

The Impacts of Carbon-neutral Renewable Energy Characteristics on Purchase Intention: Focusing on Chinese Electric Vehicles

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Abstract. Climate change affects each of us and has significant implications for the global economy. Replacing gasoline-powered vehicles with electric cars is key to reducing carbon emissions in transportation systems around the world. The popularity of electric cars has accelerated in recent years. Global sales of electric vehicles have increased by 56% annually since 2012. Its sales in 2021 doubled from the previous year to 6.75 million units, a record high. In the coming years, many governments have introduced policies to limit or even ban the production of fuel cars, while reducing or exempting taxes on electric vehicles. Governments and businesses around the world are investing heavily in charging facilities. Compared to fuel vehicles, new generation consumers are more likely to buy electric vehicles. This will continue to drive growth in the supply and demand for electric vehicles. The transition from gasoline vehicles to electric vehicles is a global structural change that will offer enormous potential opportunities for market participants. The purpose of this study is to identify the impact of the characteristics of renewable energy under the background of carbon neutrality on government policy, corporate development, and consumers' purchasing intentions. The research object is the consumers of electric vehicles in China, and the statistical analysis used SPSS 23.0 and Smart PLS 4.0. The results of the study are as follows. First, has had a significant impact on government policy. Second, circularity has had a significant impact on government policy. Third, economics has had a significant impact on government policy. Fourth, persistence had no significant effect on the development of enterprise. Fifth, circularity had a significant impact on enterprise development. Sixth, economics had a significant impact on the development of enterprise. Seventh, government policies have had a significant impact on purchase intentions. Eighth, the development of enterprise had a significant influence on purchase intention. Through this study, it has been confirmed that if the characteristics of renewable energy are clear, consumers' intention to purchase electric differential vehicles increases.

Keywords: carbon-neutral, renewable energy, electric car, resource recovery, purchase intention

1. Introduction

Due to rapid climate change, it is necessary to change the energy policy to realize carbon neutrality. The national greenhouse gas reduction target (NDC) for 2030 and the 2050 carbon neutral scenario were discussed and approved in the cabinet meeting that was held on October 27, 2021, the day the milestone for 2050 carbon neutrality was prepared by the Ministry of the Environment. Accordingly, the government decided to reduce 40% of national greenhouse gas emissions compared to 2018 by 2030 as an intermediate goal of carbon neutrality by 2050 (Duan 2018).

The government is also promoting various policies to preoccupy the EVFCEV market as part of responding to the climate crisis by reducing greenhouse gas emissions. A paradigm shift to expand the supply of environmentally friendly vehicles is currently underway in countries all over the world due to the strengthening of global environmental regulations. Here, carbon neutrality refers to a state in which emissions due to human activities are reduced to prevent an increase in the concentration of carbon dioxide in the atmosphere, and the amount of absorption increases, so that the net emission becomes zero (Dijkstra 2012).

An electric vehicle is a vehicle that generates driving force by supplying electric energy from a high-voltage battery to an electric motor. Unlike an internal combustion engine, an electric vehicle drives the vehicle with only a battery and a motor without an engine. It is a pollution-free vehicle. The current government is subsidizing the purchase of electric vehicles to increase the penetration rate of electric vehicles. This is a way to support tax revenues based on vehicle displacement from car owners. The government is insisting on the abolition of the internal combustion engine for carbon neutrality, but if the current vehicle tax structure is maintained and the eco-friendly vehicle target is met, it is estimated that the tax revenue will decrease by about 15.3 trillion won from 16.7 trillion won in 2020 to 1.4 trillion won in 2050. Faced with the current international situation, President Xi Jinping made the following clear statement to the world: Aiming to achieve a realistic peak in carbon emissions by 2030, achieve the target of carbon neutrality, and make a greater contribution to the global response to climate change (Kim 2020).

Therefore, based on previous studies, this study aims to identify sustainability, circularity, and economic factors as attributes constituting the characteristics of renewable energy, and to confirm the relationship of their influence on consumer purchase intention through empirical research. Based on earlier research, the attributes of renewable energy were divided into three categories: sustainability, circularity, and economic feasibility as causal variables affecting governmental and

corporate development, and governmental and corporate development as causal variables influencing consumer purchase intention.

