Vilnius University Press

Content lists are available at VilniusUniversity Press

Transformations In Business & Economics
2025, Vol. 24 No 1 (64), pp.238-261.

E-ISSN 2538-872X
https://doi.org/10.15388/Tibe.2025.24.1.11

Chapter: Emergent Perspectives on Green Skills: Driving Change for a Sustainable Future

# THE INFLUENCE OF AI CHATBOTS ON THE PURCHASE INTENTION OF SUSTAINABLE PRODUCTS

**Luminita-Stefania Bozdog**
*E-mail*: luminita.bozdog@e-uvt.ro
*ORCID:* https://orcid.org/0009-0009-4138-469X
*Affiliation:* Faculty of Economics and Business Administration, West University of Timisoara, Romania
*ROR*: https://ror.org/0583a0t97

**Remus Ionut Naghi**
*E-mail:* remus.naghi@e-uvt.ro
*ORCID:* https://orcid.org/0009-0007-6875-537X
*Affiliation:* Faculty of Economics and Business Administration, West University of Timisoara, Romania
*ROR*: https://ror.org/0583a0t97

**Gheorghe Preda**
E-mail: gheorghe.preda@e-uvt.ro
*ORCID*: https://orcid.org/0000-0002-1601-8331
*Affiliation:* Faculty of Economics and Business Administration, West University of Timisoara, Romania
*ROR*: https://ror.org/0583a0t97

**Sorin Ioan Prada**
*E-mail:* sorin.prada@e-uvt.ro
*ORCID:* https://orcid.org/0000-0003-2761-5913
*Affiliation:* Faculty of Economics and Business Administration, West University of Timisoara, Romania
*ROR*: https://ror.org/0583a0t97

***Annotation.*** This study investigates the influence of AI chatbots on consumers' purchase intentions of sustainable products. The primary objective is to assess how the use of AI chatbots affects environmental awareness, perceived value, and attitudes towards sustainable products, and how these factors, in turn, impact purchase intentions. Data were collected through an online questionnaire with 562 respondents and analysed using structural equation modelling (SEM). The results show that AI chatbots significantly enhance environmental awareness, perceived value, and positive attitudes towards sustainable products. Furthermore, environmental awareness and perceived value positively impact both attitudes and purchase intentions. This study highlights the potential of AI chatbots as a powerful tool in promoting sustainable consumption, emphasizing their role in shaping eco-friendly purchasing behaviours. Future research should explore the moderating effects of variables such as trust and technological literacy.

***Keywords:*** AI Chatbots, Sustainable Products, Environmental Awareness, Purchase Intention, Perceived Value.

***JEL classification:*** O33, Q01, Q56, M31, D12.

## Introduction

The integration of artificial intelligence (AI) into various sectors has become a transformative force in shaping modern business practices (Mugunzva *et al.,* 2024). While chatbots have been widely adopted in areas such as e-commerce and customer service, their potential in promoting sustainable consumption has become an area of increasing interest.


**Submitted** on October 2024. **Accepted** on November 2024.

The need for sustainable consumption has been highlighted in recent years as environmental concerns continue to grow (Todorov *et al.,* 2024). The shift towards sustainable products is driven by both businesses and consumers who recognize the importance of reducing environmental impact (Mura *et al.,* 2024). However, despite the increasing demand for eco-friendly products, motivating consumers to make sustainable purchasing decisions remains a challenge. Consumers often lack sufficient information or hold misconceptions about the value and benefits of sustainable products. AI chatbots can play a critical role in addressing these issues by providing consumers with real-time information, improving their awareness of environmental issues, and enhancing their perception of sustainable products.

This study examines the influence of AI chatbots on the purchase intention of sustainable products, focusing on how chatbot usage affects environmental awareness, perceived value, attitudes toward sustainable products, and purchase intentions. By exploring these relationships, the study aims to demonstrate the effectiveness of AI chatbots in promoting sustainable consumption and guiding consumers toward more eco-friendly purchasing behaviors.

AI chatbots have evolved into sophisticated tools capable of assisting users in various fields. As described by Cimpeanu *et al.* (2022), chatbots are increasingly being integrated into economic and social activities due to their ability to handle large amounts of data, provide accurate information, and facilitate complex tasks such as decision-making.

