The Influence of AI Chatbots on Purchase Intention of Electric Vehicles among Consumers in China

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อิทธิพลของ AI ต่อความตั้งใจซื้อรถยนต์ไฟฟ้าของผู้บริโภคในประเทศจีน

น.ส.หนิง ฟาง

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หนิง ฟาง : อิทธิพลของ AI ต่อความตั้งใจซื้อรถยนต์ไฟฟ้าของผู้บริโภคในประเทศจีน . (The Influence of AI Chatbots on Purchase Intention of Electric Vehicles among Consumers in China) อ.ที่ปรึกษาหลัก : ศ. ดร.วรวรรณ องค์ครุฑรักษา

วัตถุประสงค์ของการวิจัยนี้คือเพื่อศึกษาผลกระทบของการรับรู้ประโยชน์ (PU) การรับรู้ความสะดวกในการใช้งาน (PEU) และการรับรู้ความเพลิดเพลิน (PE) การรับรู้ความเสี่ยงทางไซเบอร์ (PCR) ของแชทบอท AI ต่อความตั้งใจในการซื้อ (PI) ของ EV ผู้บริโภคในประเทศจีน การศึกษานี้ดำเนินการใช้วิธีเชิงปริมาณ โดยใช้แบบสอบถามออนไลน์เป็นเครื่องมือในการรวบรวมข้อมูลจากผู้ตอบแบบสอบถามชาวจีน ในเซี่ยงไฮ จำนวน 300 ราย ซึ่งมีอายุระหว่าง 31-40 ปี และมีความตั้งใจหรือมีประสบการณ์ในการใช้แชทบอทหรือรถยนต์ไฟฟ้าแบบ AI ผลลัพธ์แสดงให้เห็นว่าผู้ตอบแบบสอบถามโดยรวมมีทัศนคติที่เป็นไปได้ต่อ PCR (M=3.36), PEU (M=3.27), PU (M=3.26) และ PEU (M=3.26) ของแชทบอท AI นอกจากนี้ การวิเคราะห์ความสัมพันธ์แสดงให้เห็นว่าปัจจัยทั้งหมด (PU, PE, PEU, PCR) ของแชทบอท AI มีความสัมพันธ์เชิงบวกกับความตั้งใจในการซื้อ การวิเคราะห์การถดถอยพหุคูณเผยให้เห็นว่า PU (β=0.216), PE (β=0.222) และ PCR (β=0.228) ในจำนวนนี้ ปัจจัยที่มีอิทธิพลมากที่สุดต่อ PI คือ PCR โดยการศึกษาแนะนำให้นำแชทบอท AI มาเป็นเครื่องมือสื่อสารที่จำเป็น โดยเฉพาะอย่างยิ่งในการพัฒนาผลิตภัณฑ์ที่เป็นมิตรต่อสิ่งแวดล้อม โดยใช้ประโยชน์จากความก้าวหน้าของเทคโนโลยี AI การใช้แชทบอท AI ช่วยเพิ่มประสบการณ์ของผู้บริโภคและให้ข้อมูลที่มีประโยชน์ต่อการตัดสินใจซื้อ แนวทางเชิงกลยุทธ์นี้ไม่เพียงแต่ก่อให้เกิดรายได้ของบริษัทเท่านั้น แต่ยังขยายความตั้งใจและความตระหนักรู้ของบุคคลในเรื่องการปกป้องสิ่งแวดล้อม ส่งเสริมให้เกิดผลกระทบเชิงบวกต่อความพยายามสร้างความยั่งยืนของสิ่งแวดล้อม

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The objective of the paper is to study the effects of perceived usefulness (PU), perceived ease of use (PEU) and perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots on the purchase intention (PI) of EVs among consumers in China. The study is conducted in a quantitative approach by using online questionnaires as a tool to collect data from 300 Shanghai based respondents, aged between 31-40, and have intention or experience using AI chatbots or EVs. The results show that overall respondents have a possibilities attitude towards PCR (M=3.36), PEU (M=3.27), PU (M=3.26), and PEU (M=3.26) of AI chatbots. Furthermore, the correlation analysis shows that all the factors (PU, PE, PEU, PCR) of AI chatbots are positively related to purchase intentions. The multiple regression analysis reveals that PU (β=0.216), PE （β=0.222), and PCR (β=0.228), among them, the most influential factor towards PI is PCR. The study recommends embracing AI chatbots as an essential communication tool, particularly in the development of green products, leveraging the advancements in AI technology. Utilizing AI chatbots enhances consumer experiences and provides valuable information, facilitating informed purchase decisions. This strategic approach not only contributes to company revenue but also amplifies individuals' intentions and awareness of environmental protection, fostering a positive impact on sustainability efforts.

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CHAPTER 1
INTRODUCTION

1.1 Significance of the Study

China's economy slowed down after the COVID-19 hit, but GDP growth is expected to recover in 2023 after the rapid reopening, as the largest developing country, the manufacturing activity in China has expanded at the fastest pace in more than a decade, and the urbanization has made remarkable achievements, in 2021, urbanization rate in China hit 64.72 percent, in 2022, this rate has increased by 1.1 percentage points (Yao, 2023). With the fast increase in development, China is suffering a series of serious environmental challenges, such as global warming, biodiversity loss, etc., these problems hinder economic growth and sustainable development in the future.

Therefore, China has been putting much effort into environmental protection. These years, Chinese people's environmental awareness has been increasing (Calculli et al., 2021). They are aware that their purchasing behavior is linked to environmental issues. Many environmentally conscious customers are switching to purchasing environmentally friendly products instead of substitute products, despite higher costs (Song et al., 2020). And the authors claimed that the green economy performance in China has been growing at a fast pace (Li & Lin, 2016). Today's customers see businesses as more than a company and consider them to be organizations concerned with the well-being of human societies. Thus, using more green marketing strategies became the priority for all industries (Majeed et al., 2022).

China was the world's top emitter of CO2 in 2021, accounting for nearly 11.9 billion tons, or 32.8% of all emissions (*BP Statistical Review of World Energy*, 2022). China now has 302 million automobiles, making it the second-largest automotive market in the world (*BP Statistical Review of World Energy*, 2022). China's enormous CO2 emissions and subsequent severe environmental problems are mostly caused by the country's excessive vehicle population (Wang & Dong, 2016). Electric vehicles (EVs) are thought to be one of the best strategies to slow down global warming.

Therefore, EVs have become the one of popular eco-friendly products in China, to encourage the automotive sector to switch from traditional automobiles to electric vehicles, the Chinese government implemented several subsidy measures (Merfeld & Meisel, 2022), it is anticipated that the size of the China Electric Vehicles Market will increase from USD 260.84 billion in 2023 to USD 575.56 billion by 2028 (*CHINA EV Market seize & share analysis- growth trend & forcasts (2023 - 2028)*). Therefore, this green product marketing has very bright prospects, and how to communicate effectively with consumers to purchase EVs became the focus of car manufacturers.

However, over the last couple of years, there has been no corresponding increase in consumption of environmentally friendly products when public concern about environmental issues has been rising. In China, the eco-friendly products only represented 20 % of China's overall consumption in 2021 (J. Liang et al., 2022). Taking the EVs industry as an example, the EVs market is spreading slowly these years, not just as a result of the COVID-19 damage, but also because, particularly in Chinese hinterland towns, public awareness, purchasing intent, and technological diffusion are still low (Liu et al., 2023). To bridge this gap, effective green marketing communication is crucial. Transmitting comprehensive information to customers about a company's environmentally friendly goods, pledges, initiatives, and outcomes The goal of green communication is to promote environmental preservation and quality of life. (Mera, 2003). Quality green marketing communication can have a positive effect on consumers' purchase behavior.

Nevertheless, in today's technology-driven world, too many types of communication platforms companies use to provide information and communicate with consumers, such as email, social media, etc. People are overwhelmed by too much information, which causes communication inefficiency, and hurts consumers' purchase behavior.

Therefore, it is challenging to find the right, effective channel to communicate green products to consumers. Especially these years, consumers demand to know as much and as detailed information about green products, at the same time they hope that detailed information is easy to understand, however, eco-friendly products information is often too ambiguous or too precise, and the information also varies

from product to product, and have specialized terms in it. Choosing the right communication channel is the key to success (Parguel et al., 2015). Besides, previous empirical also suggested that firms should be cautious about green product information because environmentally content advertising has a positive influence on firms' images and improves consumer purchase intention, but the basic premise is the information should be legal, decent, and trustful (Ongkrutraksa, 2007).

The rapid and continuous development in science and technology has led to many discoveries and inventions, but artificial intelligence is considered the pioneer among them. Artificial Intelligence (AI) has been acknowledged as an important tool to help companies develop a sustainably economy (Rathore, 2018). Within computer science, artificial intelligence is a vast field. Therefore, this research only chose AI chatbots as background, besides the fast development of AI chatbots, there are three categories of AI chatbots, therefore, this research only focuses on one of categories- Chat based/conversational, these bots are powered by AI, which is a piece of software that mimics a human conversation by using artificial intelligence to comprehend inquiries from customers and automatically reply, for example, ChatGPT, Siri, and so on, this type of AI because of the natural language interaction, accessibility, customization, as well as the variety make them among the most widely used artificial intelligence (AI) tools in consumers' daily lives (Huang et al., 2022). Heo and Lee (2018) proved that chatbots are popular among users. It is becoming an innovative business communication channel to draw customers' attention, according to the report, the artificial intelligence chatbots market seize in Chinese customer services will be achieved by around 7.1 billion yuan by 2030 (Brown, 2023).

However, the most popular chatbots application: ChatGPT is blocked in China. Therefore, the country's Big Tech companies have declared to fill this gap by creating Chinese ChatGPT. For example, Baidu introduced Ernie Bot; Alibaba Group announced Tongyi Qianwen (TTQW), and Tencent Holdings released HuanyuanAid. China is quickly becoming one of the most competitive markets for AI-powered chatbots development. Diverse businesses are attempting to set themselves apart by providing a better user experience and more potent artificial intelligence. China is on track to overtake other big players in the field of chatbots driven by AI (Yalalov, 2023).

Among these Chinese versions of the chatbots, one of the most popular chatbot application is Ernie Bot, which is called the Chinese version of ChatGPT, Ernie Bot came out in 2023 and allowed the Chinese public to use it, this Chatbot application was created by the Chinese tech giant Baidu, China's leading online search provider (Handley, 2023). After being released, this Chinese Chatbot jumped to the top of Apple's app store in China (Cheng, 2023). Ernie Bot hits its market valuation by $23 billion from last year's trough (Fang & Ongkrutraksa, 2023; Yu, 2023).

The technology acceptance model (TAM) used in the research. The purpose of the Technology Acceptance Model (TAM) is to forecast and explain how consumers will accept and utilize new information technologies. Additionally, people's attitudes toward technology's ease of use and their perception of usefulness are "jointly determined" by behavioral intention. As a result, people's attitudes are influenced by how helpful they think something to be and how simple they believe it to be to use. Both perceived ease of use (PEU) and perceived usefulness (PU) are basic factors and belong to the external factors, TAM therefore allows researchers to include additional elements that might impact the uptake of a certain technology (Lee et al., 2019).

As per the critique, TAM neglects psychological factors and concentrates more on technical issues like PU and PEU, so some authors suggested taking perceived enjoyment (PE) as an extra factor. For example, in this research, authors proved that the TAM model can explore consumers' intentions influenced by perceived usefulness (PU), perceived ease of use (PEU), and perceived enjoyment (PE) in the e-commerce environment (Dong et al., 2022). In the other research, the authors suggested that perceived cyber risks (PCR) should be a critical factor for this model, in today's world, information leakage has been a concern topic, therefore, those who believe there are few risks involved in using a given technology are more likely to find it useful and employ it. (Al-Adwan et al., 2023).

A lot of previous studies utilized this model to predict consumer behavior when they use modern technologies, for example, The desire of Chinese citizens to engage in livestream environmental marketing messages was investigated by the author using TAM (Liu, 2022). However, because AI chatbots are a new and developing marketing communication tool, especially in green marketing strategy, there is still a lack of TAM-based research in this area, particularly in China. Besides,

when using the TAM model, most researchers only focus on PU and PEU, ignoring consumers' psychological aspects. So, this research, based on the classical TAM model, putted perceived cyber risks (PCR) and perceived enjoyment (PE) as other key factors.

For the consumers' purchase intention of EVs, previous studies focus on the influence of subsidy policies (Bjerkan et al., 2016). Business models (Nian et al., 2019), and challenges (Un-Noor et al., 2017). Few studies explore the effective communication tool this industry can use. For the use of AI chatbots, the previous papers mostly studied it with online shopping, such as the link between AI-powered digital help and the online shopping experience for luxury businesses, where user involvement acts as a mediator (Rahman et al., 2023). According to Nagy et al. (2021), companies using AI chatbots customer service can influence consumer attitudes toward their online shopping. However, limited studies have considered whether green marketing communications can influence consumers' purchase intention on EVs based on TAM, and whether AI chatbots can be a new marketing communication tool.

Thus, this research can fill these gaps by studying whether AI chatbots can be an effective communication tool for EVs businesses and provide knowledge about unpredictable AI innovation that potentially assists us with climate disaster and make a better world instead of the negative assumption that AI would control humans.

1.2 Research Objective

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1. To study perceived usefulness (PU), perceived ease of use (PEU), perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots, and purchase intention of EVs among consumers in China.

2. To study the effects of perceived usefulness (PU), perceived ease of use (PEU) and perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots on the purchase intention of EVs among consumers in China.

1.3 Research Questions

1. What are the perceived usefulness (PU), perceived ease of use (PEU), perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots, and purchase intention of EVs among consumers in China?

2. What are the effects of perceived usefulness (PU), perceived ease of use (PEU) and perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots on the purchase intention of EVs among consumers in China?

1.4 Hypotheses

H1: Perceived usefulness (PU) of AI chatbots affects consumers' purchase intention towards EVs.

H2: Perceived ease of use (PEU) of AI chatbots affects consumers' purchase intention towards EVs.

H3: Perceived enjoyment (PE) of AI chatbots affects consumers' purchase intention towards EVs.

H4: Perceived cyber risks (PCR) of AI chatbots affects consumers' purchase intention towards EVs.

1.5 Scope of the Study

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This study used an online survey method with a quantitative approach. And purposive sampling is the method used to pick samples. The research samples are people between the ages of 31 and 40 who reside in Shanghai and have high incomes and levels of education, they are more inclined to purchase electric vehicles (EVs) (Zhao et al., 2022). A questionnaire was distributed to collect data from 300 respondents. To participate in this survey, respondents must want to use or have already used AI chatbots and electric vehicles (EVs). The survey was conducted in October 2023. As a result, the questionnaire contains seven sections: screening, perceived usefulness (PU), perceived ease of use (PEU), perceived enjoyment (PE), and perceived cyber risks (PCR), purchase intention, demographic statistics.

