors, in order to effectively promote the adoption of electric vehicles in the Indonesian setting.

4.8 Variables Affecting Attitude Toward Using Electric Vehicle

This study examines the influence of Performance Expectancy, Effort Expectancy, and Price Value on the Attitude to Use Electric Vehicles. The results indicate a significant positive relationship between Performance Expectancy (T-statistic: 3.269, P Value: 0.001) and Effort Expectancy (T-statistic: 4.361, P Value: 0.000) to the Attitude to Use Electric Vehicles, aligning with findings from Vafaei-Zadeh et al., (2022) in the Malaysian market and Gunawan et al., (2022). This suggests that the perception of Electric Vehicles, in terms of enhanced efficiency, cost-effectiveness, and ease of use, contributes to a positive attitude. However, despite its direct significant relationship with the Intention to Use Electric Vehicles, there is no significant association between Price Value and the Attitude Toward Using Electric Vehicles (T-statistic: 1.762, P Value: 0.079), a result consistent with Vafaei-Zadeh et al., (2022) research. This implies that price plays a lesser role in shaping attitudes toward Electric Vehicle use. The inverse quadratic relationship proposed by Dodds et al., (1991) suggests that price may influence attitude positively at one level and negatively at another, disrupting a linear relationship. Additionally, moderating factors such as product cost as a percentage of income and digital knowledge among respondents may contribute to this result, with technology utility potentially outweighing cost considerations.

4.9 Variables Affecting Attitude Toward Using IoV Technology

This study examines variables influencing Attitude Toward Using Internet of Vehicles (IoV) Technology, including Perceived Risk, Perceived Usefulness, Perceived Ease of Use, and Trust. The results reveal that all tested variables have a significant relationship with Attitude Toward Using IoV Technology. Perceived Usefulness (T-statistic: 3.571, P Value: 0.000), Perceived Ease of Use (T-statistic: 4.502, P Value: 0.000), Perceived Risk (T-statistic: 5.311, P Value: 0.000), and Trust (T-statistic: 2.018, P Value: 0.044) all exert a significant influence on attitudes toward IoV Technology. Consistent with Liang et al., (2020), Perceived Usefulness and Trust exhibit a positive relationship with Attitude toward Using IoV-Based Services. The importance of Perceived Usefulness lies in its impact on respondent effectiveness and productivity, while Trust plays a pivotal role, addressing consumer concerns about the safety and capability of IoV-Based Services. However, Liang et al., (2020) research differs in its results on the relationship between Perceived Ease of Use and Perceived Risk to Attitude

toward Using IoV Technology. Although no direct correlations were found, the study asserts that both variables are necessary conditions for fostering positive behavioral intentions and attitudes toward IoV services. Other research, such as Nastjuk et al., (2020), indicates a positive and significant relevance between Perceived Ease of Use and Attitude toward Using IoV-based technology, suggesting that the perceived ease of use influences attitudes. Additionally, studies by Kapser & Abdelrahman (2020) and Lim (2015), highlight a significant correlation between Perceived Risk and user attitudes and behavioral intentions toward certain technologies, emphasizing that lower risk and higher safety positively influence attitudes toward using technologies like IoV-based services. The broad spectrum of factors impacting views about IoV technology is highlighted by these complex findings, which provide insightful information for industry stakeholders, politicians, and researchers aiming to improve the adoption and consumption of IoV-based services in Indonesia.

4.10 Attitude Toward Using Electric Vehicle to Intention to Use

The result reveals a significant positive correlation between Attitude Toward Using Electric Vehicles and Intention to Use Electric Vehicles, supported by a T-statistic of 2.385 and a P Value of 0.017. This finding aligns with previous research by Gunawan et al., (2022) and Vafaei-Zadeh et al., (2022) reinforcing the notion that a more positive attitude toward Electric Vehicles corresponds to a greater inclination to use them. The alignment with previous studies adds credibility to the consistency of the relationship observed across different contexts. It suggests that efforts to enhance the positive image of Electric Vehicles, perhaps through awareness campaigns, educational initiatives, or experiential marketing, can directly contribute to fostering a more favorable intention among consumers to embrace and utilize Electric Vehicles. As the automotive landscape transitions toward sustainability, understanding and leveraging this connection between attitude and intention becomes imperative for policymakers, industry stakeholders, and advocates seeking to accelerate the adoption of Electric Vehicles in Indonesia.