The purpose of this study is to analyze the characteristics of renewable energy that affect government policy, corporate development, and purchase intention of electric vehicles in the background of carbon neutrality. The subjects of the study were Chinese consumers with the intention to purchase electric vehicles, and the structural equation package Smart PLS 4.0 was used for statistical analysis. This study aims to promote the development of electric vehicles and related industries by analyzing the characteristics of renewable resources as well as the relationship between government policy and corporate development and consumer purchase intention against the background of carbon neutrality.

2. Theoretical Background

2.1. Carbon-neutral

It is urgent to achieve carbon neutrality. Studies have shown that rising temperatures will bring about extreme weather, which will seriously threaten the living environment of human beings, and the first manifestation of climate change is extreme dry weather.

Most of the earth's surface is covered by the ocean, and there is not much land suitable for human survival, so drought will intensify the development of desertification, affecting food production and causing famine. If current climate change forecasts are accurate, Africa will be the hardest afflicted by famine half a century from now. Second, high carbon ash emissions have resulted in an increase in extreme weather, global warming has resulted in an increase in glacial meltwater and a sharp rise in sea level, endangering coastal cities and residents. Experts predict that if not effectively controlled, sea level rise will devastate more than 2 billion people worldwide, so the implementation of "carbon neutrality" is a matter of urgency. Climate change has long been on people's radar, and "carbon neutrality" has just been proposed as an international development guideline to find a solution to climate change.

Carbon neutrality refers to making actual emissions zero by absorbing carbon dioxide emitted by individuals, companies, and organizations. In other words, it is also called 'Net-Zero' as it equalizes the amount of carbon emitted and absorbed so that carbon 'net emission is 0'. To absorb greenhouse gases, calculate the amount of carbon dioxide emitted and offset pollution by planting trees equal to the amount of carbon or investing in clean energy fields such as wind and solar power generation (Bouckaert 2021).

Carbon neutrality has become a global topic since the Paris Agreement, which took effect in 2016, with 121 countries joining the '2050 Carbon Neutral Goal Climate Alliance'. In addition, as awareness of the seriousness of climate change

has expanded due to the COVID-19 crisis in 2020, and the deadline for submitting the '2050 Long-term Low Carbon Development Strategy (LEDS)' to the United Nations (UN) expires at the end of 2020, the declaration of carbon neutrality in major countries is accelerating. In fact, starting with the European Union in December 2019, carbon neutrality declarations such as China (September 22, 2020), Japan (October 26, 2020), and Korea (October 28, 2020) have been followed (Huovila 2022).

2.2. Characteristics of Renewable Energy

2.2.1. Sustainability

Sustainability is a concept that was introduced and developed in the broad framework of 'economic development and environment'. Corporate Social Responsibility (CSR), which presents environmental, social, and ethical responsibilities for a company to exist as a 'going concern', has been steadily attracting attention from academics for the past few decades, and environmental (The name was changed to ESG, a coined word made from the first letters of the alphabet for Environment, Society, and Governance, and is in the limelight again. Many companies, not just the academic world, are investing heavily in CSR or ESG, and using it as their own means of publicity. Renewable energy (solar heat, photovoltaic power generation, biomass, wind power, small hydropower, geothermal heat, ocean energy, waste energy) and new energy in three fields (fuel cell, coal liquefaction, and hydrogen energy) are designated as energy. It is environmentally friendly as it does not emit pollutants or carbon dioxide. It is relatively evenly distributed across the globe compared to fossil fuels. According to the product launch plans released by major automobile companies, it is expected that around 2012 will usher in a climax in the development of international electric vehicle industrialization. The global automotive industry has long been actively exploring and promoting the transformation of transportation energy power systems in order to break the energy and environmental constraints and achieve sustainable development. Especially since 2008, the world automobile industry has entered a period of comprehensive transportation energy transformation, and the development of electric vehicles has become a highly consensual technical route to achieve transportation energy transformation, and the world electric vehicle industry has entered a new era.

2.2.2. Circularity

The carbon cycle is the biochemical cycle of carbon between the biosphere, lithosphere, hydrosphere, and atmosphere on Earth (Hossain 2022). The carbon cycle plays a very important role in Earth's chemical and thermal evolution. Carbon is overwhelmingly present in the hydrosphere, but carbon present in the atmosphere

is much more important than carbon present in the hydrosphere. In particular, the supply and removal of carbon-centered in the atmosphere is a very important topic of modern science in relation to global climate change. Carbon exists in the atmosphere mainly in the form of carbon dioxide. Carbon dioxide is supplied into the atmosphere by decarbonation processes followed by volcanic eruptions, uplift of organic carbon, burning of fossil fuels, erosion, and the respiration of living organisms. Among these, the most important role during geologic time is the production of carbon dioxide by volcanic eruptions.