1.6 Operational Definition of the Variables

Consumers in China refers to individuals between the ages of 31 and 40 who reside in Shanghai. Respondents must have either used or intended to test any AI chatbots or EVs to be eligible to take this poll.

Artificial intelligence Chatbots, this research focuses on AI chatbots, which belong to weak AI, this program makes use of artificial intelligence (AI) to mimic human dialogue, comprehend client inquiries, and provide automated responses, such as Ernie Bot; Tongyi Qianwen; HuanyuanAid (Huang et al., 2022).

Electric Vehicles (EVs) are a technology with a high degree of efficiency and operating flexibility, minimal noise, nearly zero carbon emissions, and network integration that holds promise for creating a sustainable transportation sector in the future. EVs primarily run on electricity that is stored in a battery and is driven by an electric motor. Unlike traditional vehicles that rely on internal combustion engines powered by fossil fuels (Nanaki, 2020).

Technology Acceptance Model (TAM), Davis introduced and improved the Technology Acceptance Model (TAM) in 1989, who also offered a theoretical framework for understanding the link between attitude, intent, and action. This study suggested that people's intentions can be influenced by perceived usefulness (PU) and perceived ease of use (PEU) (Dong et al., 2022). Huang et al. (2016) developed the TAM and claimed that people’s perceived enjoyment (PE) is another critical factor influencing people’s intentions. In this research, except PU, PEU, and PE, the author added a new factor-perceived cyber risks (PCR), which has a big influence on consumers’ psychology (Al-Adwan et al., 2023).

Perceived usefulness (PU) is defined as the degree to which an individual believes that using a particular technology would enhance their capability to perform their tasks (Davis et al., 1989). This research measures how strongly a person thinks that using AI chatbots are helpful, and useful in searching information for EVs.

Perceived ease of use (PEU) expresses the degree to which an individual believes that using a particular system will be easy or require minimal effort (Doanh et al., 2022). This research used this factor to measure whether using AI chatbots to

search EVs information for consumers is easy and does not need a lot of mental effort (Liu, 2022).

Perceived enjoyment (PE) is the degree to which utilizing a particular system is regarded to be enjoyable without regard to any performance consequences (Venkatesh, 2000). This research used this factor to measure does consumers using AI chatbots to search information for EVs can make them happy.

Perceived cyber risks (PCR): technology adoption literature highlights perceived cyber risks as a critical factor influencing consumers' attitudes toward using innovative technology. The concept of risks reflects the possibilities of attainments or losses (Sharma & Warkentin, 2019). This research used this factor to measure does consumer believe using AI chatbots to search information for EVs is a low-risks behavior; it will not harm their private information.

Intention to Purchase (PI) describes people's likelihood to act after all factors are influenced (Ma et al., 2022). In this research, this factor refers to consumers' likelihood to purchase EVs after using AI chatbots to search for relevant information.

1.7 Expected Benefits from the Study

The research's conclusions have the potential to broaden academic understanding of AI, electric vehicles, and environmentally friendly marketing communications. Additionally, it can support current hypotheses, and the research can benefit future studies in related fields, which can provide a research basis for further discussion on how AI can be an effective communication tool to influence consumers' purchase intention, especially can utilize this technology in green marketing strategy. Besides, it could provide knowledge about unpredictable AI innovation which potentially assists us with urgent climate disasters and make a better world instead of the negative assumption that AI would control humans.

Practically, this research can help marketing communication practitioners, especially when they are doing the green marketing strategy, helping them keep track of the trend, and using modern technology to communicate with their consumers, which not only can help companies increase sales but also can improve people's awareness about environment protection.

CHAPTER 2
LITERATURE REVIEW

To conduct its study and suggest the following subjects, this research collects data from previous studies, popular theories, recent publications, and pertinent documents.

2.1 Artificial Intelligence

2.1.1 The Definition of Artificial Intelligence

AI has many definitions and each of those definitions has been updated over time. Presently, according to many definitions, Artificial Intelligence (AI) is a computer science methodology that teaches computers to understand and replicate human speech and behavior. It has given rise to a novel intelligent computer that operates, thinks, and emulates human behavior using provided data. Artificial intelligence (AI) can carry out extremely complex and specialized tasks including robotics, picture and audio recognition, natural language processing, problem-solving, etc. Artificial intellect is a grouping of many technologies that can carry out activities that need human intellect (Chintalapati & Pandey, 2022).

AI is a wide-ranging term, which is classified into two categories, including weak AI and Strong AI. Strong AI is more of a philosophy than an actual way to create AI and solve problems, this kind of AI machine has never been trained to work before. Therefore, strong AI does not actually exist in the world currently; normally people only can see this kind of AI in movies, like the robots from *Westworld*. Weak AI, also known as Narrow AI, this kind of AI depends on data and algorithms to make decisions and produce outputs, help humans solve problems, widely used in humans' daily life, for example, chatbots, and self-driving cars (*What is artificial intelligence?*, 2023).

The majority of the key 2020s applications—such as search engines like Baidu Search, targeted online advertising, recommendation systems like those provided by Taobao—as well as growing internet traffic, virtual assistants like Siri, targeted advertising like Facebook, autonomous vehicles like drones, ADAS, and self-driving cars, automatic language translation like Google Translate, facial recognition like

Apple's Face ID, and image tagging like TikTok—all make use of artificial intelligence (AI) technology. Furthermore, dozens of effective AI applications are utilized by organizations or sectors to address certain issues (Lohr, 2016). Lately, Coca-Cola has partnered with an AI company to launch "Create Real Magic," a unique AI platform. This platform allows people to generate original artwork using AI technology and iconic Coca-Cola assets. Artists worldwide can experiment with branded elements and submit their work for a chance to be featured on digital billboards in New York and London. This initiative marks Coca-Cola's commitment to exploring AI's creative potential and its broader applications in marketing and operations (Lepitak, 2023).

2.1.2 The Definition of Chatbot

Among the vast applications of AI, chatbots stand out as a fundamental and widely recognized example of intelligent Human-Computer Interaction (HCI), showcasing a classic instance of an AI system. A chatbot is a piece of software or an online interface designed to mimic human speech or text-based communication, this AI technology can interpret human input in natural language and produces pertinent and intelligent replies to send back to the user.

Chatbots can be classified based on the primary goal they aim to achieve. (1) Task based: They carry out a specific activity, such as assisting users with shopping or arranging a trip. Most of the time, the steps required to complete a task and the order of occurrences, including exceptions, are preset. In terms of requesting information and comprehending the user's input, the bots are intelligent, where consumers may communicate with them by selecting the button from a programmed menu that most closely matches their requirements. Depending on what the user chooses, this kind of chatbots may present a different range of possibilities before presenting the most appropriate, precise solution. Examples include FAQ bots and bots for restaurant reservations. (2) Informative: These bots are made to give users access to data that has been pre-stored or is available from a stable source. The chatbots is an update of the task bots. These bots are based on simple keyword detection. Compared to real human services, this chatbot has 24/7 availability, instant responses, cost-effective, for example, FAQ bots, thus these bots normally used in the online shopping. However, these bots struggle to answer complicated questions. As their output is reliant on the

pre-written material programmed by the chatbot's creators, these chatbots fail to respond to inquiries that have not been anticipated by the conversation designer. (3) Chat based/conversational: The objectives of these bots revolve around accurately responding to the provided sentences. As a result, they are often designed to sustain a conversation with users using techniques such as cross-questioning, evasion, and deference. Powered by AI, these bots excel at comprehending user queries, regardless of the phrasing. Leveraging AI and natural language understanding (NLU), these intelligent chatbots efficiently capture pertinent contextual details shared by users. They utilize a database of information, employing pattern matching along with deep learning, machine learning, and natural language processing (NLP), utilize machine learning techniques to analyze consumer requests and provide the most accurate responses possible (Dempt, 2016). Example: Siri, ChatGPT, Ernie Bot, Alexa, mitsuku, Jenny, Tay, Xaoice (Nimavat & Champaneria, 2017). And all of these chat based applications' characteristics are the same. For example, ChatGPT, this AI chatbot application interacts in the form of a dialogue, which not only satisfies the basic functions of a dialogue with a human being, but also enables it to respond to follow-up queries, acknowledge errors, challenge false presumptions, and decline improper requests. Moreover, according to user feedback from various domains, ChatGPT can also handle a wide range of styles and genres, including code writing, basic mental work processing, and a range of common text output tasks. And based on keywords or questions, ChatGPT can generate scripts, speeches, and other instruments. As a result, industry insiders claim that ChatGPT has surpassed the previous Al Q&A system by a wide margin (*AIGC Development Trends Report*, 2023).

In conclusion, information that users get from the informative and task chatbots are sponsored by companies, organizations, and governments, but the information that chat based/conversational provides is based on the database and the internet. And the chat based type is an updated version of the previous two types. Therefore, based on the characteristics of different chatbots, in this research, the author did the research in the context of chat based/conversational.

2.1.3 Artificial Intelligence in China

After many years of use, AI is considered the most promising and influential technology. The artificial intelligence (AI) sector in China has maintained a robust pace. In 2021, the market value of artificial intelligence is approximately RMB 150 billion (US$23.196 billion) and is anticipated to attain RMB 400 billion (US$61.855 billion) by the year 2025 (Chipman Koty, 2021). According to McKinsey analysis, artificial intelligence business in China will present a $600 billion potential over the next ten years. The automotive, transportation, and logistics industries are predicted to account for 64% of this opportunity. Meanwhile, corporate software will provide 13%, manufacturing will account for another 19%, and healthcare and life sciences should contribute 4% of the potential (McKinsey, 2022). According to the International Data Cooperation (IDC), China is predicted to invest US$26.69 billion in AI by 2026, accounting for around 8.9% of worldwide investment and placing second globally among other nations (IDC, 2022).

The size of the national AI sector will surpass 400 billion yuan by 2025, according to the State Council of China's "New Generation AI Development Plan." Take Shanghai city as an example, by 2025, it is anticipated that Shanghai's AI sector will be worth more than 250 billion yuan and have more than 1,000 AI core businesses. According to statistics from the Shanghai Pudong District Science and Technology and Economic Committee, there have over 600 artificial intelligence (AI) businesses in the Pudong District by the end of 2020. These businesses will cover the fundamental, technical, and application layers of AI.

AI in China started in the late 1970s, after many years of development, it has been using in many fields to make Chinese people’s lives easier and improve the economy. For example, artificial intelligence (AI) is vital to the tourism industry. AI helps businesses discover potential visitors, comprehend their preferences, and more effectively focus their marketing efforts by analyzing this data. In this instance, artificial intelligence (AI) is utilized to forecast Chinese travelers' travel choices to Turkey, therefore supporting both academic research and the tourism industry (Topal & Uçar, 2019).

For AI chatbots, based on its characteristics, this kind of AI technology has been widely used in China. By 2022, customer service from the artificial intelligence

chatbots market size in China achieved around 7.1 billion yuan. However, for the personal assistant chatbots, due to some reasons, the most popular chatbot application-ChatGPT is blocked in China. So, the country's Big Tech companies have announced to creation Chinese own ChatGPT. Baidu introduced Ernie Bot; Alibaba Group has announced Tongyi Qianwen (TTQW); Tencent Holdings has released HuanyuanAid. Among these Chinese AI chatbots, the most popular one is Erbie Bot. In 2023, China's version of ChatGPT- Ernie Bot finally came out and allowed the Chinese public to use it, this chatbot application was created by Chinese tech giant Baidu, China's leading online search provider (Handley, 2023). Based on the ERNIE, this chatbot is relevant to the PaddlePaddle platform's dialogue generation model (PLATO) series models. It can converse, generate content, apply reasoning to knowledge, and provide a range of outputs (Guo et al., 2023). After being released, this Chinese version chatbot jumped to the top of Apple's app store in China (Cheng, 2023). Ernie Bot hits its market valuation by $23 billion from last year's trough (Yu, 2023).

2.1.4 Challenges and Opportunities of Artificial Intelligence in China

Over the past decade, China realized that AI will be a useful tool to help the government increase the country's economy, citizens' educational level, and life span, etc., Hence, this nation has unveiled an ambitious initiative for the indigenous advancement of artificial intelligence (AI) technology, envisioning China as the primary global AI development hub by 2030. The government aims to proliferate the use of AI across various sectors, including production, governance, and defense, by the specified deadline. However, Artificial intelligence (AI) is considered as the next technology to challenge the status quo of interpersonal and professional human interactions. Even today, China ranks second in the AI industry in the world; it still has to overcome major challenges. AI became a double-edged sword for China's development (Union, 2021).

Positively, iMedia Research estimates that by 2025, the AI market in China will have grown from its expected value of RMB 150 billion (US$23.196 billion) in 2021 to RMB 400 billion (US$61.855 billion). The Chinese government wants the AI sector to generate RMB 1 trillion (US$154.638 billion) in income annually by 2030, and it wants allied sectors to produce RMB 10 trillion (US$1.546 trillion) yearly as

well (Wu, 2022a). The Chinese government has been enacting several public policies to advance this business to meet this aim. Examples include the Next Generation Artificial Intelligence Development Plan (2017), the Action Outline for Promoting the Development of Big Data (2015) and Made in China 2025. These official government rules show that artificial intelligence is important in many different domains. Artificial intelligence (AI) has been used in the medical field in a number of ways since and during the COVID-19 pandemic, including medical statistics, diagnostic and treatment support, robotic surgery, medical imaging, and human biology research (Hamet & Tremblay, 2017). According to recent reports AI chatbots can help retail sales reach $112 billion by 2023(Williams, 2019).

However, the damage and threats AI brought have been a trending topic. There are several main threats led by this technology, which include unemployment, safety and security risks, and transparency challenges. AI's impact on jobs has been a critical topic in China. Job displacement has been rising due to the use of AI in the workplace. China's government is substantially funding the development of AI and associated technologies, which worsens unemployment in this country, for example, AI consumer service chatbots can make a redundancy in e-commerce or retailed stores field, for personal assistant chatbots had made damage in education, medicine sectors. According to the International Monetary Fund, some Chinese enterprises have replaced 30% to 40% of their laborers with autonomous machines in some Chinese cities, like Guangdong, Zhejiang, and Jiangsu provinces (Danmeng & Jia, 2018). According to a recent research by the Chinese Academy of Social Sciences, robots and other AI applications have replaced migrant labor in 8–10 million manufacturing positions throughout China's 13th Five-Year Plan (ending in 2020), with an average of 1.6–2 million jobs lost annually (Shen, 2020). Thus, how humans co-live with AI in the future became one of the most important topics. How can humans utilize this technology to help more people and find a balance to make our world better.