Sustainable consumption has emerged as a global priority in response to environmental degradation and the depletion of natural resources. Consumers are becoming more aware of the impact their purchasing decisions have on the environment, leading to a growing demand for eco-friendly products. However, the transition to sustainable consumption is often hindered by the lack of information and perceived value of sustainable products. Research shows that consumers may hesitate to buy sustainable products due to concerns about higher costs or doubts about their quality (Cimpeanu, 2023; Imashev *et al.,* 2024).

Based on the literature, this study develops a conceptual model to examine the relationships between several key variables: AI chatbot usage, environmental awareness, perceived value, attitudes toward sustainable products, and purchase intention. To test these hypotheses, an online questionnaire was developed to collect data from respondents regarding their interactions with AI chatbots and their attitudes toward sustainable products. The questionnaire used established scales adapted from previous studies to measure the constructs of chatbot usage, perceived value, environmental awareness, attitudes, and purchase intention. Data were analyzed using structural equation modeling (SEM) to evaluate the relationships between the variables in the conceptual model. SEM was chosen for its ability to simultaneously test multiple relationships, providing a comprehensive understanding of the influence of AI chatbots on consumer behavior in the context of sustainable consumption.

This study aims to contribute to the growing body of research on AI applications and sustainable consumer behavior by demonstrating how chatbots can play a pivotal role in promoting eco-friendly purchasing decisions.

## 1. Literature Review

### *1.1 AI Chatbots*

AI Chatbot technology has seen significant advancements in recent years, transforming the way humans interact with machines. With the development of sophisticated models such as the Generative Pre-Trained Transformer (GPT) series by OpenAI, chatbots have evolved from simple rule-based systems to complex conversational agents capable of understanding and generating human-like text.

AI Chatbot has progressed through various stages, beginning with rule-based systems that follow predefined scripts to respond to user inputs. These early chatbots were limited in handling diverse and complex queries. The introduction of machine learning and natural language processing (NLP) marked a significant advancement, enabling chatbots to learn from data and improve their responses over time.

The development of the GPT series by OpenAI, particularly GPT-3, has revolutionized the field of AI chatbot. GPT-3 utilizes a transformer architecture, which allows it to process and generate text by understanding context and semantic relationships within the data. This model is trained on a vast corpus of text data, enabling it to perform a wide range of language-based tasks, from simple question answering to complex content generation (Lund *et al.,* 2023).

AI Chatbot has found applications across various sectors, significantly impacting how services are delivered and enhancing user experiences. In the commercial sector, chatbots are employed for customer service, providing instant responses to queries, and guiding users through purchasing decisions. Research by Chang *et al.* (2024) highlights that ChatGPT recommendations have a notable influence on consumer choice, demonstrating higher perceived performance and trust compared to traditional AI recommender systems.

In academia and libraries, AI chatbots like ChatGPT can assist with literature reviews, data analysis, and automated summarization of scientific papers (Lund *et al.,* 2023). These capabilities can save researchers considerable time, allowing them to focus on more analytical and creative aspects of their work.

While the benefits of AI chatbot are substantial, several implications need careful consideration. The deployment of AI chatbot raises significant ethical concerns. One major issue is the potential for bias in the responses generated by these models. Since GPT-3 and similar models are trained on vast datasets that may contain biased information, there is a risk that these biases will be reflected in the chatbot's outputs (Lund *et al.,* 2023). This can lead to the perpetuation of stereotypes and misinformation. Privacy is another critical concern. Chatbots often require access to sensitive information to provide accurate responses, raising questions about data security and user privacy. Ensuring that data used by these systems is anonymized and securely stored is essential to prevent unauthorized access and misuse (Lund *et al.,* 2023).

The trust that users place in AI chatbots is influenced by their perceived performance and the system's ability to provide reliable and accurate information. Chang *et al.* (2024) found that users tend to trust recommendations from ChatGPT more than those from traditional AI recommender systems, primarily due to ChatGPT's contextual understanding and coherent response generation. However, the trustworthiness of AI chatbots can be compromised if users are unaware of the system's limitations. For instance, GPT-3, despite its advanced capabilities, can generate plausible but incorrect or nonsensical

answers. Users need to be informed about the potential for errors and the importance of verifying information obtained from chatbots (Lund *et al.,* 2023).