Renewable energy, unlike fossil fuels, is not depleted because it is renewable. There are some mineral resources that cannot be avoided, the mineral deposits are limited, but must be used, then all kinds of resources are recovered, and then reused, this is the necessity and significance of resource recovery and recycling to reduce the amount of solid waste generated, the maximum rational development of resources and energy. Solid waste has been generated for recovery and processing, recycling or other reuse, etc., so that the waste after comprehensive utilization directly into products or into secondary raw materials available for reuse, achieves resourcefulness. Solid wastes that have been generated but cannot or temporarily cannot be integrated use of solid waste for environmentally sound or low-hazard safe treatment to reduce or mitigate the harm of solid waste (Park et al., 2009).

The energy that is used by converting existing fossil fuels or by converting renewable energy including sunlight, water, geothermal heat, and biological organisms. It characterizes future energy sources for a sustainable energy supply system. The importance of new and renewable energy has grown due to the instability of oil prices and the regulatory response of the Climate Change Convention (Malecki 2022).

2.2.3. Economics

Carbon neutrality will also proceed in a form closely coupled with the process of evolving in the form of a decentralized/independent distribution network of the energy network (Zhang and Hanaoka 2021). The increase in heterogeneous systems will face challenges of increased volatility and complexity of infrastructure and services. Even in the trend change of the economic system, since Adam Smith, Keynes, and Schumpeter, capitalism, neoclassical modified capitalism, and behavioral economics have undergone many changes in terms of microeconomics. However, problems such as the concentration of wealth and injustice are attracting the improvement of the current economic system. Alternatives to new economic systems and systems are being proposed to solve these problems. Even while the limits of expansion have become obvious as a result of resource depletion, environmental pollution, and the financial crisis, they are nevertheless buried under growth. Through the redefinition of the value concept, it is claiming a coexistence economy to break away from the myth of growth and protect humans and the

environment together. Based on Natural/Green Capitalism, we need to create a carbon economy paradigm centered on carbon, which expresses the value of environmental preservation. There are no emissions as well as pollution during the use of electric cars, which can reduce carbon dioxide emissions, as well as improve air quality with a big boost, which is the most obvious advantage of electric cars. For fuel cars as well as electric cars, the use of electrical energy to drive energy conversion efficiency is higher; add environmental protection and energy saving effect is better. The charging mode of peak-shaving and valley-filling that is, charging at night can significantly improve the night load of the power grid, which in turn improves the utilization rate of coal and other resources.

2.3. Government policy

The market is the most central issue in the promotion of electric vehicles, which is difficult to solve with government support and must rely on key technological innovation and cost reduction (Huang and Ge 2019). The future of the market for electric cars is largely dependent on advances in battery technology, but technological progress requires a process as well as market promotion and market verification. Therefore, the development of electric vehicles is still a long road, pending market recognition and the test of time. Improve the infrastructure. Under the guidance of government policies, the construction of centralized charging stations and distributed charging piles should be completed, so that charging electric vehicles can be as convenient as refueling fuel cars and consumers can easily find charging stations or charging piles when they need to charge. Expand the choice to add imported electric vehicles to the subsidy targets. Consider lowering the import tariff of electric vehicles and selectively including imported electric vehicles into the subsidy catalog to reduce the cost of consumers to buy imported electric vehicles with superior performance and further stimulate consumption.

Energy security is a global and strategic issue related to the country's economic and social development, and it is vital for people's lives to improve and for the long-term stability of society. In the face of the new changes in energy supply and demand patterns and new trends in international energy development, China emphasizes the need to promote the energy consumption revolution, energy supply revolution, energy technology revolution, energy system revolution and strengthen international cooperation in all aspects, which provides the direction for China's energy development. Accelerating the construction of a clean, low-carbon, safe and efficient energy system provides strong energy support for China to build a modernized economic system. Many countries and regions around the world have already established strategies and policies for the development of the new energy vehicle industry under the leadership of governments. However, in 2001, the Chinese government set the new energy vehicle research project as the first national 15-year planning period. It has been included in the major scientific and

technological challenges, opening a new chapter for new energy vehicle projects. On March 5, 2019, Premier Li Keqiang insisted in the “2019 Government Work Report” that it is still necessary to stabilize automobile consumption, continue to implement the new energy vehicle purchase discount policy, and promote the construction of charging, hydrogen charging, and other facilities (Huang and Ge 2019).