In conclusion, artificial intelligence (AI) is very important in China and has a wide range of applications. ranging from virtual assistants, chatbots, driverless cars, to medical technologies. It has improved human existence and contributed to the economic and social growth of China. But AI is a two-edged sword; although

technology offers China advantages, it also poses drawbacks like employment displacement.

To overcome these obstacles, optimize the advantages of AI, and win over people to this technology, society needs to find a middle ground. Educating people about AI is a crucial and practical step toward bettering their lives.

This research used the above knowledge as a foundational reference point to delve deeper into this technology topic, to explore how AI, especially AI chatbots can help humans instead of replacing them.

2.2 Green Marketing Communications

2.2.1 Green Marketing

As previously mentioned, it is crucial for AI to prove its potential in improving human lives rather than substituting them. In the twenty-first century, solving environmental issues has emerged as humanity's top priority. It is therefore crucial to take advantage of the chance to apply AI to help solve these problems. Green marketing techniques can be essential in demonstrating how AI and people can work together to solve environmental problems and advance society.

Green marketing is a combination of ecological marketing and environmental marketing. In 1975, The American Marketing Association (AMA) stated that “green marketing means that their products should be environmentally safe and friendly” (Majid, 2016). The concept and definition of Green Marketing has been developing. In 1976, green marketing was defined as “concerned with all marketing activities that have served to help environmental issues and that may serve to provide a remedy for environmental problems”(Pasto et al., 1976). According to Polonsky (1991), green marketing is any activity aimed to produce and support any exchanges meant to meet human needs or wants while having as little of a negative impact on the environment as possible. After over a decade of development, Environmental marketing refers to marketing that responds to environmental problems. It may be investigated from a variety of angles, such as those pertaining to procurement, production, packing, distribution, and waste disposal (Hartmann et al., 2005).

As the economy develops, and technology changes, environmental challenges in this century are escalating, exemplified by the exacerbation of issues like global warming, the repercussions of greenhouse gases, pollution, and worldwide climate changes. These challenges are intricately connected to the agricultural and manufacturing sectors, exerting a profound impact on human existence. More and more consumers are already aware of how closely their purchasing decisions link to environmental concerns despite more expensive costs, many environmentally concerned customers prefer to purchase eco-friendly items rather than alternatives (Laroche, 2001). As a result, the number of companies developing green marketing has been rapidly growing. The advantages of green marketing for businesses and marketers, including the chance for innovation, have expanded with the use of ecologically friendly goods (Pujari et al., 2004), brand image, and reputational benefits for businesses (Miles & Covin, 2000), Hasan & Ali (2015) claim that through promoting favorable contacts with the public and the media, green marketing provides companies a competitive edge.

Green marketing will rule the future in China. The Chinese government intends to achieve carbon neutrality by 2060 and peak carbon dioxide emissions by 2030, and have renewable energy sources makeup 25% of global energy consumption by 2030 (Bryan & Gao, 2018). To accomplish these aims, the Chinese government has been supporting public and privacy firms to do green marketing and introducing a range of strategies to help them. To promote the use of green products, China has continuously strengthened the systems for green product certification and promotion, green government procurement, and the implementation of an energy and water efficiency labeling system. It has encouraged innovative business models including the sharing economy and second-hand sales and fostered the creation of green infrastructure in the circulation sector, such as green shopping malls. A wider range of green products is available, and more individuals are choosing to purchase them ("China's Green Development in the New Era," 2023). After the United States, the nation now has the second-largest green bond market globally. There were 1,643 green bonds in China as of December 31, 2021, with a total balance of RMB 1,727 billion (about US$270 billion) (Wu, 2022b). The Electric Vehicles Market size in China is estimated to grow

from USD 260.84 billion in 2023 to USD 575.56 billion by 2028 (*CHINA EV market size & share analysis - growth trends & forecasts (2023 - 2028)*).

2.2.2 Green Marketing Communications

When firms do green marketing, communication is the most effective way to help them communicate with consumers and provide relevant information. Green marketing communication is one of the most important subjects since it has an influence on a variety of audiences, making it just as crucial as in the case of conventional marketing communication (Peattie & Belz, 2010). Environmental marketing communications are any of the diverse types of communication that are connected to an environmental issue or topic and that a business uses to inform or influence customers to act. There are several ways to provide environmental communications, including sustainable marketing, green marketing, and public relations techniques (Swift et al., 2021).

The main objectives of environmental marketing communications are 1. To inform consumers about the brand and the product to ensure that the target audiences are aware of the advantages of using the brand's products and the advantages of its environmentally friendly business practices. 2. To sway consumers' opinions about the product and spark their interest in encouraging them to choose an ecologically friendly option. 3. To advise customers where and how to get eco-friendly products while also reminding them that they will need to use them. 4. To express gratitude for their selecting the advised substitutions to eco-unfriendly items (Bakanauskas & Liesionis, 2002).

According to Polonsky (1994), there are four factors that drive the environmental practices in the company as follows:

1. Social responsibility is the necessity for an industry or business to follow consumer perceptions of the latest environmental trends by operating in a socially responsible manner. The business will either use marketing tools to advertise its green practices or just do it.

2. Government pressure occurs when a corporation is forced to comply with official rules about an environmental concern that the government has stated.

Regarding the use of environmental resources and associated marketing claims, the restrictions are intended to safeguard customers, businesses, and society.

3. The necessity to maintain a positive reputation among rivals in environmentally linked fields is referred to as competitive pressure.

4. Cost or profit issues relate to a cost-saving or profit gain that results from using environmentally friendly marketing techniques, such as substituting single-use plastic with biodegradable packaging to demonstrate the company's care for the environment while simultaneously lowering manufacturing costs.

2.2.3 Green Marketing Communication Challenges

Information on the performance of green product firms' products is typically presented in an unclear or precise manner. To market their green goods, Wang Pin Xuan, a well-known Chinese food business, uses the slogan "Taste green, enjoy health and multiple nutrition at Wang Pin Xuan." Tesla, on the other hand, claims that the Model S cut emissions of nitrogen oxide by 72 tons, carbon monoxide by 1200 tons, and hydrocarbons by 120 tons.

Generally speaking, customers' purchasing decisions are influenced by the way green product information is conveyed to them (Nguyen et al., 2019). However, given that most consumers lack environmental knowledge, their favorable attitudes toward environmental protection may not translate into purchasing behavior (Liu et al., 2012). For instance, customers may find it challenging to understand the precise or abstract information presentation of green products (Nittala, 2014). Additionally, the detailed labeling of a product's parameters or too abstract, ambiguous information will make buyers skeptical and force them to confirm the items' legitimacy, which will decrease their desire to make a purchase (Luo et al., 2020).

2.2.4 Green Consumers

From Elkington’s research (1994), "green consumer" is someone who avoids products that could seriously harm the environment during production, use, or disposal; endanger the health of themselves or others; consume excessive amounts of energy; produce needless waste; use materials sourced from endangered species or environments; involve the needless use of animals; or have an adverse effect on other

countries. Strong environmental values and attitudes are thought to drive green consumers, who seek out environmental product information, logically balance the utility a product provides against the environmental cost associated with it, and base their purchasing decisions on these environmental criteria in addition to more traditional factors like cost, quality, and convenience (Schaefer & Crane, 2005).

In 2007, Ongkrutraksa proved that people who are prepared to take action to stop the environmental crisis they are now facing are reen customers. In the early years of study into consumer behavior, some authors proved that younger people are more ecologically conscious (Anderson Jr & Cunningham, 1972; Berkowitz & Lutterman, 1968; Van Liere & Dunlap, 1981). However, according to Laroche, Bergeron, and Barbaro-Forleo (2001), there was a change in the early 1990s older people were more likely to express environmental concern. Therefore, we can see that the definition and concept of green buyers is still an evolving trend. The latest research also indicated that businesses that engage in green marketing have a favorable impact on consumers' sustainable purchase practices and trust. Additionally, consumers' loyalty and sustainable consumption habits are strongly impacted by customer trust (Yang et al., 2023).

According to Li et al., (2017), Most consumers in China have a basic perception of sustainable consumption. Young individuals (20-29 years old) have a great deal of intention and desire, but adults (30-49 years old) have more purchasing power for sustainable consumption. The main drivers of sustainable consumption in China include guaranteeing food safety and health, decreasing total costs, and safeguarding the environment.

2.2.5 Green Products

There are many meanings for the word 'green', and it has been a popular topic in the literature (Kleiner, 1991; McDonagh & Prothero, 1996; Silverstein, 1993). Among these related research, McDonagh and Prothero's research defined green dimensions, including ecological, political, corporate social responsibility, fair trade, conservation, non-profit, new consumerism, sustainability, and equality. These ideas are quite broad and include a wide range of topics.

“Green products” are defined by a lot of writers. For example, In Peattie’s research, he described a product as "green" if it performs much better in terms of the environment and society throughout manufacturing, usage, and disposal as compared to traditional or rival product offerings. This concept emphasizes the various stages of a product's life cycle in which its environmental friendliness may be shown. This idea focuses on the different points of a product's life cycle where its environmental friendliness may be shown.

While no consumer product is entirely without environmental impact, the terms "green products" or "environmental products" are commonly employed in the business sphere. These terms refer to products designed to conserve or enhance the natural environment by minimizing energy and resource usage and reducing the presence of toxic substances, pollution, and waste. This concept emphasizes the four primary environmental considerations for the creation of green products: energy, resources, pollution, and waste (Ottman et al., 2006).

Besides, green products are considered more costly than typical or traditional products (S. Liang et al., 2022). Several other authors have emphasized the distinguishing qualities of green products. The concepts of green products are extremely broad, so it generates a lot of confusion on the meaning of ‘green’ and when companies do green marketing, the direction is not clear (McDonagh & Prothero, 1996). The awareness of green labeling grew from 78% to 89% between 2015 and 2017 in China. Additionally, from 58% to 83% more Chinese people are aware of green products. In 2017, 71% of respondents claimed they had increased their expenditure on eco-friendly goods in the previous 12 months. The idea of green consumerism has been more popular in recent years among Chinese citizens, according to statistics made public by the China Chain Store and Franchise Association (*Green products in China: Growing out of ‘Niche’ but needs more investment*, 2020).

In conclusion, navigating the challenges of green marketing communication is a worthwhile endeavor for companies aiming to thrive in an era where sustainability and environmental responsibility play pivotal roles in consumer decision-making. Embracing green marketing not only meets the demands of conscious consumers but also contributes to broader environmental sustainability objectives. It is a strategic

imperative for companies looking to align their operations with evolving consumer values and societal expectations.

2.3 Artificial Intelligence Chatbots in Marketing Strategy

Recent studies consistently highlight the efficacy of AI chatbots as valuable tools for marketers in enhancing communication with consumers. These findings underscore the positive impact of AI chatbots on consumer purchase behavior. The growing body of evidence suggests that leveraging AI chatbots can significantly contribute to more effective and favorable interactions between marketers and consumers. Here are some latest studies, that have chosen China as background to explore the AI chatbots and marketing strategy.

The findings of the research explored China's online shopping consumption and AI chatbots, the findings indicated there have a positive impact of chatbot characteristics, including empathy, intimacy, accuracy, ease of use, and social presence, on customer satisfaction. Furthermore, the research establishes a positive association between customer satisfaction and chatbot reuse intention (Gao & Xing, 2023). Chosen Chinese chatbots-Xiaoiceto study, the results showed that the function of chatbots if focused on consumer service, consumers more prefer emotional and esteem social support more than informational support (Lee et al., 2022). The other study results show that AI chatbot service quality positively affects customer loyalty through perceived value, cognitive trust, affective trust and satisfaction (Chen et al., 2023).

Additionally, recently Microsoft new plan will bring a huge change to the AI chatbots industry, this company has confirmed that ads are coming to Bing's AI-power chatbot. The IT behemoth is still looking into new possibilities for ad experiences, so users still cannot see any ads on Bing chat yet. Microsoft anticipates that the Bing AI chatbot's more human replies will lead to an increase in users of its search function and, consequently, in advertising. In comparison to conventional search ads, advertisements within the Bing chatbot could also have greater visibility on the page. Microsoft is plans to integrate traditional search ads into responses generated by the chatbot. The ads would appear in response to user queries, potentially at the top of the search page.

Microsoft is also considering an ad format tailored to specific industries, aligning with user queries. While Microsoft has not provided a timeline for ad availability, the Bing chatbot, which is AI-powered, presents a lucrative opportunity for the company in the search advertising market (Dang, 2023).

There is a scarcity of studies and campaigns exploring the use of AI chatbots, particularly chat based/conversational with green marketing strategy. Nevertheless, the Bing chat ads plan and previous studies on Informative and task chatbots offers robust foundations for this research. They indicate that AI chatbots, this technology, have a positive impact on consumer behavior. Additionally, the potential for future advertising strategies involving AI chatbots suggests the possibility of attracting a larger consumer base. This research aims to bridge the gap in existing research by exploring the intersection of AI chatbots and green marketing, drawing insights from successful models such as Bing chat ads, informative and task chatbots. The overarching goal is to demonstrate the viability of incorporating chat based/ conversational into green marketing strategies, leveraging their positive effects on consumer behavior and paving the way for innovative advertising approaches in the future.

2.4 Technology Acceptance Model (TAM)

While AI chatbots have shown to be effective marketing and customer support tools, their adoption may be hampered by a variety of problems, especially if companies try to offer environmentally friendly items. Therefore, it is crucial to use TAM to research the customer acceptability of AI chatbots.

As the most influential and commonly employed theory, an individual's adoption of information systems is characterized by the Technology Adoption Model (TAM) (Lucas Jr & Spitler, 1999). The technology acceptance model originated from the theory of reasoned action (TRA) (Fishbein & Ajzen, 1977). TRA is a generic theory of human behavior. Therefore, TAM was updated based on this basis in the 1980s; the foundation of the technology acceptance model is information systems research. This model has been extensively employed to elucidate and forecast the variables that impact organizations and individual users' adoption and utilization of a

certain technology (Rauschnabel & Ro, 2016). Perceived usefulness and ease of use (PEU and PU) are the two primary aspects of the technology acceptance model (Davis et al., 1989).

TAM delves into the cognitive and psychological factors that impact users' acceptance of emerging technology. In accordance with TAM, the adoption and utilization of technology (Actual Behavior) are contingent upon users' behavioral intention (BI). Additionally, people's attitudes toward technology's ease of use and their perceived usefulness (PU) are "jointly determined" by behavior intention. As a result, people's attitudes are influenced by how helpful they think something to be and how simple they believe it to be to use. Both PU and PEU are determined by external factors. Due to the external variable architecture, TAM enables researchers to incorporate other possible factors that might influence the adoption of a certain technology.

