Artificial Intelligence In The Electric Vehicle Ecosystem: Adoption; Impact; And Future Prospect

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Abstract

Artificial Intelligence (AI) has been around since 1940, namely the first digital computer called Atanasoff Berry Computer (ABC) which aroused the enthusiasm of scientists to develop the idea of making an "electronic brain" or hiding electronic devices in the human brain . With Artificial Intelligence (AI) that can work efficiently, of course, work can be done more easily. The purpose of writing this scientific paper is to explain the use of Artificial Intelligence (AI) in the automotive industry which can make it easier for humans in the future. The method taken by the author is through observations obtained from browsing (searching) through the internet, quoting from various written sources and books that match the theme. Artificial Intelligence (AI) is created in machines and made capable of applying them in real life. Artificial Intelligence (AI) embedded in the steering wheel for self-driving cars complements the driver's abilities when it comes to driving. So that the driver can drive more safely. In the automotive industry, Artificial Intelligence (AI) can be implemented to find a balance point between reactive maintenance (risk of failure) and preventive maintenance (can incur high costs) which uses sensors to track equipment conditions and analyze data on an ongoing basis. An example of the application of Artificial Intelligence (AI) in automotive is in its manufacture by carrying out monitoring processes, errors, downtime and optimizing production operations.

Keywords: *AI, Automotive, Electric Cars, Vehicles, Technology.*

1. Introduction

Currently, technological advances dominate every aspect of human life as consumers of technology. The need for industry 4.0 is increasing rapidly as it provides automation and data exchange in manufacturing technology. Advanced technology is permitted by the concept of Artificial Intelligence (AI), whose presence provides both convenience and challenge for humans towards a super sophisticated civilization. With the very fast growth of technology, it makes it easier for humans to innovate to develop Artificial Intelligence (AI) which is in line with the growth of science and technology throughout the world.

The concept of Artificial Intelligence (AI) is very attractive for people to use it in everyday life, the concept of Artificial Intelligence (AI) is widely used because of its ease and efficiency, it is accurate and can be controlled easily. One of them is the use of Artificial Intelligence (AI) in the automotive industry which has been widely developed and has been widely produced which makes the importance of Artificial Intelligence (AI) in the industrial world, especially the automotive industry.

Benefits of Scientific Writing Research:

- Can provide new innovations related to Artificial Intelligence (AI) technology which is entering industrial development, especially the automotive industry.
- The use of Artificial Intelligence (AI) is a useful reference for human life.
- Providing more knowledge to the wider community about the adoption, impact and prospects of Artificial Intelligence (AI) in the electric vehicle ecosystem in the automotive industry.

Based on the problem formulation developed, the aim of writing this scientific work is to explain the adoption, impact and future prospects of artificial intelligence (AI) in the electric vehicle ecosystem which has a significant influence on the automotive industry, especially in developing and optimizing electric vehicles and car technology without drivers.

2. Literature Review

In writing this Scientific Work, the literature review used. is previous research, books, national and international journals related to the research title as a theoretical basis for our research.

2.1. Theory

Journal written by ES Soegoto, RD Utami, and YA Hendrawan in 2022. With the title "The Influence of Artificial Intelligence in the Automotive Industry". This research uses descriptive research methods where data is obtained from existing facts. The results obtained that the presence of artificial intelligence in the automotive world can improve human driving safety, increase free time to do other things, and improve transportation services for the better.

2.2. Theory 2

In another research, conducted by Roy Mubarak entitled "Implementation of Artificial Intelligence in Automotive Manufacturing Industrial Processes" in 2020. This research used research methods in the form of literature studies through several sources such as review papers and books related to the title of the research . The results obtained from this research indicate that AI technology has been used as a tool for solving optimization problems in automotive manufacturing systems.

3. Material and Method

The research began with an extensive literature review to understand the landscape of AI adoption in EVs, its impact, and future prospects. Relevant sources are identified and analyzed to gain deep insights. Apart from that, the author also developed a questionnaire consisting of open and closed questions to obtain quantitative and qualitative data. This questionnaire was distributed via an online platform to EV users and related professionals. As well as collecting data from company reports and news articles to compile detailed case studies of several companies in the EV space.

3.1. Design Study

This research aims to identify the adoption rate of artificial intelligence (AI) in electric vehicles (EVs), analyze its impact on efficiency, safety and user satisfaction, and assess the future prospects of AI in the EV industry. The research approach used includes quantitative and qualitative methods. The quantitative approach involves collecting and analyzing numerical data from surveys and industry reports. Meanwhile, a qualitative approach involves in-depth interviews and case studies to gain deeper insight into user experiences and expert perspectives.

The population of this study consists of electric vehicle users in Indonesia as well as people who are very passionate about AI and automotive fields. The samples taken were 40 randomly selected EV users and 20 people who had hobbies in the fields of AI and automotive. The research instruments used include a questionnaire containing closed and open questions to measure the level of AI adoption, its impact, and future perceptions. Secondary data is also collected from reliable industry statistics and reports, such as from a report by one EV company. The data collection procedure begins with an online survey, where a questionnaire is distributed via an online platform to a selected sample. Additionally, secondary data was collected from relevant literature, industry reports, and scientific publications.

3.2. Data Analysis

After the research instrument has been prepared, the next step is to distribute the questionnaire form online via social media. After obtaining the sample size, the data was analyzed using SEM PLS using SmartPLS 3.0.