The widespread adoption of AI chatbots has implications for employment, particularly in sectors heavily reliant on customer interaction and service provision. While chatbots can handle routine inquiries efficiently, there is a risk that they may replace human jobs, leading to unemployment in certain roles (Dwivedi *et al.,* 2023). Conversely, AI chatbots can also create new job opportunities in fields such as AI development, data analysis, and digital communication. The key is to ensure a balanced approach where AI augments human capabilities rather than replacing them entirely (Dwivedi *et al.,* 2023). The future of AI chatbots lies in addressing its current limitations and expanding its capabilities. Research is ongoing to enhance the contextual understanding and reasoning abilities of these models, making them more adept at handling complex and nuanced interactions (Dwivedi *et al.,* 2023). Integration with other AI technologies, such as computer vision and speech recognition, could further enhance the functionality of AI chatbot, enabling multimodal interactions that combine text, voice, and visual inputs (Lund *et al.,* 2023). Moreover, developing robust ethical guidelines and regulatory frameworks will be crucial in ensuring that AI chatbots are used responsibly and ethically. This includes addressing issues of bias, privacy, and transparency, as well as ensuring that the benefits of AI are distributed equitably across society (Dwivedi *et al.,* 2023).

Dwivedi *et al.* (2023) have identified several research gaps in the field of AI and marketing that highlight the need for further exploration. Firstly, there is a lack of empirical data on the impact of AI recommender systems on consumer adoption of recommended products. Most studies have focused on the adoption of the recommender system itself rather than its influence on consumer choices. Secondly, the moderating effect of brand awareness on the trust transfer effect is underexplored. While it is known that higher brand awareness leads to greater trust in recommended products, the interaction between brand awareness and trust transfer, particularly at different levels of brand awareness, needs further investigation. Thirdly, there is a need for more research on the application of AI in emerging markets and its impact on consumer behavior. The majority of studies have been conducted in developed markets, leaving a gap in understanding how AI influences consumers in different cultural and economic contexts. Lastly, the ethical implications of AI in marketing, including issues of bias and privacy, require more comprehensive studies. There is a need to develop frameworks that ensure the ethical use of AI, protecting consumer rights while leveraging the technology's capabilities to enhance marketing strategies. Peltier *et al.* (2024) also discusses similar research gaps and future directions in AI and marketing. Their paper identifies key areas needing further research, such as the definition and boundaries of AI in marketing, the role of AI in value co-creation within interactive marketing relationships, and the necessity for frameworks to manage AI ethics, privacy, and biases effectively. They emphasize the importance of understanding how AI technologies can enhance interactive marketing by improving consumer engagement and firm-consumer relationships, particularly the need for more empirical data on AI's impact on consumer behavior. They call for more empirical studies to explore the effectiveness of AI applications in diverse marketing contexts and stress the need for comprehensive strategies to mitigate potential ethical and privacy issues associated with AI deployment in marketing. Farooq *et al.* (2024) also highlights the need for more empirical data on AI's impact on consumer behavior. In this paper, the authors categorize various themes in AI and consumer behavior research and emphasizes the positive influence that AI has on consumer attitudes. However, they also identify significant gaps in empirical data, particularly regarding the nuanced effects of AI on decision-making and consumer trust.

The study recommends leveraging AI in marketing strategies to enhance consumer engagement while calling for more detailed empirical investigations to understand these dynamics thoroughly.

Additionally, in their study Nguyen *et al.* (2023) specifically examines how AI chatbots influence customer trust and decision-making. The authors employed correlation analysis and structural equation modeling to analyze data from a structured questionnaire survey. The findings reveal that empathy response, anonymity, and customization significantly impact customer interactions and trust. This research underscores the need for more empirical studies to explore the broader implications of AI chatbots across different industries.

AI Chatbot represents a significant advancement in artificial intelligence, with the potential to transform various sectors by enhancing user interactions and improving service delivery. However, it is essential to address the ethical, trust, and employment implications associated with this technology. By fostering a balanced and responsible approach to AI deployment, we can harness the full potential of AI chatbots while mitigating its risks.

### *1.2 AI Chatbots and Circular Economy*

The transition to a circular economy (CE) represents a significant shift from the traditional linear economy of "take-make-dispose" to a model emphasizing sustainability through resource efficiency, waste minimization, and the continuous reuse of materials. Artificial Intelligence (AI), particularly through the deployment of chatbots, plays a critical role in facilitating this transition (Câmpeanu, 2023; Zota *et al.,* 2023).