For the market, The secret to assisting them in gauging their performance is getting clients to embrace an invention (Rese et al., 2017). The TAM model states that the variables influencing success are the user's attitude (AT) and behavioral intention (BI) toward innovation or technology (Martínez et al., 2014). Therefore, the initial TAM rests on four pillars: perceived usefulness (PU) and perceived ease of use (PEOU), users' attitude, and their behavioral intentions (Kim & Forsythe, 2008).

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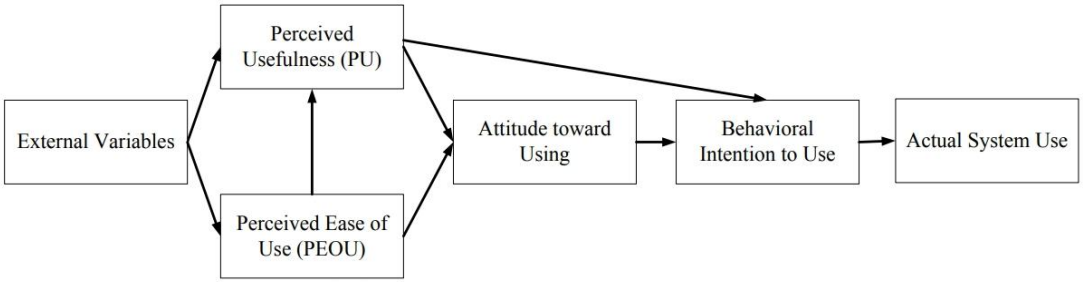
Figure 1

Technology Acceptance Model



Note. From Liu (2022)

Considering the rise in self-awareness and the pervasiveness of technology use in daily life. Some authors expanded the TAM with new components to more accurately define and forecast user adoption behavior (Pantano & Viassone, 2014;

Rese et al., 2017). The models employed in technology's acceptance study grew increasingly so the additional factors are distant from one another, and they have no relationship. Among these additional factors, one of the key dimensions is refers to a new technology's hedonic value and defines how enjoyable a subject finds its utilization, it seeks to elucidate a user's inherent motivation, this dimension called perceived enjoyment (PE) (Kim & Forsythe, 2008; Pantano & Di Pietro, 2012; Pantano & Viassone, 2014). In research by Kakabadse et al. (2008) about student compliance with an online learning environment, it was discovered that pleasure affects behavior directly but attitudes indirectly. Venkatesh (2000) defined enjoyment as in use. In the TAM, this factor means whether people can feel happy and satisfied when they are using a certain information system or technology (Kakabadse et al., 2008).

One critique leveled regarding TAM is that the majority of research on TAM has ignored consumers' negative views in favor of concentrating solely on their positive ones (Cenfetelli, 2004). Thus, some authors took perceived cyber risks (PCR) as another important factor influencing users' adoption towards technology (Al-Adwan et al., 2023).

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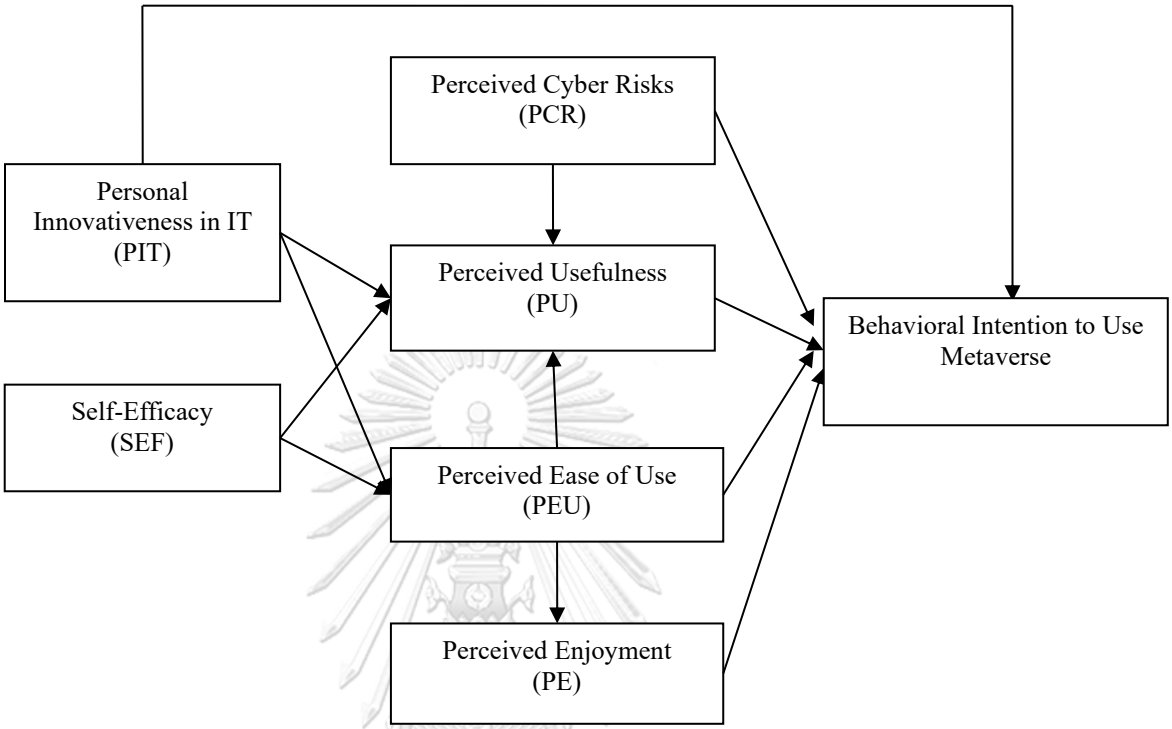
Figure 2

Extending the Technology Acceptance Model



Note. From Al-Adwan et al., (2023)

In conclusion, the framework and hypotheses for this research developed using the knowledge gathered from the survey of the literature on TAM. The questionnaire for this research developed using the literature on PU, PEU, PE, and PCR to explore whether AI chatbots can influence consumers' purchase intention on EVs.

Perceived Usefulness (PU) refers to the degree to which people believe that using a certain technology improves their performance (Davis et al., 1989). PU in this research described to what extent consumers in China Shanghai city perceive that the use of the AI chatbots will make their purchase behavior more efficient. Accordingly, it is proposed that:

H1: Perceived usefulness (PU) of AI chatbots affects consumers' purchase intention towards EVs.

Perceived Usefulness (PU) refers to the degree to which a person believes that a certain technology is simple to use and requires little mental work (Davis et al., 1989). This research studied employing PEU to capture consumers' perceptions of how easy and effortless it is to utilize AI for EVs information. Consequently, it is anticipated that:

H2: Perceived usefulness (PU) of AI chatbots affects consumers' purchase intention towards EVs.

Perceived Enjoyment (PE) has shown that it is useful in describing how individuals utilize technology. It is an intrinsic motivation that underpins the enjoyment concept (Abdullah & Ward, 2016). When referring to "the extent to which the action of using a particular system is regarded to be enjoyed in its own right separate from any performance consequence resulting from system use." Based on the findings, this research examined does consumers using AI chatbots for EVs information can make them happy, and furthermore affect their purchase intentions behavior. Thus, it is hypothesized that:

H3: Perceived enjoyment (PE) of AI chatbots affects consumers' purchase intention towards EVs.

Perceived Cyber Risks (PCR)

One common belief is that the main obstacle to users adopting new technology is their sense of hazards (Wang et al., 2018). An individual's subjective evaluation of potential cyber security dangers and vulnerabilities is referred to as perceived cyber risks. These opinions can affect behavior, decision-making, and cyber security procedures. They are influenced by a variety of circumstances. Prior studies conducted in many settings suggest that perceived risks have an adverse impact on behavior intentions about technology, as well as perceived utility, given that they encompass both unpredictability and adverse outcomes (Al-Adwan et al., 2023; Jiang et al., 2022; Sarosa, 2022; Siyal et al., 2019; Trinh et al., 2020; Wang et al., 2018). Users are more likely to find a technology useful and be more eager to utilize it if they believe that adopting it is a low risk undertaking. Hence, it is argued that:

H4: Perceived cyber risks (PCR) affect consumers' purchase intention towards EVs.

According to the review of the literature, TAM is an important method that is widely used to study the factors that affect software adoption and people's intention to utilize technology. Several articles published in the context of the TAM showed TAM has a positive effect on green marketing and protects the environment. One research discusses a study conducted in Taiwan to understand consumer behavior and attitudes towards building-attached photovoltaic (BAPV) systems, specifically rooftop solar power installations. The study utilizes the Technology Acceptance Model (TAM) to investigate how consumers perceive and intend to use BAPV systems, incorporating three external variables: perceived safety (PS), electricity price trends, and green awareness (Tsaur & Lin, 2018). The other author implies that the TAM model assesses the acceptance and adoption of technology to understand consumer acceptance and adoption of green products and practices. This research involved incorporating variables related to perceived usefulness, ease of use, and safety in the context of eco-friendly products and services. Using TAM to explore how green awareness and environmental concerns influence consumers' attitudes and intentions toward adopting green solutions (Mishra & Sharma, 2010).

In summary, that TAM integrates essential factors such as perceived usefulness, perceived ease of use, perceived enjoyment, and perceived cyber risks, providing a holistic perspective on how consumers perceive and engage with technology. This framework proves instrumental in understanding the intricate dynamics that shape consumers' interactions with technology and, ultimately, how these perceptions influence their intentions to make a purchase. The incorporation of TAM enhances the depth and breadth of the study, making it an effective and insightful tool for investigating the complex interplay between consumers and emerging technologies.

2.5 Purchase Intention

A company's success with green marketing is mostly determined by the purchase intentions of its customers, but this is impacted by a complicated web of interrelated elements. Thus, the Technology Acceptance Model (TAM) offers a framework that enables marketers to examine the purchasing patterns of their target audience. This approach may be used by companies and marketers to create and promote items, raising potential customers' desire to make a purchase. Because attitude and behavior are connected, a marketer must understand the consumer's purchasing intention to ascertain whether the consumer's attitude toward environmental messages is related to their desire to purchase the marketed items.

2.5.1 The Definition of Purchase Intention

Making a buying decision is difficult; this behavior is influenced by a lot of factors. It frequently has an impact on consumer attitudes, perceptions, and behavior. Purchase behavior plays a key role in how consumers acquire and evaluate certain goods and services. It is a useful instrument for marketers to predict consumers' purchase behavior (Gogoi, 2013).

Individual attitudes and experience with the products have an impact on consumer purchase intentions (Fitzsimons & Morwitz, 1996). Purchase intention refers to a person's propensity to purchase a certain good, and it is a crucial factor in assessing consumer behavior (Fishbein & Ajzen, 1977). "What we think we will buy" is how purchase intention is defined.

As a result, purchase intention can be used to quantify the tendency of a consumer to buy a product, and there is a positive correlation between these two factors, with a stronger purchase intention being associated with a stronger desire to make a purchase (Dodds et al., 1991; Schiffman et al., 2000). There are three types of purchase intention, including unintended purchase, partially intended purchase, and fully intended purchase. Impulse purchases, also known as intentional purchases, are defined as sudden, unexpected, and unwelcome decisions made when at a store to acquire a certain brand or category of goods. When making a purchase, consumers who partially plan their purchases choose a product category and a base and then

decide on brands and kinds at the store. On the other hand, a fully planned purchase implies that consumers select the products and brands they wish to purchase even before they enter the store. It should be noted that these three types of buying behavior may be influenced by the level of awareness and the strength of the brand image (Fishbein & Ajzen, 1977).

2.5.2 Purchase Intention towards Green Marketing

Consumer purchase intention toward green marketing has been studied by much previous marketing research (Ahuja, 2015; Rahbar & Wahid, 2011; Ramli et al., 2020). For example, one author proved that by drawing customers' attention and increasing their purchase intention, information about green products is important, and the communication strategy has a positive relationship with consumers' purchase intention (Ginsberg & Bloom, 2004).

Customer purchase intention is a complex interaction driven by several elements and is a critical driver of the effectiveness of green marketing. In this context, the Technology Acceptance Model (TAM) shows itself to be a useful framework for deciphering and examining customer buying behavior. Marketers may increase potential consumers' buying intentions by using TAM to successfully create and promote products. Understanding purchase intention is essential for marketers to assess the relationship between consumers' attitudes toward environmental communications and their willingness to buy promoted goods.

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2.6 Electric Vehicles

EVs adoption is essential for lowering carbon emissions and reducing air pollution, particularly in China. This business has a bright future as the largest national market for EVs in the world. An electric vehicle (EVs) is a vehicle that uses one or more electric motors for propulsion. It can be powered by solar panels or batteries, fuel cells or generators that convert gasoline into energy, or collector systems that draw power from sources other than vehicles (Faiz et al., 1996). This type of vehicle is propelled by electricity and an electric motor instead of a traditional internal combustion engine fueled by gasoline.

The first electric motor was developed by Hungarian priest Nyos Jedlik in 1827. The next year, he used it to power a tiny automobile (Guarnieri, 2012). In the early 1900s, mass-produced electric cars first appeared in America. However, the popularity of electric automobiles substantially decreased with the introduction of affordable assembly-line cars by Ford Motor Company (Le Petit, 2017). After one decade, EVs came back to public life, and this kind of car was confirmed to help humans to protect the environment.

Electric vehicles include four types, which are Battery electric vehicles (BEVs), Plug-in hybrid electric vehicles (PHEVs), Hybrid electric vehicles (HEVs), and Fuel cell electric vehicles (FCEVs). Electric Vehicles (EVs), also referred to as Battery Electric Vehicles (BEVs), operate without relying on an internal combustion engine to convert gasoline into propulsion power. Instead, they exclusively rely on electricity from one or more large batteries. Hybrid Electric Vehicles (HEVs) marked a significant entry into the EV market, combining an internal combustion engine with an electric motor to enhance fuel economy by switching between the two. Plug-in Hybrid Electric Vehicles (PHEVs) represent a blend of BEVs and HEVs, designed to operate on both gasoline and battery power, with the primary energy source being plug-in chargers, making them more akin to EVs. Fuel Cell Electric Vehicles (FCEVs) utilize electric motors, generating electricity in fuel cells and storing it in a small buffer battery. FCEVs require hydrogen as their fuel source (Richter, 2023).

Air pollution is one of the greatest threats to our earth. Hydrocarbons, nitrogen dioxide, lead, carbon monoxide, sculpture dioxide, and particulate matter are the main pollutants, and all led by car emissions. Nearly one-fifth of the EU's overall CO2 emissions, the primary greenhouse gas, come from the road transportation sector. Additionally, between 1990 and 2010, CO2 emissions from road transportation rose by almost 23%, and they are continuing to increase inside the EU and the whole world (Rezvani et al., 2015).