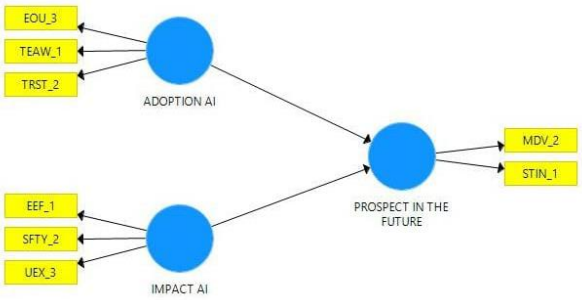

Figure 1. Research Model

4. Result

There are 3 stages in the measurement model, and the first is to analyze internal consistency. Second, evaluate the validity of the construct. Furthermore, the final step is to determine discriminant validity. The internal consistency value is obtained by assessing Cronbach alpha (CA) and Composite Reliability (CR) values. The recommended value to meet good reliability is above 0.7.

4.1 Outer Model

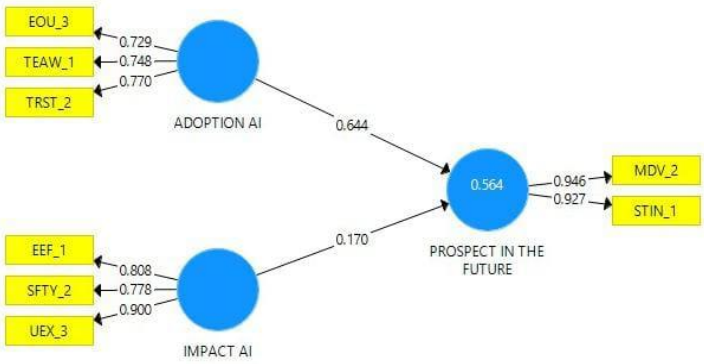

Figure 2. Model Smart PLS 3.0

Matrix

	ADOPTION AI	IMPACT AI	PROSPECT IN ...
EEF_1		0.808	
EOU_3	0.729		
MDV_2			0.946
SFTY_2		0.778	
STIN_1			0.927
TEAW_1	0.748		
TRST_2	0.770		
UEX_3		0.900	

Figure 3.Outer Loadings

Construct Reliability and Validity

Matrix	Cronbach's Alpha	rho_A	Composite Reliability	Average V
	Cronbach's Al...	rho_A	Composite Rel...	Average Varian...
ADOPTION AI	0.613	0.616	0.793	0.561
IMPACT AI	0.778	0.833	0.869	0.689
PROSPECT IN ...	0.860	0.872	0.934	0.877

Figure 4. Cronbach's Alpha and Composite Reliability

R Square

Matrix	R Square	R Square Adjusted
	R Square	R Square Adjus...
PROSPECT IN ...	0.564	0.549

Figure 5. R Square

The prospect in variable has an R Square value of 0.564, this is in the medium category according to expert Chin 1998. The R-squared value is 0.564. This indicates that 56.4% of the variance in the prospect in variable studied is explained by the variance of the independent variable. Another 44.6% was influenced by other factors.

4.2 Inner Model

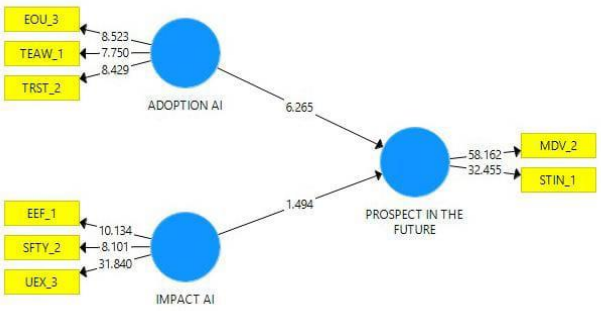

Figure 6. Model Smart PLS 3.0

Outer Loadings

Mean, STDEV, T-Values, P-Va... | Confidence Intervals | Confidence Intervals Bias C... | Samples | Co

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O...	P Values
EEF_1 <- IMPA...	0.808	0.792	0.080	10.134	0.000
EOU_3 <- ADO...	0.729	0.722	0.085	8.523	0.000
MDV_2 <- PRO...	0.946	0.943	0.016	58.162	0.000
SFTY_2 <- IMP...	0.778	0.768	0.096	8.101	0.000
STIN_1 <- PRO...	0.927	0.922	0.029	32.455	0.000
TEAW_1 <- AD...	0.748	0.736	0.097	7.750	0.000
TRST_2 <- AD...	0.770	0.752	0.091	8.429	0.000
UEX_3 <- IMPA...	0.900	0.901	0.028	31.840	0.000

Figure 7. T Statistics

Statistical T test, the value must be above 1.96. From the table above, All Indicators that are related to each other have a statistical T value above 1.96 it can be said that all indicators have achieved validity Construct

5. Conclusion

This research shows that the adoption of AI in electric vehicles is driven by technology awareness and trust. AI's positive impact on energy efficiency, safety and user experience underscores the importance of AI in the electric vehicle industry. The bright future prospects for AI in electric vehicles paint an optimistic picture of future developments in electric vehicle technology and markets. The results of this research can be used by policy makers, electric vehicle manufacturers, and AI technology developers to design effective strategies for promoting AI and improving electric vehicle performance.

6. Reference

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