4.11 Attitude Toward Using IoV Technology to Intention to Use

The research outcomes demonstrate a noteworthy positive correlation between Attitude Toward Using Internet of Vehicle (IoV) Technology and Intention to Use Electric Vehicles, with a T-statistic of 7.703 and a P Value of 0.000. These findings are consistent with previous studies conducted by Buckley et al., (2018) and Nastjuk et al., (2020) which also identified a positive relationship between attitude toward using IoV-Based Services and the behavioral intention to use specific technology. Therefore, it suggests that a more positive attitude toward employing IoV Technology corresponds to a higher likelihood of using Electric Vehicles. The correlation's implications go beyond the particular study scenario; it suggests that consumers' inclinations to adopt electric vehicles are significantly shaped by their acceptance and positive impressions of IoV technology. For stakeholders hoping to promote the adoption of both IoV technology and electric vehicles in Indonesia, comprehending and fostering this optimistic mindset will become crucial as IoV technology develops and becomes more integrated into the automotive scene. In the context of developing and interconnected technologies like IoV and Electric Vehicles, these findings offer insightful information for policymakers, industry executives, and researchers. They emphasize the interconnection of attitudes about technology and its impact on broader behavioral intentions.

4.12 Mediation Analysis

To further the indirect influence of some variables, several variables that are mediated through attitude variable will be highlighted within this part. First the Price Value and the Intention to Use Electric Vehicles are significantly correlated, although there is no significant correlation between Price Value and the mediating variable of Attitude Toward Using Electric Vehicles. This suggests that price has a limited impact on shaping attitudes toward Electric Vehicle use. Other findings also stated that the effort

expectancy holds both direct and indirect influence to the intention to use electric vehicle. While on the other hand, the Performance Expectancy only shown significant correlation through the mediation of Attitude Toward Electric Vehicle. The research suggests that other variables, such as Price Value, Environmental Factor, and the mediating effect of Attitude itself, could collectively cover the majority of the direct effect on the Intention to Use Electric Vehicles. Nonetheless, further research is encouraged to find the indirect and direct correlations of the variables to the intention to use electric vehicle.

From the overall result, by looking at the T-statistic value and the patch coefficient result, it can also be interpreted that the attitude toward using IoV technology (7.703) and effort expectancy (2.56) has the most influence regarding to the intention to use electric vehicle. While the attitude toward using IoV technology itself are being heavily influenced by Perceived Risk (5.311) and Perceived Ease of Use (4.502). Furthermore, the attitude to use electric vehicle are also being highly influenced by Effort Expectancy (2.56) and Performance Expectancy (2.509).

5. Conclusions

By looking at the result of the hypotheses testing from the previous chapter, this study yields valuable insights for industry stakeholders and policymakers seeking to promote the adoption of electric vehicles in Indonesia. The paramount importance of government regulations and incentives underscores the need for collaboration between industry managers and policymakers to advocate for favorable policies, including direct tax exemptions and the exemption of odd-even regulations, to stimulate the usage of electric vehicles. Additionally, the emphasis on the price value of electric vehicles highlights the necessity for industry managers to continue making them cost-effective and accentuate long-term cost savings in their marketing efforts, effectively communicating these economic advantages to potential buyers.