China has the second-largest economy; making it the world's only major economy to attain growth, and the GDP growth increased to 9 percent in 2021 and 5.8 percent for 2022 and became the fourth-largest auto producer and third-largest auto consumer in the world by 2004. However, Road cars are now one of the main sources of CO2 and pollutant emissions in China because of the country's economic expansion

and quickening urbanization (Yan & Crookes, 2007). China emitted about 10.2 billion tons of carbon in 2020 and 2021; motorized vehicles emitted around 7.7 million tons of carbon monoxide. Chinese government committed to peaking carbon dioxide emissions (CO2) by 2030 and achieving carbon neutrality by 2060. As a result, one of the best ways to assist people in protecting the environment is the introduction of electric cars, or EVs. The Chinese government has been enacting several policies to support the electric vehicle (EV) industry. Some of these policies include oil and power price subsidies, purchase subsidies, and purchase tax exemptions. Different policy mixes have different effects on promoting EVs (Chu et al., 2018). In conclusion, Chinese official regulations drive the market of electric vehicles, Chinese EVs sales have benefited greatly from official support, in the end, EVs industry will be one of the most helpful tools to help the Chinese government and people help the environment (Lin & Wu, 2018).

Budget electric car Hongguang Mini was the best-selling electric car in China last year (2021). More expensive cars from Tesla and BYD dominated the top vehicles sold in the new energy vehicle category, which includes battery-powered and hybrid cars. At the same time, more Chinese car firms coming into this market, they use high quality, and low prices to attract consumers, for example, Nezha, and Nio.

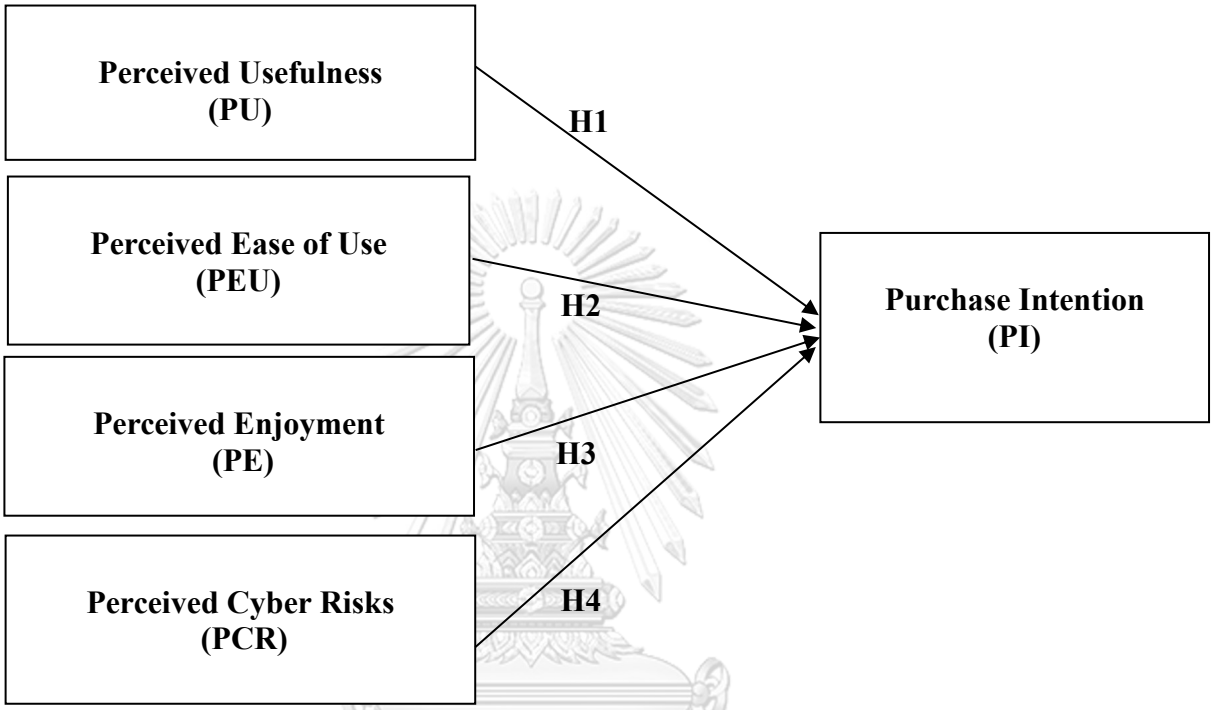
Due to the Chinese government's policies of encouragement and the comparatively low cost of batteries, the market size of EVs in China has grown quickly over the past several years. Shanghai, one of the first pilot cities to promote EVs, has put in place various laws to encourage their use. Shanghai has been essential in promoting EVs in China since it was a critical first-tier city for EVs testing. In 2018, Shanghai became the city with the highest sales of EVs in China, and the registration number of EVs in Shanghai has increased significantly since 2015 (Lin & Wu, 2017). As a result, analyzing the EVs adoption in Shanghai serves as a crucial benchmark for other cities.

Even though the number of electric vehicles (EVs) on the road has been rising, China is now dealing with a significant issue: EVs' market shares are still lower than those of conventional ICEVs. This phenomenon can also be found in Shanghai city (Lin & Wu, 2018).

2.7 Conceptual Framework

Figure 3

Conceptual Framework



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CHAPTER 3
METHODOLOGY

The study uses a quantitative methodology to investigate how AI chatbots' PU, PEU, and PE, as well as their PCR, affect consumers' intentions to buy electric vehicles. a survey employed as a data collection method in research. The specifics of the research instrument, variable measurement, data collecting and analysis procedures, research sample and sampling technique, and research sample are covered in this chapter.

3.1 Research Methodology

The research employed a quantitative methodology, utilizing an online questionnaire survey to collect information and assess the research model. The questionnaire's questions and measurement items were developed based on the literature review and previous studies. A purposive sampling method involved 300 participants for data collection. The surveys are conducted in October 2023, with data collection taking place through online email or social media links. Confidentiality of all participants ensured.

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3.2 Population and Sample

According to the latest statistics from the Shanghai government website (2023), as the largest city in China, Shanghai is not only China's most thriving economic center but also one of the world's leading financial centers: The city's GDP became the fourth highest in the world, thus Chinese government takes this city as one of the gateways to help China go to the global world and as a model city for other Chinese areas. At the same time, Shanghai is the first city to carry out strict regulations on garbage sorting, recycling and against light pollution; Shanghai citizens have high environmental awareness.

At present, EVs consumer markets in China are mostly in first-tier cities such as Beijing, Shanghai, and Shenzhen. Shanghai has been the main consumption market,

ranking first among Chinese cities in terms of market share, but sales have slightly declined in recent years (*CHINA EV market size & share analysis - growth trends & forecasts (2023 - 2028)*).

Therefore, in this research, based on the previous studies and government reports, choosing people living in Shanghai city as research samples; it can be a good example to help other Chinese cities to develop the green economy. The sample should consist of individuals between the ages of 31 and 40 who reside in Shanghai and who either want to use or have previously used AI chatbots and EVs. Data for this study came from 300 participants.

The statistical approach from the book Multivariate Data Analysis (Hair et al., 2010) states that the sample number of each questionnaire should be five times the number of questions, with a minimum sample size of no less than a ratio of 5 to 1. For this study, there are 26 questions, so the initial sample number should be 130. But, to make sure the good reliability and validity of the questionnaire, the researcher used a total of 300 samples.

3.3 Questionnaire Format

Because some of the samples in this study are Chinese, questionnaires designed in Chinese are employed to gather data from the participants. Screening questions, demographics, perceived utility (PU), perceived ease of use (PEU), perceived enjoyment (PE), perceived cyber risks (PCR), and purchase intention were among the seven components of the questionnaire (see Appendix A).

The screening question appears in the first section of the questionnaire. It asks responders to three questions about their knowledge of AI chatbots and EVs, asking whether they are living in Shanghai city, and asking about their age and do they know AI chatbots and EVs.

The second part of the questionnaire examined the perceived usefulness (PU) of AI chatbots. This section explored how much respondents would agree or disagree regarding AI chatbots are usefulness for them to search EVs information.

The third part of the questionnaire focused on the perceived ease of use (PEU) of AI chatbots exploring Whether AI chatbots for respondents is easy to use and do not need a lot of mental effort when they search for EVs information.

The fourth part of the questionnaire focused on perceived enjoyment (PE) exploring how much participants would agree or disagree whether when they use AI chatbots for EVs information, the process is fun and interesting.

The fifth part of the questionnaire is perceived cyber risks (PCR). This part examined does the participants believe using AI chatbots to search for information about EVs is safe; this technology will not invade their private information.

The six parts of the questionnaire will examine the purchase intention of EVs. To explore whether the use of AI chatbots influenced responders' purchase intention of EVs.

Three questions on gender, monthly income, and educational attainment make up the demographic information section, which is the seventh section of the questionnaire.

3.4 Measurement of the Variables

3.4.1 Variables

Perceived usefulness (PU), perceived enjoyment (PE), perceived ease of use (PEU), perceived cyber risks (PCR), and purchase intention are the five factors that this study concentrated on. The following describes the measurement scales that were used to gauge the five variables. The first variable is perceived usefulness. It defined in this research is to measure how strongly a person thinks that using AI chatbots are helpful, and useful to for searching information about EVs. Thus, through a 5-point Likert scale chart from 1 (strongly disagree) to 5 (strongly agree). There are 5 statements in this section to measure the PU, which are adapted from previous research (Holdack et al., 2022).

Some examples of question items are shown below:

-Using AI chatbots for EVs information would improve my shopping ability

-Using AI chatbots for EVs information would makes my life easier

The second variable is perceived ease of use (PEU) borrowed from previously validated scales (Holdack et al., 2022). In this research, through a 5-point Likert scale chart from 1 (strongly disagree) to 5 (strongly agree) with 4 statements to measure this variable, to see whether using AI chatbots to search EVs information for consumers is easy, does not need a lot of mental effort.

Some examples of question items are shown below:

-Using AI chatbots for EVs information is clear and understandable

-I would find it easy to get AI chatbots to do what I want it to do.

The third variable investigated the perceived enjoyment (PE) of AI chatbots through a 5-point Likert scale chart from 1 (strongly disagree) to 5 (strongly agree). There are 4 statements in this section to measure the PE, which are adapted from previous research (Liu, 2022; Zhou et al., 2021b).

Some examples of question items are shown below:

-I enjoy using AI chatbots to look for EVs information.

-Using AI chatbots for EVs information would not bore to me.

The fourth variable is perceived cyber risks (PCR), in this research using a five-point Likert scale ranging from strongly disagree to strongly agree, asking the level of agreement or disagreement respondents have on the 4 statements, based on the previously validated scales (Al-Adwan et al., 2023).

Some examples of question items are shown below:

-I am concerned that AI chatbots distribute the gathered data without my knowledge to third parties.

-I perceive AI chatbots as more privacy-invasive compared to non-AI chatbots applications.

The last variable is consumers' purchase intention (PI), borrowed from previously validated scales. In this research it refers to consumers' likelihood to purchase EVs after using AI chatbots to search relevant for information**.** Through a 5-point Likert scale chart from 1 (strongly disagree) to 5 (strongly agree), 3 statements to measure this variable (Vafaei-Zadeh et al., 2022).

Some examples of question items are shown below:

- After using AI chatbots to get EVs information, I predicted I will buy an EV in the future.

-EVs information provided by AI chatbots encourages me so I have planned to buy an EV.

3.5 Check for Reliability and Validity

To check the reliability and validity, after the questionnaire completed, invited three Chinese individuals with a high level of education to review and validate the accuracy of both the English and Chinese translations to ensure clarity and comprehension. Additionally, conducted a pre-test with a sample of 50 individuals.

Table 1

Cronbach's Alpha for the Variables

Variables	Cronbach's Alpha	Number of items
Perceived usefulness (PU)	.882	5
Perceived ease of use (PEU)	.766	4
Perceived enjoyment (PE)	.827	4
Perceived cyber risks (PCR)	.882	4
Purchase intention (PI)	.778	3

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The scale's overall reliability coefficient score, α=0.827, indicates that the questionnaire generally has strong internal consistency and stability. Simultaneously, every subscale had a coefficient of reliability value (α) more than 0.7, which suggests that each subscale had strong stability. The ultimate determination is that this scale's data dependability is good.

Table 2

KMO and Bartlett's Test

KMO		0.758
Bartlett's Test of Sphericity	Approx. Chi-square	500.283
	df	190
	P	0.000

Table 2 displays the findings of the exploratory factor analysis used to assess the structural validity of the measure. P=0.000 was found using the Bartlett's sphericity test, and the KOM value is 0.758. This suggests that the questionnaire's overall validity is strong.

3.6 Data collection and Data Analysis

The data collected from October to November 2023 at https://www.wjx.cn using an online questionnaire as the instrument. The link to the survey questionnaire was posted on WeChat, which is one of the most popular social media applications among different age groups of people to share information (Wang et al., 2023). SPSS (Statistical Package for the Social Sciences) program was used to assess and analyze the gathered data. The analysis of the results is described through descriptive statistics, which includes the means, standard deviation, percentage, and frequency. The finding included the use of multiple regression analysis to test the influence of the independent variables (PU, PEU, PE, PCR) on the dependent variables (PI). The results of this research are reported in the next chapter. The researcher has requested the IP addresses and timestamps from the samples to verify the legitimacy of the collected data; refer to Appendix C for details.

CHAPTER 4
RESULTS AND ANALYSIS

The Statistical Package for the Social Sciences (SPSS) is employed to analyze the primary data collected from research questionnaire in this research.

4.1 Descriptive Statistics

4.1.1 General Demographic Description

This part illustrates the general demographic data of the respondents. Gender, monthly revenue, education level among the demographics. A total of 300 questionnaire responses were gathered. 26 questionnaires were eliminated because the respondents did not qualify for the questionnaire's screening phase.

Table 4.1

Demographic Characteristics of the sample

Demographic Characteristics			
Gender			
	Male	149	49.7%
	Female	151	50.3%
	Others	0	0%
Revenue			
	Equal to or less than 3,000 RMB	0	0%
	3,000-5,000 RMB	0	0%
	5.001-7,000 RMB	32	10.7%
	7,001-9.000 RMB	147	49.0%
	More than 9,000 RMB	121	40.3%
Highest Education Level			
	Lower than secondary school	6	2.0%
	Secondary school or equivalent	20	6.7%
	Bachelor's degree or equivalent	220	73.3%
	Higher than the bachelor's degree	54	18.0%

Note. n = 300, n is sample.