The background of carbon neutrality promotes the reduction of carbon emissions and promotes the use of renewable energy. In order to promote automobile consumption in terms of stabilizing foreign trade and expanding domestic demand, the automobile purchase tax exemption policy for new energy vehicles is extended for two years. The new energy vehicle subsidy standard in 2022 will be reduced by 30% from the 2021 standard. Urban public transport, road passenger transport, rental (including online car-hailing), sanitation, urban logistics and distribution, postal express, civil aviation airports, political parties, and official business of government agencies meet the requirements, and the required vehicles are subject to tax reduction. In terms of purchasing promotion, take corresponding reduction and exemption measures to promote and increase people's purchase and use of new energy vehicles (Lichtenstein 1995).

2.4. Development of enterprise

From the perspective of market demand, the entire automotive industry pattern will change in the future, as consumers' living standards improve and their spending power increases, more and more people will choose to use energy-saving new energy vehicles instead of traditional cars. While new energy tankers will face more intense and severe market competition pressure and challenges in the future, along with the increasing technical threshold and input costs, increasing demand, market growth, and increasing regulatory requirements, it is anticipated that pure electric vehicles will achieve large-scale explosive growth and will dominate in the next few years. Future industry competition will be a multi-dimensional game and adjustment from the aspect of technological progress. In general, the development trend of new energy vehicles will be to give priority to green and low-carbon development under the premise of more safety, energy saving, and environmental protection, and eventually realize the goal of ecological civilization construction of new energy vehicle industry. These keywords are constantly mentioned to indicate that it will continue to promote the optimization of industry structure and innovation to accelerate the process and market space expansion and other factors. As of March 2019, according to data jointly released by the National Monitoring Center for New Energy Vehicles and the Management Center, the total number of registered automobile enterprises in China reached 486 (Lee et al., 2022; Sarson 2019). It can be seen that competition in China's new energy vehicle market is fierce, including well-known automakers such as Volkswagen, Audi, and Nissan. The 2021 World

New Energy Vehicle Conference (WNEVC) opened in Haikou with a focus on the new energy vehicle industry against a carbon-neutral backdrop. Shanghai Woolai Automobile Co., Ltd. (abbreviated as Woolley Car) is a global smart electric vehicle company founded in Shanghai in 2014 by well-known science and technology enterprises and entrepreneurs. Wollaecha creates a pleasant lifestyle for consumers by providing high-performance smart electric vehicles and user experiences. It is concentrating on growing into a global company with user experience as its main competitive strategy. According to the evaluation of the German Automobile Management Center (CAM), Ullaicha is the first Chinese car brand to rank 10th in the 2019 Global Luxury Car Innovation Chart. The production and sales of China's new energy vehicles have ranked first in the world for six consecutive years, and the technological level of key components is at the forefront of the world, forming a new energy vehicle industry chain that effectively connects upstream and downstream. The performance of some foreign electric cars is already close to that of traditional fuel cars, and even some single technical indicators have surpassed the existing fuel cars. Through foreign high-performance cars to drive the development of domestic electric vehicles, such as the United States Tesla electric car, fully charged has been able to drive 500 km, and fuel cars with a full tank of driving range is very close. Break through the key technical bottlenecks as soon as possible. For example, the waiting time to charge like fuel car refueling; electric cars can also drive 500km with one full charge, etc. Improve the convenience of charging and strengthen the research and development of fast charging technology. Overall, although electric vehicles have a very broad market prospect, the development of the whole industry still needs a long process (Bensaber 2019). In view of some problems encountered in the promotion of electric vehicles in China, the solution strategy to cope with them should be government-led and coordinate the relationship between various automobile enterprises, automobile dealers, electric power and other related enterprises to jointly promote the industrialization of electric vehicles (Lee et al., 2022).