Furthermore, by uncovering the pivotal roles of government policy, environmental values, cost considerations, and ease-of-use perceptions in shaping decisions regarding electric vehicle adoption, this study provides substantial empirical and theoretical contributions. It adds depth to the relatively unexplored literature on emerging mobilities in the Indonesian context and advances scholarly understanding of technology acceptance models by incorporating contextual factors such as government regulations, Internet of Vehicle, and environmentalism. Moreover, the practical implications, including the emphasis on purchase incentives, cost-effectiveness, pro-environment messaging, and user-friendly vehicle experiences, offer tangible value to policymakers and industry managers aiming to facilitate Indonesia's transition to sustainable transport. Nonetheless, the generalizability of the findings may be limited due to sample characteristics, and further validation through expanded consumer profiling is recommended. Comparative studies across Southeast Asian countries dealing with automobile emissions could also yield valuable insights into contextual variations in electric vehicle adoption trends.

Based on the insights garnered from this research, several recommendations are proposed for future studies. Firstly, given the dynamic and expansive nature of the Electric Vehicle user base in Indonesia, it is advisable to conduct future research with a broader and more diverse audience to continually measure and update the findings. Furthermore, considering the limited availability of information in Indonesia, there is a specific need for in-depth exploration of Internet of Vehicle Applications and Services to comprehensively understand their impact and effectiveness on Electric Vehicles and other related technologies. Lastly, further investigation is warranted to examine the correlations between additional variables that could influence the intention to use Electric Vehicles in the Indonesian market. Several recommended variables that might be added for future research includes brand loyalty, fuel efficiency, and various other factors.

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APPENDICES

A. Full Questionnaire Construct

Research Survey		
CHAPTER I – Respondent Profile		
Gender	◯ Male	◯ Female
Age	◯ < 25 ◯ 36 - 40	◯ >50
	◯ 25 - 30	◯ 41 - 45
	◯ 31 - 35	◯ 46 - 50
Last educational level	◯ Highschool	
	◯ Diploma (D1 – D3)	
	◯ Bachelor (S1 / D4) and above	
Occupation	◯ Student	
	◯ Private Employee / BUMN / BUMD	
	◯ Businessman / *self-employed*	
	◯ Professional (doctor, lawyer, consultant, dll.)	
	◯ Civil Servant	
	◯ Unemployed / Retiree	
	◯ Others, ……	
Monthly Income	◯ < Rp. 5.000.000,-	
	◯ Rp. 5.000.000,- s.d. Rp. 10.000.000,-	
	◯ Rp. 10.000.000,- s.d. Rp. 20.000.000,-	
	◯ Rp. 20.000.000,- s.d. Rp. 40.000.000,-	
	◯ > Rp. 40.000.000,-	
Number of Car Owned	◯ 0	
	◯ 1	
	◯ 2	
	◯ 3	
	◯ > 3	

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
A	**Intention to Use**					

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
1	If I were to purchase a vehicle within the next 5 years, I would buy and use an EV.					
2	I would recommend using the electric car to other people.					
3	There is a high probability that my next Vehicle will be an EV.					
4	I prefer to buy and use EV rather than traditional vehicles.					
5	I intend to drive an electric car in the near future					
6	I look forward to the introduction of various electric vehicle brands on the market.					
B	**Government Regulations**					
7	The Purchase Subsidy is able to persuade me to use EV.					
8	The Tax Rebates and Exemptions are able to persuade me to use EV.					
9	The non-monetary regulations of Odd-Even Policy Exemption are able to persuade me to use EV.					
10	The Special Parking Spot is able to persuade me to use EV.					
11	The Free Electricity Upgrade is able to persuade me to use EV.					
12	The Free Charging Facilities are able to persuade me to use EV.					
C	**Facilitating Conditions**					
13	If necessary facilities exist, I would use EV.					
14	I have the necessary knowledge that made me want to use and buy an EV.					
15	EV is compatible with other technology that I use.					
16	Other people can help me when I have difficulties in using EV.					
17	I will drive EV if there is enough guidance and instructions on how to use it					
D	**Price Value**					
18	EV are reasonably priced					
19	Using and buying EV will benefit me in the long-term in the context of expense					