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Table 4.1 shows the demographic characteristics of the samples. When classified by gender, it is indicated that the proportions of males and females are almost close to half and half, and the proportion of others is zero. The data shows 149 are male, accounting for 49.7%, 151 are female which accounts 50.3% and 0 is from others.

When classified by revenue, it is indicated that the largest number of 147 respondents with monthly income between 7,001-9,000 RMB accounts for 49.0%. The second largest group of 121 respondents with monthly income more than 9,000 RMB accounts for 40.3% followed by 32 respondents (10.7%) whose monthly average income between 5,001-7,000 RMB.

When classified by the highest level of education, it is indicated that most of the respondents hold a bachelor's degree or equivalent taking up the highest proportion of 73.3%, and this group has 220 respondents, followed by 54 people who graduate from higher that the bachelor's degree, accounting for 18.0% and 20 people hold secondary school or equivalent which accounts 6.7% among all respondents. Only 6 hold a degree lower than the secondary school accounting for 2.0%.

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4.1.2 Descriptive Results of the Variables

Table 4.2

Mean, Standard Deviation of Perceived Usefulness (PU) of AI Chatbots on the purchase intention of electric vehicles

	M	*SD*
PU1 With the AI chatbots, I couldn't get the EVs information that I need.	3.32	1.130
PU2 If I want to buy EVs, I could accomplish just what I might need with AI chatbots.	3.36	1.169
PU3 Using AI chatbots for EVs information would make shopping more productive.	3.37	1.145
PU4 Using AI chatbots for EVs information would makes my life easier.	3.42	1.161
PU5 Using AI chatbots for EVs information would improve my shopping ability.	3.40	1.515
Total	3.26	1.224

Note. Cronbach's Alpha = 0.873

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The results in Table 4.2 showed the overall means score of PU was 3.26. In detail, PU of AI chatbots contains five statements. The statements with the highest mean score was "With the AI chatbots, I couldn't get the EVs information that I need" with a score of 3.42 (SD=1.161), followed by the statement, "If I want to buy EVs, I could accomplish just what I might need with AI chatbots" with score of 3.40 (SD=1.151), "Using AI chatbots for EVs information would make shopping more productive" (M=3.37, SD=1.145), "Using AI chatbots for EVs information would makes my life easier" (M=3.36, SD=1.1169). The statement with the least mean score (M=3.32, SD=1.130) was "Using AI chatbots for EVs information would improve my shopping ability". The Cronbach's alpha value for PU scale is 0.873, assuring the scale's high level of dependability. Additionally, the dependability of the original scale,

which had a value greater than 0.7, is consistent with this number (Holdack et al., 2022).

Table 4.3

Mean, Standard Deviation of Perceived Ease of Use (PEU) of AI Chatbots on the purchase intention of electric vehicles

	M	*SD*
PEU1 Using AI chatbots for EVs information is clear and understandable.	3.33	1.199
PEU2 Using AI chatbots does not require a lot of mental efforts.	3.31	1.146
PEU3 Using AI chatbots for EVs information is easy and use.	3.36	1.112
PEU4 I would find it easy to get AI chatbots to do what I want it to do.	3.32	1.120
Total	3.26	1.144

Note. Cronbach's Alpha = 0.851

The second variable, which is perceived ease of use (PEU), the result showed that overall PEU of AI Chatbots was 3.26. This part consists of 4 statements. The statement with the highest mean score (M =3.36, SD =1.112) was "Using AI chatbots for EVs information is easy to use", followed by the statement "Using AI chatbots for EVs information is clear and understandable" (M =3.33, SD =1.199). Then was the statement "I would find it easy to get AI chatbots to do what I want it to do", receiving a score with 3.32 (SD =1.210). The statement with the least mean score was "Using AI chatbots does not require a lot of mental efforts" (M = 3.31, SD =1.146). The Cronbach's alpha value for PEU scale is 0.851, making sure the scale has great dependability. Additionally, this number agrees with the original scale's dependability of 0.725 (Holdack et al., 2022).

Table 4.4

Mean, Standard Deviation and Level of Perceived Enjoyment (PE) of AI Chatbots on the purchase intention of electric vehicles

	M	*SD*
PE1 I enjoy the process that uses AI chatbots to get EVs information	3.24	1.125
PE2 Using AI chatbots for EVs information would not bore to me.	3.29	1.174
PE3 Using AI chatbot for EVs information is entreating because I can communicate with	3.26	1.199
PE4 Using AI chatbots for EVs information can arouse my interest and keeps me happy.	3.30	1.141
Total	3.27	1.160

Note. Cronbach's Alpha = 0.852

The results in Table 4.4 showed that the overall perceived enjoyment of AI Chatbots was 3.27. The statement with the highest mean score was "Using AI chatbots for EVs information can arouse my interest and keeps me happy" with a mean score of 3.30 (SD = 1.141), followed by the statement "Using AI chatbots for EVs information would not bore to me" (M = 3.29, SD =1.174) and next is "Using AI chatbot for EVs information is entreating because I can communicate with" with a mean score of 3.26 and SD=1.199. On the other hand, the statement with the least mean score (3.24, SD = 1.125) was "I enjoy the process that uses AI chatbots to get EVs information". The Cronbach's alpha value for perceived enjoyment scale is 0.852, ensuring high reliability of the scale, this result agrees with the dependability of the original scale, which was 0.811 (Liu, 2022).

Table 4.5

Mean, Standard Deviation of Perceived Cyber Risks (PCR) of AI Chatbots on the purchase intention of electric vehicles

	M	*SD*
PCR1 The personal information that enters an AI chatbots will be handled securely.	3.33	1.160
PCR2 AI chatbots have enough safeguards to make me feel comfortable using them to access EVs information.	3.32	1.150
PCR3 I am concerned that AI chatbots distribute the gathered data without my knowledge to third parties.	3.34	1.179
PCR4 I perceive AI chatbots as more privacy-invasive compared to non-AI chatbot applications	3.44	1.213
Total	3.36	1.176

Note. Cronbach's Alpha = 0.877

Next, this variable, which is perceived cyber risks, the result showed that overall PCR was 3.36. This part consists of four statements. The statement with the highest mean score (M = 3.44, SD =1.213) was "I perceive AI chatbots as more privacy-invasive compared to non-AI chatbot applications", followed by the statement "I am concerned that AI chatbots distribute the gathered data without my knowledge to third parties" (M =3.34, SD =1.179). Then was the statement "The personal information that enters into an AI chatbots will be handled securely" receiving a score with 3.33 (SD =1.160). The statement with the least mean score was "AI chatbots have enough safeguards to make me feel comfortable using them to access EVs information" (M = 3.32, SD =1.150). The Cronbach's alpha value for brand equity scale is 0.877, guaranteeing the scale's excellent dependability. Additionally, this number matches the dependability of the original scale (0.886) (Al-Adwan et al., 2023).

Table 4.6

Mean, Standard Deviation of Purchase intention (PI) of EVs

	M	*SD*
PI1 After experiencing using AI chatbots to get EVs information, I predicted I probably will buy an EV in the future.	3.35	1.189
PI2 The experience that uses AI chatbots to get EVs information inspired me, so I have planned to buy an EV.	3.30	1.164
PI3 After I used AI chatbots to get information about EVs, I decided to buy an EV soon.	3.33	1.205
Total	3.33	1.186

Note. Cronbach's Alpha = 0.825

The result showed that the overall social experience of Marimekko brand was 3.33 (SD = 1.186). According to the three statements of PI, the statement with the highest score (M = 3.35,) was "After experiencing using AI chatbots to get EVs information, I predicted I probably will buy an EV in the future", followed by "After I used AI chatbots to get information about EVs, I decided to buy an EV soon" with a mean score of 3.33 (SD = 1.205). The statement with the least mean score (M = 3.30, SD = 1.164) was "The experience that uses AI chatbots to get EVs information inspired me, so I have planned to buy an EV." The Cronbach's alpha value for PI scale is 0.825, ensuring high reliability of the scale. Furthermore, this value corresponds to the original scale, which had a reliability of 0.957 (Vafaei-Zadeh et al., 2022).

4.2 Hypothesis Testing

The research uses data to test the influence of independent variables (PU, PEU, PE and PCR) on the dependent variable (PI) through correlation and multiple regression analysis. The results are shown in Table 4.7 and 4.8.

Correlation Analysis

Table 4.7

Correlation between PI and PU, PE, PEU, PCR

Relationship between	*r*
PI and PU	0.429*
PI and PEU	0.344*
PI and PE	0.412*
PI and PCR	0.427*

**P <0.001*

The correlation table (Table 4.7) shows that all the factors (PU, PE, PEU, PCR) of AI chatbots all are positively related to purchase intentions. Among these variables, r value of PU is 0.429 which means that it has a strongest positive linear relationship with purchase intention compare the other. Following is PCR (0.427), and PE (r=0.412), the lowest relationship is PEU, the r=0.344. The paper discusses the use of correlation analysis to assess the linear relationship between two variables, highlighting that some correlations among independent variables are close to 0.6, which could indicate potential multi-collinearity issues (Ruangkanjanases et al., 2021). In this study, the correlations are not close to 0.6, eliminating the need for additional multi-collinearity tests.

Multiple Regression Analysis

Table 4.8

Results of Multiple Regression Analysis

Variable	B	SE	95% CI		β	t	P
			PL	LL			
(constant)	0.669	0.238	0.201	1.137		2.816*	0.005
PU	0.235	0.062	0.113	0.357	0.216	3.786*	0.01
PEU	0.096	0.059	-0.19	0.212	0.092	1.641	0.102
PE	0.235	0.057	0.122	0.347	0.222	4.095*	0.01
PCR	0.232	0.056	0.121	0.342	0.228	4.113*	0.01

Note. F= 33.543, R^2 = 0.313, R^2 adj = 0.303, *p < 0.01[b].

In detail, (1) the perceived cyber risks (PCR) got highest Beta score= 0.228; (2) the perceived enjoyment (PE) variable with Beta = 0.222, followed by (3) the perceived usefulness with Beta=0.216 (4) the last variable (PEU) with Beta= 0.092. Table 4.8 presents the results of multiple regression analysis evaluating the factors that influence the purchase intention. For participants PU (β=0.216), PE (β=0.222), PCR (β=0.228) significantly predict their purchase intention, whereas PEU (β=0.092) is not a significant predictor. This model explains 31.30% of the variance in respondents' purchase intention (R^2 = 0.313, R^2 adj = 0.303).

CHAPTER 5
SUMMARY AND DISCUSSION

The findings of this study suggest that this chapter included a thorough synopsis of the data analysis and research discussion. Additionally, this study's shortcomings, potential future research areas, and practical ramifications are all covered.

5.1 Summary

Demographic

Of the total of 300 respondents, 149 respondents are males (49.7%), and 151 respondents are females (50.3%). In terms of revenue, the largest number of 147 respondents with monthly income between 7,001 to 9,000 RMB accounts for 49.0%. The second largest group of 121 respondents (40.3%) has an average monthly income of more than 9,000 RMB and the rest of respondents' monthly revenue income belongs to 5,001-7,000 RMB, which accounts for only 10.7%. In terms of the highest education level, most of the respondents hold a bachelor's degree or equivalent taking up the highest proportion of 73.3%, and this group has 220 respondents, followed by 54 people who graduated with a higher than the bachelor's degree, accounting for 18.0%.

This research explains the following research question:

1. What are the perceived usefulness (PU), perceived ease of use (PEU), perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots, and purchase intention of EVs among consumers in China?

Perceived Usefulness (PU)

Perceived usefulness (PU) in this research includes five dimensions - PU1: Using AI chatbots for EVs information would improve my shopping ability, PU2: Using AI chatbots for EVs information would makes my life easier, PU3: Using AI chatbots for EVs information would make shopping more productive, PU4: With the AI chatbots, I couldn't get the EVs information that I need, and PU 5: If I want to buy EVs, I could accomplish just what I might need with AI chatbots. Among the five

dimensions, PU 4 received the highest mean score of 3.42 (SD=1.161), followed by PU 5 with a mean score of 3.40 (SD=1.100), PU1 with a mean score of 4.03 (SD=1.039), and PU4 with a mean score of 4.01 (SD=1.151). Through the data collection analysis, it was concluded that the variable's five dimensions received a prominent level of agreement with an average of 3.26.

Perceived Ease of Use (PEU)

Perceived Ease of Use (PEU) in this research includes four dimensions - PEU1: Using AI chatbots for EVs information is clear and understandable, PEU2: Using AI chatbots does not require a lot of mental efforts, PEU3: Using AI chatbots for EVs is easy to use and PEU4: I would find it easy to get AI chatbots to do what I want it to do. Among the four dimensions, PEU3 received the highest mean score of 3.36 (SD=1.112), followed by PEU1 with a mean score of 3.33 (SD=1.199), PEU4 with a mean score of 3.32 (SD=1.210), and PEU2 with a mean score of 3.31 (SD=1.146). Through the data collection analysis, it was concluded that the variable's four dimensions received an important level of agreement with an average of 3.26.

Perceived Enjoyment (PE)

Perceived Enjoyment (PE) in this research includes four dimensions - PE1: I enjoy the process that uses AI chatbots to get EVs information, PE2: Using AI chatbots for EVs information would not bore to me, PE3: Using AI chatbot for EVs information is entreating because I can communicate with, and PE4: Using AI chatbots for EVs information can arouse my interest and keeps me happy. Among the four dimensions, PE4 received the highest mean score of 3.30 (SD=1.141), followed by PE2 with a mean score of 3.29 (SD=1.174), PE3 with a mean score of 3.26 (SD=1.199), and PE1 with a mean score of 3.24 (SD=1.125). Through the analysis of the data collection, it was concluded that the four dimensions of the variable received a high level of agreement with an average of 3.27.

Perceived Cyber Risks (PCR)

Perceived Enjoyment (PE) in this research includes four dimensions - PE1: The personal information that enters into an AI chatbots will be handled securely, PE2: AI chatbots have enough safeguards to make me feel comfortable using them to access EVs information, PE3: I am concerned that AI chatbots distribute the gathered data without my knowledge to third parties, and PE4: I perceive AI chatbots as more privacy-invasive compared to non-AI chatbot applications. Among the four dimensions, PE4 received the highest mean score of 3.44 (SD=1.213), followed by PE3 with a mean score of 3.34 (SD=1.179), PE1 with a mean score of 3.33 (SD=1.160), and PE2 with a mean score of 3.32 (SD=1.150). Through the data collection analysis, it was concluded that the variable's four dimensions received a high level of agreement with an average of 3.36.