2.5. Purchase intention

According to the China Automotive Technology Development and Consumer Insight Study, "environmental protection" is the most important factor for users to consider when purchasing new energy vehicles, accounting for 55.0% of users. In recent years, the adverse effects of the poor environment on health have become a growing concern, and people want to see blue skies and white clouds and breathe fresh air while the economy develops and living standards improve. In addition, more than 50% of users tend to buy new energy vehicles because of "low cost of use", and the economy of using a car is one of the most important factors for the public to consider. In addition, "good driving experience" is also an important factor that drives users to buy new energy vehicles, accounting for nearly 40%. With the

gradual improvement of the infrastructure, technology and cost, the actual purchase intention of users will also be greatly improved.

Intention is a word that first appears in psychology and refers to the subjective probability or likelihood of an individual doing something. Purchase intention is a subjective probability that a consumer intends to make a purchase. According to Fishbein & Ajzen's model (Fishbein and Ajzen 1977), consumer's purchase intention can be interpreted as a subjective probability. This probability can be used to predict the likelihood that a consumer's purchasing behavior will actually occur. In the definition of purchase intention presented by Dodds et al. (1991). The possibility that a customer will purchase a certain product or service is universally recognized and it can reflect not only satisfaction with any product, but also the probability of purchase behavior. According to a study by Erasmus et al. (2001), purchase intention is a subjective expression before a consumer's purchase behavior is materialized, and it is possible to interpret and predict the behavior itself. Lin & Chen (2009) pointed out that purchase intention is a measure of the probability that a consumer will choose a certain product or service. Purchase intention refers to the possibility that expected and planned beliefs and attitudes formed during the consumer's decision-making process lead to the consumer's future behavior. Morrison (1971) defined purchase intention as the intention related to what a consumer will purchase in the future. It is a concept that combines the evaluation of consumer interest and purchase possibility Intention.

3. Research Model and Research Hypothesis

This study aims to analyze the impact of the characteristics of renewable energy on the background of carbon neutrality, government policy, corporate development, and consumer purchase intention. Based on previous studies, sustainability, circularity, and economic feasibility were selected as the characteristics of renewable energy, which are factors that affect government policy, corporate development, and consumer's purchase intention. The proposed research model is shown in Fig. 1.

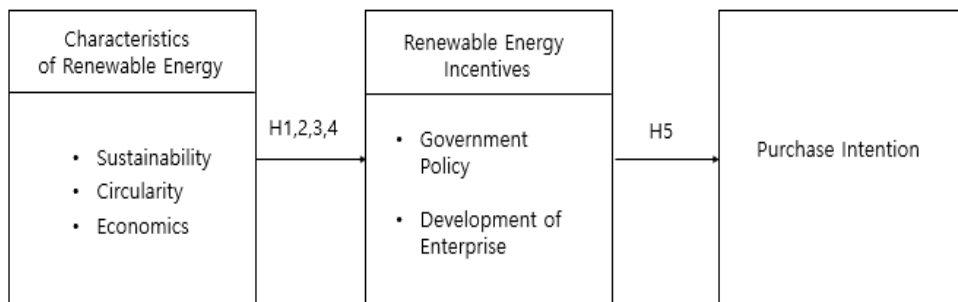


Fig. 1: Research model

3.1. Research hypothesis

The characteristics of renewable energy, which is a factor influencing purchase intention of consumer's purchase intention, government policy, corporate development, and renewable energy in the background of carbon neutrality, were classified into sustainability, circularity, and economic feasibility. In this study, the following hypotheses were established based on previous studies.

Hypothesis H1-1 The characteristics of renewable energy will have a positive (+) significant effect on government policy.

Hypothesis H1-1-1 Sustainability will have a positive (+) significant effect on government policy.

Hypothesis H1-2-1 Circularity will have a positive (+) significant effect on government policy.

Hypothesis H1-3-1 Economic feasibility will have a positive (+) significant effect on government policy.

Hypothesis H1-2 The characteristics of renewable energy will have a positive (+) significant effect on Development of enterprise

Hypothesis H1-1-2 Sustainability will have a positive (+) significant effect on development of enterprise

Hypothesis H1-2-2 Circularity will have a positive (+) significant effect on development of enterprise

Hypothesis H1-3-2 Economic feasibility will have a positive (+) significant effect on development of enterprise

Hypothesis H2 The government policies and The development of enterprises will have a positive (+) significant effect on consumers' purchase intention.

Hypothesis H2-1 The government policies will have a positive (+) significant effect on purchase intentions.

Hypothesis H2-2 The development of enterprises will have a positive (+) significant effect on purchase intention.