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
20	EV offer value for money					
21	Price is important factor when it comes to buying and using EV					
22	EV price is the most important factor when deciding to buy an EV or not.					
E	**Hedonic Motivation**					
23	Driving EV is fun					
24	Driving EV is enjoyable					
25	Driving an EV is entertaining due to its smooth acceleration.					
26	To me, driving EV is stimulating					
27	To me, driving and EV is an adventure					
F	**Social Factor**					
28	EV have a positive image in society.					
29	I will use an EV if many people use them on the street.					
30	People who have an opinion I care about believe that EV is good.					
31	Driving an EV will attract attention to me					
32	Having EV will reflect my personality.					
33	Having EV will increase my status symbols to others.					
G	**Environmental Factor**					
34	By using and buying EV I can preserve the environment.					
35	I want to buy an EV because of the high air pollution crisis.					
36	By using and buying EV I can contribute to help preserve the environment for the next generation.					
37	I want to use EV because it can help with reducing overall pollution.					
38	By using EV I believe I can help reduce global warming.					
H	**Performance Expectancy**					
39	Using EV will increase my productivity.					

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
40	Using EV will increase the travel efficiency					
41	Using EV enhance my living quality					
42	Using EV makes it easier to do my activities.					
43	I find EV useful.					
I	**Effort Expectancy**					
44	I can easily understand how to use an EV.					
45	I think it would be easy for me to use EV wherever I want to go.					
46	I find it easy to recover from the errors encountered when using EV.					
47	It is easy for me to remember how to perform EV easily.					
48	Interacting with EV required a lot of my mental effort.					
49	Becoming skilled and proficient in using electric vehicles is not difficult for me.					
J	**Attitude toward Using Electric Vehicle**					
50	In general, I think it is good to use EV					
51	In general, I think it is wise to use EV					
52	In general, I think it is very satisfying to use EV					
53	I am among the first to adopt EV as a new technology.					
54	I look forward to using EV					
K	**Attitude toward Using IoV Technology**					
55	I think using IoV Technology (ex: My Wuling+) is a good idea.					
56	I like to use IoV Technology (ex: My Wuling+).					
57	I am eager to use IoV Technology (ex: My Wuling+).					
58	I am among the first to try IoV Technology (ex: My Wuling+).					
59	I look forward to using IoV Technology (ex: My Wuling+)					
L	**Perceived Usefulness**					

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
60	Using IoV Technology (ex: My Wuling+) will increase my productivity.					
61	Using IoV Technology (ex: My Wuling+) will increase travel efficiency.					
62	Using IoV Technology (ex: My Wuling+) enhances my living quality.					
63	Using IoV Technology (ex: My Wuling+) makes it easier to do my activities.					
64	In general, I think IoV Technology (ex: My Wuling+) will be useful					
M	**Perceived Ease of Use**					
65	I can easily understand how to use IoV Technology (ex: My Wuling+).					
66	I think it would be easy for me to use IoV Technology (ex: My Wuling+) wherever I want to go.					
67	I find it easy to recover from the errors encountered when using IoV Technology (ex: My Wuling+).					
68	It is easy for me to remember how to perform IoV Technology (ex: My Wuling+) easily.					
69	In general, I think it is to easy to use the features within the IoV Technology (ex: My Wuling+).					
N	**Perceived Risk**					
70	I believe in the general safety of IoV Technology (ex: My Wuling+).					
71	I'm not worried about the failure or malfunctions of IoV Technology (ex: My Wuling+) which may cause accidents.					
72	I believe IoV Technology (ex: My Wuling+) will not collect too much personal information from me.					
73	I believe IoV Technology (ex: My Wuling+) will not use my personal information for other purposes without my authorization.					
74	I believe IoV Technology (ex: My Wuling+) will not share my personal information with other entities without my authorization.					
O	**Trust**					

No.	Questions / Indicators	Likert Scale				
		1	**2**	**3**	**4**	**5**
75	IoV Technology (ex: My Wuling+) is dependable.					
76	I believe in the information that IoV Technology (ex: My Wuling+) provides me.					
77	I can trust IoV Technology (ex: My Wuling+) features and safety.					
78	I do not doubt the honesty of IoV Technology (ex: My Wuling +).					
79	Overall, I can trust IoV Technology (ex: My Wuling+).					