Purchase Intention (PI)

Intention to purchase EV in this research includes three dimensions – PI1: After experiencing using AI chatbots to get EVs information, I predicted I probably will buy an EV in the future, PI2: The experience that uses AI chatbots to get EVs information inspired me, so I have planned to buy an EV, and IP3: After I used AI chatbots to get information about EVs, I decided to buy an EV soon, PI3 received the highest mean score of 3.60 (SD=1.147), followed by PI1 with a mean score of 3.35 (SD=1.189), and IP3 with a mean score of 3.33 (SD=1.205), and the last one is PI2 with mean score 3.30 (SD=1.164). Through the data collection analysis, it was concluded that the variable's three dimensions received a high level of agreement with an average of 3.33.

2. What are the effects of perceived usefulness (PU), perceived ease of use (PEU) and perceived enjoyment (PE), perceived cyber risks (PCR) of AI chatbots on the purchase intention of EVs among consumers in China?

The research checked the scale's validity and reliability. The Cronbach's Alpha values for the five variables are higher than 0.07, which is acceptable. This research

used SPSS to assess the questionnaires from 300 samples and the statistics for each question are described using descriptive statistical methods including: (1) the general demographic description (frequency and percentage), (2) mean, standard deviation, of PU, PEU, PCR, and PI. Secondly, Correlation Analysis and Multiple Regression Analysis was used to test the following four hypotheses:

H1: Perceived usefulness (PU) of AI chatbots affects consumers' purchase intention towards EVs.

H2: Perceived ease of use (PEU) of AI chatbots affects consumers' purchase intention towards EVs.

H3: Perceived enjoyment (PE) of AI chatbots affects consumers' purchase intention towards EVs.

H4: Perceived cyber risks (PCR) of AI chatbots affects consumers' purchase intention towards EVs.

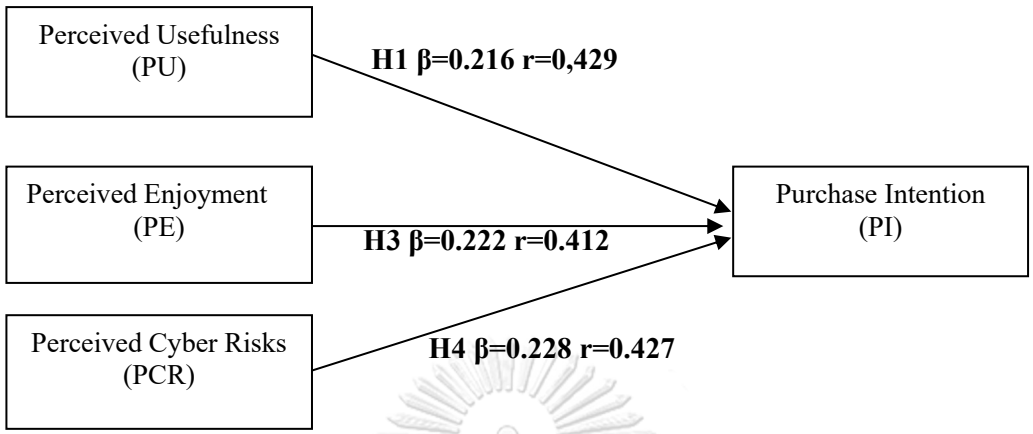
Hypotheses Testing Conclusion

The results from multiple regression analysis shows there are four independent variables (PU, PEU, PCR and PE) that positively affect the dependent variable (PI):

1. Perceived usefulness (PU) variable with Beta = 0.216
2. Perceived enjoyment (PE) variable with Beta = 0.222
4. Perceived cyber risks (PCR) variable with Beta=0.228

Figure 5.1

Research Findings



R^2 = 0.313, R^2 adj = 0.303, *p < 0.01[b].

5.2 Discussion

The research on the impact of AI chatbots on Chinese consumers' intention to purchase electric vehicles has produced insightful findings for a few variables, including perceived usefulness (PU), perceived ease of use (PEU), perceived enjoyment (PE), perceived cyber risks (PCR), and purchase intention (PI). This research also confirmed that Technology Acceptance Model (TAM) can be used in green marketing communications and the hypotheses are valid.

H1: Perceived usefulness (PU) of AI chatbots affects consumers' purchase intention towards EVs

Respondents believe that using AI chatbots can be a good assistant to help them to do the shopping. In the majority of situations, including the internet buying habits of Chinese overseas students, prior research has produced consistent findings (Mensah, 2020), The Chinese' people intention to participate to participate in liver-stream environmental marketing communication (Liu, 2022). Consumer satisfaction is influenced by numerous factors, with key elements encompassing time savings, cost-effective products, and a high-quality consumption experience (Chopdar et al., 2018). Participants strongly endorse AI chatbots for significantly influencing their purchase intention towards electric vehicles (EVs), expressing satisfaction with the services and

experiences provided. The technology's capacity to deliver detailed insights on various auto companies' EV models, performance metrics, store locations, and website addresses. Integrating AI chatbots into the decision-making process is believed to enhance shopping abilities and overall efficiency, streamlining the complex decision-making process for consumers inundated with product information. This streamlined solution not only saves time and energy but also contributes to cost efficiency, providing a personalized and efficient avenue for consumers to access specific and detailed information tailored to their preferences.

H2: Perceived ease of use (PEU) of AI chatbots affects consumers' purchase intention towards EVs

The study's conclusions show that perceived ease of use (PEU) positively affects purchase intention (PI). This outcome aligns with the results reported by Liu (2022) and is consistent with this study that identified a significant relationship from effort expectation to behavioral intention in the context of adopting live e-commerce shopping (Zhou et al., 2021a). However, it is noteworthy that the p-value in our research exceeds 0.05, suggesting a lack of sufficient evidence to conclude a significant relationship between PEU and PI. Consumers find AI chatbots user-friendly but express slight disagreement regarding ease of control.

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H3: Perceived enjoyment (PE) of AI chatbots affects consumers' purchase intention towards EVs

The research reveals a significant link between respondents' perceived enjoyment (PE) of AI chatbots and their purchase intention toward electric vehicles (EVs), consistent with prior studies, particularly the work of Venkatesh (2000) and Liu (2022). One key explanation for this outcome is rooted in the nature of AI chatbots as a computer science technology that endeavors to teach computers to understand and replicate human communication and behavior (Chintalapati & Pandey, 2022). The shift in evaluating technology beyond functionality to its contribution to personal happiness is noteworthy. In the context of green products, participants believe that AI

chatbots not only inspire happiness but also prevent boredom when obtaining information about EVs. AI chatbots, designed to replicate human communication, create engaging and enjoyable experiences, positively influencing purchase behavior. In conclusion, the perceived enjoyment of AI chatbots plays a crucial role in enhancing user experiences and impacting.

H4: Perceived cyber risks (PCR) of AI chatbots affects consumers' purchase intention towards EVs

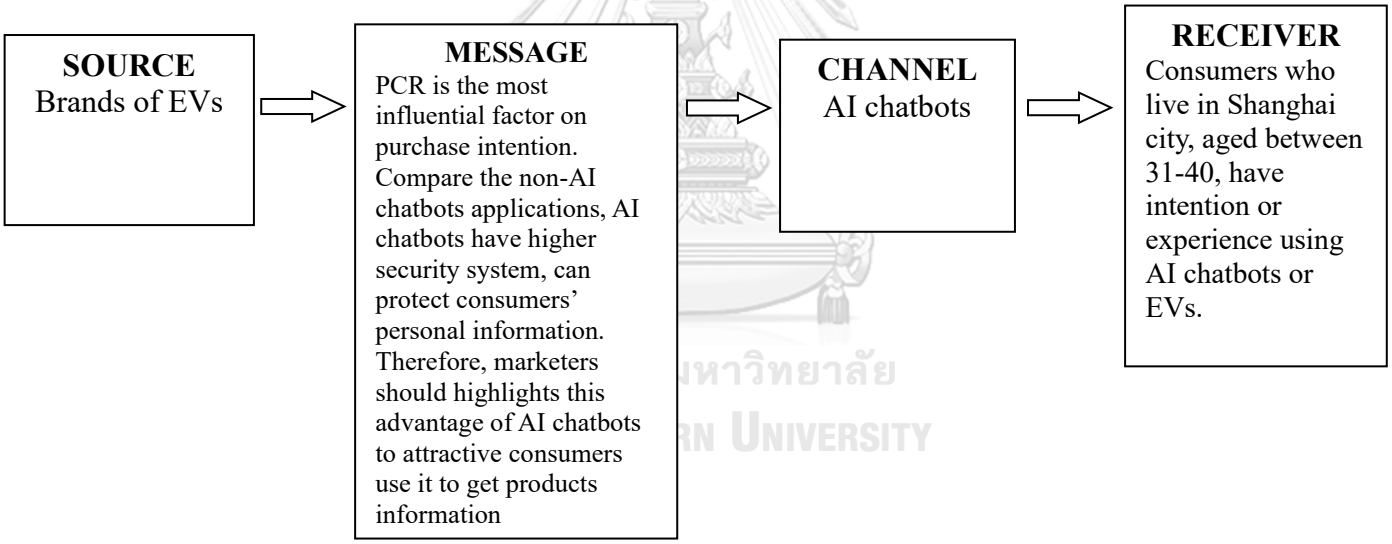
The research findings highlight the substantial positive impact of privacy concerns (PCR) on purchase intention (PI). Customers place value on various website features, including service quality, transaction capabilities, and product information quality. However, inadequate security information can hinder purchase intent, with the study demonstrating that the release of financial data is associated with cyber risks. Security concerns, a well-established obstacle to online buying, consistently exhibit a negative impact on consumers' purchase intention. Requesting extensive personal information erodes trust, emphasizing the critical need for businesses to prioritize robust security measures, transparent data practices, and effective communication to address consumer apprehensions (Azizi & Javidani, 2010). Majority of the studies shows that security concerns negatively impact consumers' purchase intentions, particularly when companies seek extensive personal information, eroding confidence and trust (Karnik, 2014; Teo, 2002; Tsai & Yeh, 2010).

Expanding on this understanding, recent years, with the development of AI, and the number of users of AI chatbots, this innovative technology will used in marketing to provide information to consumers and play a pivotal role in influencing purchase intention. Like concerns regarding financial data release from online shopping platform and social medias, consumers are increasingly cautious about potential cyber risks associated with AI chatbots. As these intelligent systems handle sensitive information and interact with users in various contexts, consumers are keenly aware of the need for secure and trustworthy AI interactions.

In the evolving landscape of online transactions, where AI chatbots are becoming integral, understanding, and addressing the perceived cyber risks is paramount. Businesses must not only prioritize security measures for AI chatbots but also transparently communicate these measures to build and maintain consumer trust. Establishing a secure and trustworthy environment for AI interactions, akin to addressing traditional online security concerns, becomes essential for fostering positive attitudes and influencing purchase decisions positively.

In summary, the article underscores the importance of addressing security concerns in the online realm and extends this understanding to highlight the emerging significance of perceived cyber risks associated with AI chatbots, emphasizing their positive influence on purchase intention in the contemporary digital landscape.

Finally, this study shows how all variables effect the purchase intention, based on the Berlo's SMCR model to generate a graph to summarize this study.



Note From Berlo (1960).

5.3 Practical Implications

5.3.1 Theoretical Implications

This study advances our understanding of the Technology Acceptance Model (TAM), AI chatbots, purchase intention for Electric Vehicles (EVs), and green marketing strategies. While past studies on EV purchase intention focused on factors like subsidy policies and business models, effective communication tools within the EV industry have been underexplored. Addressing this gap, the study highlights AI

chatbots as a valuable marketing communication tool for influencing EV purchase intentions in the context of green marketing. The findings suggest that Perceived Usefulness (PU), Perceived Ease of Use (PEU), Privacy Concerns (PCR), and Perceived Enjoyment (PE) all positively impact Purchase Intention (PI), with PCR having the highest influence. This research serves as a foundation for further exploration in the field of AI chatbots, EVs, and green marketing strategies, providing valuable insights for future academic research in environmental marketing communications or diverse global contexts.

5.3.1 Business Implications

Leveraging AI chatbots as a communication tool proves both effective and efficient for engaging consumers. Marketers should capitalize on the positive influences of AI chatbots, use AI chatbots to provide information to consumer and communicate with them. This strategic approach is particularly significant for AI technology and green marketing sectors. For AI technology companies, integrating AI chatbots aligns with innovation-driven images, while for green marketing, the eco-friendly associations contribute to a positive brand image. In conclusion, embracing AI chatbots as a strategic communication tool is imperative across industries. Recognizing and harnessing their positive influences enhances consumer engagement and fosters favorable purchase intentions, making it integral for brands navigating the dynamic landscape of consumer interactions.

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1. The survey highlights that privacy concerns (PCR) rank highest among consumers, indicating a strong trust in AI chatbot security. This presents a significant opportunity for marketers to emphasize personal information security in their communication strategies, addressing consumer concerns and positioning AI chatbots as a reliable and preferred choice. Marketers should actively convey that AI chatbots not only provide rapid and seamless information but prioritize stringent privacy measures, fostering stronger connections and influencing consumer preferences. Integrating this messaging into marketing strategies enhances AI chatbot adoption and creates a positive narrative around their use.

2. As the p-value for perceived ease of use in this research exceeds 0.05, indicating no statistically significant positive relationship with purchase intention, companies, especially Chinese enterprises, should address this gap. To overcome this, companies need to proactively educate users on the seamless integration of AI chatbots into their information-seeking processes. This includes providing clear instructions, highlighting user-friendly features, and tailoring educational materials to local cultural preferences, ultimately fostering confidence and ease among users and promoting broader acceptance of AI chatbots.

3. Green marketing is essential for long-term sustainable development, offering ecological impact and positive brand image. In the era of ESG strategies, green marketing is crucial for overall company success. AI chatbots play a key role in enhancing green marketing by effectively conveying information about eco-friendly products, engaging consumers, and creating deeper connections through personalized interactions. The integration of AI chatbots into green marketing strategies is strategic, ensuring companies meet consumer expectations for sustainability and build enduring brand loyalty based on shared environmental values.

4. In conclusion, while AI chatbots have not been extensively used for commercial platforms like displaying ads, research suggests a compelling case for AI technology companies to consider this shift. Incorporating advertisements within AI chatbot applications presents opportunities for tailored product recommendations based on user preferences, enhancing shopping capabilities, and streamlining the decision-making process. This personalized advertising approach aligns with evolving consumer expectations and provides new avenues for companies to engage with their target audience.

5.4 Limitations of the Study

Overall, the research was successfully conducted with acceptable and reasonable results. The hypotheses are accepted and like previous empirical studies from the literature review. However, there are a few limitations of this research that can be noticed for an improvement of future studies as follows:

Given the rapid evolution of markets, the primary buyers of EVs and main users of AI chatbots are subject to change over time, therefore, this research limitation is demographic, only those who have been selected, aged 31 to 40, reside in Shanghai.