3.2. Variable operational definition and measurement

The survey questions in this study consisted of a total of 6 items and 18 questions, including sustainability, circularity, economic feasibility, government policy, corporate development, and purchase intention of renewable resources. Questionnaires for each construct were constructed on a 5-point scale.

Based on previous studies, operational definitions of variables were summarized as follows. Sustainability means whether renewable energy is sustainable. Circularity means that renewable resources can be reused in nature through circulation, improving resource utilization and reducing carbon emissions. Economic feasibility means that economic activities carried out in industries related

to renewable resources can promote the development of renewable resources. Government policies related to the regenerative economy affect the purchase intention of EV consumers. The research and development of the regenerative economy of related companies influences the purchase intention of Chinese electric vehicle consumers. Purchasing intention refers to a person's will for predictable future behavior, and refers to the probability that one's beliefs and attitudes will be translated into actions.

Table 1: Operational definition

Variables		Details	Previous study
Characteristics of renewable energy	Sustainability	- The fuel supply of renewable energy vehicles is sustainable. - The sustainability of renewable energy fuels may promote the development of new-energy vehicle industry. - New-energy vehicles may boost the development of relevant new-energy industries.	[6]
	Circularity	- Renewable energy vehicles are good at recycling resources. - The circularity of renewable energy vehicle fuels can reduce carbon emissions. - I think new clean energies like solar, wind and water are more cyclical than fossil fuels.	[7,8]
	Economy	- Renewable energy vehicles can save more than conventional vehicles. - The economy of renewable energy vehicles is also a consideration for car purchases. - It is said that renewable energy vehicles will promote the development of new energy-related industries.	[9]
Renewable Energy incentives	Government policy	- Government subsidies and support for renewable energy vehicles will increase the willingness to buy renewable energy cars. - The government subsidizes renewable energy vehicles - The development of new-energy vehicles will help the government solve the employment problem.	[10,11]
	Development of enterprise	- The continuous development of better renewable energy vehicles by automobile companies will promote your willingness to buy new energy vehicles. - The continuous development of Renewable energy vehicles will promote the continuous innovation and	[12]

		development of Renewable energy automobile enterprises. - The continuous development of new-energy automobile enterprises is conducive to the improvement of relevant supporting facilities of new-energy facilities.	
Purchase intention		- I will recommend renewable energy cars to people around me. - It will consider replacing existing vehicles with renewable energy vehicles. - Believe that new energy vehicles will have an impact on the consumer market of conventional vehicles.	[13,14,15,16,17]

3.3. Demographic characteristics

A survey was conducted targeting consumers who have an intention to purchase an electric vehicle in China. Data collection was conducted through the Internet for 13 days from November 3 to November 15, 2022. Out of a total of 123 copies, 91 copies were used for analysis, excluding 32 copies of insincere responses. The basic statistical survey is as follows. 49.45% of the respondents were male, and 62.63% were in their 20s the most. As for education, 53.9% graduated from university and 17.58% were self-employed.

Table 2: Demographic characteristics

	Item	Frequency	Ratio (%)
Gender	Male	45	49.45%
	Female	46	50.55%
Age	Under 20 years old	28	30.77%
	20-29 years old	61	67.10%
	30-39 years old	2	2.22%
	Over 40	3	3.30%
Education	High school and below	11	12.10%
	College degree	8	8.80%
	University graduation	49	53.9%
	Master degree or above	9	9.90%
Job	Student	34	62.64%
	Company employee	12	3.30%
	Government employee	15	16.48%
	Business service	16	17.58%

4. Empirical Analysis

4.1. Data analysis method

For statistical analysis, SPSS 23.0 and Smart PLS 4.0 were used. Factor loadings of 0.6 or more, Composite Reliability (C.R) and Cronbach' α values of 0.7 or more,

and Average Variance Extraction (AVE) values of 0.5 or more are generally valid. Discriminant validity is valid because the square root of AVE is greater than the vertical and horizontal values of the correlation coefficient.

Table 3: Reliability and internal consistency

Variable name		Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Sustainability	A1	0.821	0.717	0.883	0.802
	A2	0.859			
	A3	0.801			
Circularity	B1	0.767	0.656	0.852	0.737
	B2	0.859			
	B3	0.801			
Economy	C1	0.710	0.714	0.882	0.801
	C2	0.818			
	C3	0.843			
Government policy	E1	0.915	0.789	0.922	0.873
	E2	0.900			
	E3	0.865			
Development of enterprise	F1	0.872	0.853	0.945	0.805
	F2	0.955			
	F3	0.941			
Purchase intention	G1	0.899	0.786	0.916	0.913
	G2	0.934			
	G3	0.825			

Table 4: Correlation and discriminant validity

Variable name	AVE	1	2	3	4	5	6
Sustainability	0.717	0.847*					
Circularity	0.656	0.812	0.816*				
Economics	0.628	0.772	0.707	0.792*			
Government policy	0.789	0.755	0.785	0.761	0.893*		
Development of enterprise	0.853	0.822	0.793	0.790	0.863	0.893*	
Purchase intention	0.786	0.703	0.681	0.744	0.688	0.791	0.886*

* Note: The diagonal is the square root of the AVE value, which is larger than the vertical and horizontal values of the correlation coefficient, so discriminant validity is secured.

4.2. Verification of the structural model

Smart PLS 4.0 was used as the structural model, and path coefficients and coefficients of determination (R^2) between the variables of the research model were derived through the structural model. If the R^2 value is 0.26 or more, the fit is high,

and if it is 0.25 to 0.13, it is medium. Less than 0.13 can be marked as poor fit. The coefficient of determination (R^2) values for government policy (0.782), business development (0.766), and consumer purchase intention (0.682) were 'high'.

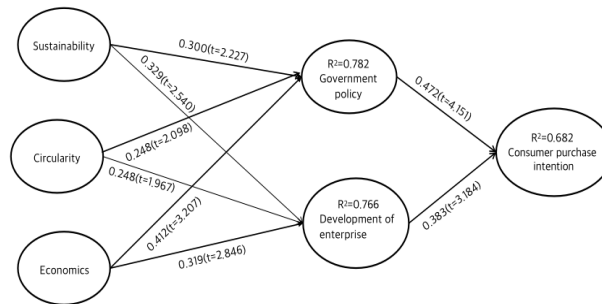


Fig. 2: Results of research model

First, hypothesis H1-1-1 was adopted. Sustainability was found to have a significant effect on government policy ($\beta = 0.300$, $t = 2.227$, $p < 0.05$). Second, hypothesis H1-2-1 was adopted. Circularity was found to have a significant effect on government policy ($\beta = 0.248$, $t = 2.098$, $p < 0.05$). Third, hypothesis H1-3-1 was adopted. Economics was found to have a significant effect on government policy ($\beta = 0.412$, $t = 2.846$, $p < 0.01$). Fourth, hypothesis H1-1-2 was rejected. Sustainability was shown to have a significant ($\beta = 0.329$, $t = 2.540$, $p < 0.05$) effect on corporate development. Fifth, hypothesis H1-2-2 was adopted. Circularity was found to have a significant ($\beta = 0.248$, $t = 1.967$, $p < 0.05$) effect on corporate development. Sixth, hypothesis H1-3-2 was adopted. Economic feasibility was found to have a significant effect on business development ($\beta = 0.319$, $t = 2.846$, $p < 0.01$).

Hypothesis H2 was accepted. First, hypothesis H2-1 was adopted. Government policy was found to have a significant effect ($\beta = 0.472$, $t = 4.151$, $p < 0.001$) on consumer's purchase intention.

Second, hypothesis H2-2 was adopted. Enterprise development was found to have a significant effect on consumers' purchase intention ($\beta = 0.383$, $t = 3.184$, $p < 0.01$).

Table 5: Hypothesis test result summary

	Variable	Path coefficient	T-value	Result
H1-1-1	Sustainability - Government policy	0.300	2.227	Accept
H1-2-1	Circularity - Government policy	0.248	2.098	Accept
H1-3-1	Economics - Government policy	0.421	3.207	Accept
H1-1-2	Sustainability - Development of enterprise	0.329	2.540	Accept
H1-2-2	Circularity - Development of enterprise	0.248	1.967	Accept

H1-3-2	Economic - Development of enterprise	0.319	2.846	Accept
H2-1	Government policy - Purchase intention	0.427	4.151	Accept
H2-2	Development of enterprise - Purchase intention	0.383	3.184	Accept

5. Discussions

This study is an empirical study to identify how the characteristics of renewable energy (sustainability, circularity, and economy) under the background of carbon neutrality affect government policy, enterprise development, and Chinese electric vehicle consumers' purchasing intentions.