5.5 Directions for Future Research

1. Future research should broaden its scope by exploring additional factors influencing individuals' intentions to purchase green products. For example, price, policy, product functionalities, and the impact of Key Opinion Leaders (KOLs). Investigating these diverse factors will enhance researchers understanding of the complex elements shaping consumers' intentions to adopt environmentally friendly products.

2. When using the Technology Acceptance Model (TAM), researchers should consider more factors, beyond traditional factors like PE, PU, PCR, PEU.

3. To enhance the applicability of the results across various regions, researchers need to thoughtfully design the demographic sampling strategy. By doing so, the research outcomes can offer insights that are more representative and adaptable to a broader range of locations.

4. Recognizing that the ESG strategy influence companies’ long-term goals, communication strategy should integrate with ESG.

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APPENDIX

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APPENDIX A

Questionnaire (English Version)

Research Questionnaire

The Influence of AI Chatbot on Purchase Intention of Electric Vehicles among Consumers in China

*Note: This survey is part of research **for educational purposes only***

Example of AI chatbots

电动汽车中国市场发展以及电动汽车品牌推荐

EVs industry development in China and EVs brand recommendation

中国电动汽车市场发展迅速，政策和技术创新等因素都在推动着电动汽车产业的发展。随着环保意识的加强和政策的鼓励，预计未来几年电动汽车的销量和市场份额将继续提升。

国内市场比较热门的电动汽车品牌有很多，比如特斯拉、比亚迪、蔚来、威马、小鹏汽车、理想汽车等。

特斯拉是美国新能源汽车品牌，在中国市场拥有很高的品牌知名度和用户美誉度，其技术领先、智能化程度高、用户体验好等优点使其成为国内电动车市场的龙头。

比亚迪是国内电动车市场的老牌厂商，具有技术实力雄厚、产品线丰富、价格亲民等优点，在市场上也备受消费者青睐。

蔚来和威马是中国新兴的电动汽车品牌，他们年轻化、智能化程度高、用户体验好等优点使其受到年轻消费者的青睐。

小鹏汽车和理想汽车也是国内新能源汽车品牌，他们也具有智能化程度高、用户体验好等优点，在市场上相对较新，需要进一步发展壮大。

China's EVs market is growing rapidly, with policy and technological innovation are driving the development of this industry. With the strengthening of environmental awareness and policy encouragement, it is expected that the sales and market share of electric vehicles will continue to increase in the next few years.

There are many popular electric vehicle brands recommend, such as Tesla, BYD, Azera, Weimar, Xiaopeng and BMW etc.

Tesla is an American new energy automobile brand, which has a high brand awareness and user reputation, and its technology is leading, technology, high degree of intelligence, good user experience and other advantages make it become the domestic

BYD is an established player in the domestic EVs market with strong technology, a rich product line, and affordable prices, and is highly favored by consumers.

NIO and Wilma are emerging EVs brands in China recent years. They are favored by young consumers because of their high degree of innovation, and good user experience.

Xiaopeng and Lixiang are also newcomer in this industry. They also have the advantages of high degree of intelligence and good user experience.

Electric Vehicles (EVs): a kind of vehicle that is powered by electric motors and uses electricity stored in batteries as their primary source of energy. Unlike traditional internal combustion engine (ICE) vehicles that rely on fossil fuels, EVs run entirely on electricity, making them a more environmentally friendly and sustainable transportation option, for example, Tesla.

Example of EV

Section 1 Screening Question
Instructions: Please check (✓) the answer that best represents you
Are you living in Shanghai city?
(1) □ Yes (2) □ No (end the survey)

Are you between 31-40 years old?
(1) □Yes (2) □ No (end the survey)

Do you know Artificial Intelligence chatbots and Electric Vehicles (EVs)?
(1) □Yes (2) □ No (end the survey)

Section 2 Perceived Usefulness (PU) of AI Chatbots
Instructions: Please rate the statements below according to your opinion about Perceived Usefulness by marking (✓) under the number in the scale below: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly agree.

1. Using AI chatbots for EVs information would improve my shopping ability.
2. Using AI chatbots for EVs information would makes my life easier.
3. Using AI chatbots for EVs information would make shopping more productive.
4. With the AI chatbots, I couldn't get the EVs information that I need.
5. If I want to buy EVs, I could accomplish just what I might need with AI chatbots.

Section 3 Perceived ease of use (PEU) of AI Chatbots
Instructions: Please rate the statements below according to your opinion about Perceived Ease of Use by marking (✓) under the number in the scale below: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly agree

1. Using AI chatbots for EVs information is clear and understandable.
2. Using AI chatbots does not require a lot of mental efforts.
3. Using AI chatbots for EVs information is easy to use.
4. I would find it easy to get AI chatbots to do what I want it to do.

Section 4 Perceived Enjoyment (PE) of AI Chatbots
Instructions: Please rate the statements below according to your opinion about Perceived Enjoyment by marking (✓) under the number in the scale below: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly agree.

1. I enjoy the process that uses AI chatbots to get EVs information.
2. Using AI chatbots for EVs information would not bore to me.
3. Using AI chatbot for EVs information is entreating, I can communicate with it.
4. Using AI chatbots for EVs information can arouse my interest and keeps me happy.

Section 5 Perceived cyber risks (PCR) of AI Chatbots
Instructions: Please rate the statements below according to your opinion about perceived cyber risks by marking (✓) under the number in the scale below: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly agree

1. The personal information that enters an AI chatbots will be handled securely.
2. AI chatbots have enough safeguards to make me feel comfortable using them to access EVs information.
3. I am concerned that AI chatbots distribute the gathered data without my knowledge to third parties.
4. I perceive AI chatbots as more privacy-invasive compared to non-AI chatbot applications.

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Section 6 Purchase Intention (PI) of EVs
Instructions: Please rate the statements below according to your opinion about Intention by marking (✓) under the number in the scale below: 1= Strongly disagree, 2= Disagree, 3= Neither agree nor disagree, 4= Agree, 5= Strongly agree

1. After experiencing using AI chatbots to get EVs information, I predicted I probably will buy an EV in the future.
2. The experience that uses AI chatbots to get EVs information inspired me, so I have planned to buy an EV.
3. After I used AI chatbots to get information about EVs, I decided to buy an EV soon.

Section 7 Demographic Question
Instructions: Please check (✓) the answer that best represents you

What is your gender?
(1) Male □ (2) Female □ (3) Others

Highest level of education attained ?
(1) Lower than secondary school □ (2) Secondary school or equivalent
(3) Bachelor's degree or equivalent □ (4) Higher than bachelor's degree

How much of your revenue per month?
□ (1) Equal to or less than 3,000 RMB (Equal to or less than 417 USD)
□ (2) 3,000 -5,000 RMB (Around 417 -693 USD)
□ (3) 5,001 -7,000 RMB (Around 694 -970 USD)
□ (4) 7,001 -9,000 RMB (Around 971–1,248 USD)
□ (5) More than 9,000 RMB (More than 1,248 USD

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APPENDIX B

Questionnaire (Chinese Version)

研究问卷

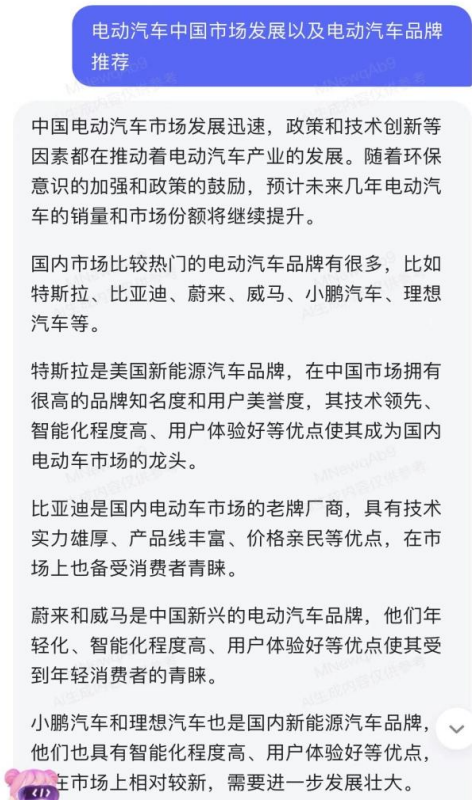
人工智能聊天机器人对居住在中国上海的消费者的电动汽车购买意向的影响

注：本调查是研究的一部分，**仅用于教育目的**。

在你做这份调查之前，研究者想向您解释一下研究主题（人工智能聊天机器人和电动汽车）的定义，并为您提供一些例子：

在本文中，我们主要讨论人工智能聊天机器人，它是一种利用人工智能技术理解使用者问题，根据数据库信息自动回复问题、模拟人类对话的计算机程序，例如 ChatGPT、苹果 Siri、百度推出的文心一言。

人工智能聊天机器人例子



电动汽车（EVs）：一种以电动马达为动力，以电池中储存的电能为主要能源的汽车。与依赖化石燃料的传统内燃机（ICE）汽车不同，电动汽车完全靠电力驱动，是一种更环保、更可持续的交通工具，例如特斯拉。

电动汽车例子

第 1 部分 填写说明： 请您在选项上打勾(✓)

1. 您是否居住在上海市？

☐(1)是 ☐(2)否（结束调查）

2. 您的年龄在 31-40 岁之间吗？

☐(1)是 ☐(2)否（结束调查）

3. 您知道人工智能聊天机器人和电动汽车（EVs）吗？

☐(1)是 ☐(2)否（结束调查）

第 2 部分 填写说明:请根据您对下列陈述的看法对其评分

1= 非常不同意；2= 不同意；3=不反对也不赞同；4= 同意；5= 非常同意。

1.使用人工智能聊天机器人获取电动汽车信息可以提高我的购物能力，比如浏览商店和平台的选择，对产品特点和价格的了解等能力。

2.使用人工智能聊天机器人获取电动汽车信息会让我的生活更轻松。

3.使用人工智能聊天机器人获取电动汽车信息会提高购物效率。

4.使用人工智能聊天机器人，我无法获得我需要的电动汽车信息。

5.如果我想购买电动汽车，人工智能聊天机器人可以满足我的需求。

第 3 部分 填写说明:请根据您对下列陈述的看法对其评分

1= 非常不同意，2= 不同意，3=不反对也不赞同，4= 同意，5= 非常同意

1.人工智能聊天机器人提供的电动汽车信息清晰易懂。

2.使用人工智能聊天机器人获取电动汽车信息的过程很简单，
不需要花费很多脑力。

3.使用人工智能聊天机器人获取电动汽车信息非常方便。

4.我觉得让人工智能聊天机器人做我想让它做的事情很容易。

第 4 部分 填写说明:请根据您对下列陈述的看法对其评分
1= 非常不同意，2= 不同意，3=不反对也不赞同，4= 同意，5= 非常同意。

1.我很喜欢使用人工智能聊天机器人获得电动汽车信息的过程。
2.使用人工智能聊天机器人获取电动汽车信息不会让我觉得无聊。
3.使用人工智能聊天机器人获取电动汽车信息很有趣，可以与其互动。
4.使用人工智能聊天机器人获取电动汽车信息可以激发我的兴趣，
让我觉得开心。

第 5 部分 填写说明:请根据您对下列陈述的看法对其评分
1= 非常不同意，2= 不同意，3=不反对也不赞同，4= 同意，5= 非常同意

1.输入人工智能聊天机器人的个人信息将得到安全处理。
2.人工智能聊天机器人有足够的保障措施让我放心使用它们来访问
电动汽车信息。
3.我担心人工智能聊天机器人会在我不知情的情况下将收集到的数据分
发给第三方。
4.与非人工智能聊天机器人相比，我认为人工智能聊天机器人更具隐私侵犯
性。

第 6 部分 填写说明:请根据您对下列陈述的看法对其评分
1=非常不同意，2=不同意，3=不反对也不赞同，4=同意，5=非常同意。

1.在体验了使用人工智能聊天机器人获取电动汽车信息后，我预测我将来
可能会购买电动汽车。
2.使用人工智能聊天机器人获取电动汽车信息的体验启发了我，所以我计划
购买电动汽车。
3.在我体验了使用人工智能聊天机器人获取有关电动汽车的信息后，我决定
尽快购买电动汽车。

第七部分 填写说明:请在您的选项上打勾(√)
1. 您的性别是什么?
□1.女性 □2.男性 □3.其他

2.您达到的最高教育水平是
□ 1. 高中以下学历
□ 2. 高中或同等学历
□ 3. 本科或同等学历

□ 4. 本科以上学历

3. 您每个月的收入是多少?
□ 1. 不超过 3,000 元人民币(不超过 417 美元)
□ 2. 3,000 -5,000 元人民币(约 417 -693 美元)
□ 3. 5,001 – 7,000 元人民币(约 694 -970 美元)
□ 4. 7,001 – 9,000 元人民币(约 971 – 1,248 美元)
□ 5. 超过 9,000 人民币(超过 1,248 美元)

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APPENDIX C

Participants' ID address and time they spend for this research's questionnaire.

	Submission Date	Time			IP address
序号	提交答卷时间	所用时间	来源		来自IP
1	2023/10/19 21:40:41	57秒	微信	N/A	101.229.166.132(上海-上海)
2	2023/10/19 21:40:44	58秒	微信	N/A	117.143.164.105(上海-上海)
3	2023/10/19 21:40:51	66秒	微信	N/A	112.65.0.122(上海-上海)
4	2023/10/19 21:41:03	77秒	微信	N/A	114.84.195.30(上海-上海)
5	2023/10/19 21:41:05	79秒	微信	N/A	117.135.85.47(上海-上海)
6	2023/10/19 21:41:44	57秒	微信	N/A	117.135.127.124(上海-上海)
7	2023/10/19 21:41:47	56秒	微信	N/A	101.228.11.33(上海-上海)
8	2023/10/19 21:42:04	68秒	微信	N/A	114.82.45.105(上海-上海)
9	2023/10/19 21:42:27	77秒	微信	N/A	58.38.247.116(上海-上海)
10	2023/10/19 21:42:29	79秒	微信	N/A	114.93.144.59(上海-上海)
11	2023/10/19 21:42:50	61秒	微信	N/A	114.93.10.213(上海-上海)
12	2023/10/19 21:42:53	61秒	微信	N/A	101.87.72.29(上海-上海)
13	2023/10/19 21:43:19	70秒	微信	N/A	210.22.182.159(上海-上海)
14	2023/10/19 21:43:52	79秒	微信	N/A	101.87.250.19(上海-上海)
15	2023/10/19 21:43:57	82秒	微信	N/A	117.143.25.119(上海-上海)

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