Firstly, the hypothesis H1-1 that the characteristic factors of renewable energy have significant influence on government policies is all adopted. Secondly, the hypothesis H1-2 that the characteristic factors of renewable energy have significant influence on enterprise development is partially adopted. In other words, among the characteristics of renewable energy, sustainability, circularity and economics were shown to have a significant impact on enterprise development. Thirdly, the hypothesis H2 is adopted that government policies and enterprise development have a significant impact on the purchasing intention of electric vehicle consumers. The following are the implications of this study. First, consumers who purchase electric vehicles in China rated government policies in the order of economic feasibility, sustainability and circularity among the characteristics of renewable energy. Secondly, it is confirmed that consumers purchasing electric differential vehicles in China influence the development of enterprises in the order of continuity, economic feasibility and circularity among the characteristics of renewable energy.

The following are some of the study's limitations: This study examined the relationship between Chinese consumers' preferences for renewable energy and the evolution of governmental regulations and industry-related businesses against the backdrop of carbon neutrality. In the context of carbon neutrality, the characteristics of renewable energy are becoming increasingly clear as demands for carbon emission reductions promote the development of renewable energy, and the government is also announcing policies based on related characteristics to promote consumers' purchase of electric vehicles. Enterprises can also improve the problems related to enterprise development, so as to improve the use experience of consumers and increase the use of renewable energy, thus replacing the environmental pollution caused by the traditional automobile industry.

6. Conclusion

This experiment focuses on the influence of Chinese consumers on the purchase intention of electric vehicles and the relationship between the characteristics of renewable energy and government policies and enterprise development. This paper

attempts to grasp the relationship between the characteristics of renewable energy and the purchase intention of electric vehicle consumers, and conducts an empirical study on the test of the previous research and the consumption of electric vehicles by Chinese consumers. The characteristic features of regeneration are sustainability, circularity and economy. The results of the analysis show that the characteristics of renewable energy have a positive impact on government policies.

Among the characteristics of renewable energy, in the face of people's pursuit of environmental protection and low-carbon energy saving, Chinese consumers' demand for electric vehicles is also increasing, and government policies and enterprise development are also affected by the characteristics of renewable energy. This study focuses on the characteristics of renewable energy affecting consumers' purchase intention. In view of the numerous characteristics of renewable energy, we select three characteristics among them, demonstrate whether these characteristics are related to consumers and purchase intention, and compare and analyze the data. It verifies that the sustainability, circularity and economy of renewable energy are related to the purchase intention of new energy electric vehicles.

There are many problems with this research. The sample size of the sample survey is insufficient and the sample scope is not wide enough. In addition to the factors mentioned in this article, there are many other factors that may influence the purchase intention of EV consumers.

If we look at the development status of new energy vehicles in a short period of time, hybrid technology should be dominant. However, the long-term development should be the pure electric technology is more promising. Because the current stage is in the fuel car and pure electric car of the transition period, electric car energy consumption is really low and can do no emissions. But restrict the development of pure electric vehicles is not only the charging technology, more importantly, supporting facilities are not perfect, which is also the most taboo problem when many consumers choose pure trams. Regarding fuel cell technology, at present, it mainly refers to hydrogen fuel cells. The emission of hydrogen fuel cell is water, so it is also a very clean energy. However, the current promotion of hydrogen fuel technology has also encountered great bottlenecks. One of the most important ones is that the hydrogen production technology has not been much improved. The current source of hydrogen for hydrogen energy technology is mainly industrial collection and electrolysis of water. Electrolysis of water is the most effective way, but electrolysis of water is a huge consumption of electricity, at present, the main power generation technology is thermal power generation, and the excessive consumption of electricity is undoubtedly "pollution in disguise". in recent years, the country's support for pure electric vehicles, hybrid cars is not a long-term plan. In the future, if the pure electric technology has a great breakthrough, the relevant facilities and regulations are more and more perfect, the chances of hybrid cars are

eliminated. So, this study will be more comprehensive on the aspects of electric vehicles with shorter segmentation.

The selected sample is only applicable to the study of the characteristics of renewable energy with Chinese consumers as the research center. For the relationship between the purchase intention of electric vehicles in other countries and government policies and enterprise development, its correlation with the survey sample data does not represent the overall situation. Therefore, it is recommended to complete the new work and continue the development.

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