AI technologies, including machine learning, computer vision, and natural language processing, are instrumental in optimizing the circular economy's core processes. AI can enhance the design of circular products, optimize circular business models, and improve circular infrastructure (Wynn *et al.,* 2022). For instance, AI algorithms can predict material flows, optimize resource usage, and facilitate efficient waste management, contributing to a more sustainable and resilient economic system.

As AI-driven conversational agents, chatbots are increasingly utilized to support circular economy initiatives. They can interact with users, provide information, and assist in decision-making processes related to recycling, waste management, and resource optimization. Two notable chatbot applications in the circular economy are A.I.R-e and Iio. A.I.R-e, The Intelligent Recycling Assistant, developed by TheCircularLab in Spain, exemplifies the application of chatbots in the circular economy. This chatbot utilizes visual object recognition and natural language processing to assist users in identifying recyclable materials and locating recycling centers (Cimpeanu *et al.,* 2022). By providing accurate and timely information, A.I.R-e helps reduce contamination in recycling streams and encourages proper waste sorting. Iio, The Japanese Waste Management Chatbot, developed by NTT Docomo, guides residents on proper waste disposal practices. Iio answers questions about waste sorting categories, collection schedules, and recycling locations, thereby enhancing public awareness and participation in recycling programs (Cimpeanu *et al.,* 2022). This chatbot's ability to handle complex queries about waste management illustrates its potential to support large-scale circular economy initiatives.

Chatbots are deployed in various domains within the circular economy, including waste management, resource optimization, and consumer engagement. Chatbots can facilitate efficient waste management by providing users with information on sorting, collection, and recycling. For example, chatbots can inform users about the correct disposal methods for different types of waste, reducing contamination

and improving recycling rates. They can also coordinate with waste management systems to optimize collection routes and schedules, thereby reducing operational costs and environmental impact (Cimpeanu *et al.,* 2022). AI chatbots can analyze data from various sources to optimize resource use and minimize waste. They can predict demand for recycled materials, manage inventory levels, and recommend efficient resource allocation strategies. By leveraging AI capabilities, chatbots can help businesses implement sustainable practices and achieve circular economy goals (Lekan *et al.,* 2020). Engaging consumers is crucial for the success of circular economy initiatives. Chatbots can play a significant role in educating consumers about sustainable practices, encouraging recycling, and promoting the use of eco-friendly products. They can provide personalized recommendations, answer queries, and offer incentives for sustainable behavior, thus fostering a culture of environmental responsibility (Cimpeanu *et al.,* 2022).

Lekan *et al.* (2020) demonstrate the impact of AI chatbots on the circular economy through multiple case studies. Stuffstr is a platform that buys back used products from consumers and resells them in the second-hand market. An AI algorithm helps the company set competitive prices and refine its sales strategy. By using AI, Stuffstr enhances its operational efficiency and promotes the reuse of products, contributing to the circular economy (Lekan *et al.,* 2020). ZenRobotics uses AI and robotics to sort and recover recyclables from waste streams. The robots, guided by AI, make autonomous decisions on waste separation, improving the purity and recovery rates of secondary materials. This application of AI in waste management demonstrates the potential of intelligent systems to support circular economy practices (Lekan *et al.,* 2020). NotCo leverages AI algorithms to develop plant-based food products as alternatives to meat, dairy, and eggs. The AI models optimize ingredient combinations to create sustainable and nutritious products. This approach not only supports the circular economy by reducing reliance on animal-based products but also promotes sustainable agriculture (Lekan *et al.,* 2020).

AI can significantly enhance circular business models by improving efficiency and promoting sustainable practices. AI-driven predictive maintenance can reduce equipment downtime and extend product lifespans, which are critical components of circular business strategies (Ronaghi, 2023). Moreover, AI can facilitate the development of "product-as-a-service" models, where products are leased rather than sold, thus promoting reuse and reducing waste.

Digital technologies, including AI, are essential for implementing circular economy principles. Wynn *et al.* (2022) emphasize the importance of AI and IoT (Internet of Things) in tracking and managing resource flows. By integrating AI with IoT, companies can monitor the lifecycle of products, optimize resource use, and enhance recycling processes. This integration leads to greater transparency and efficiency in managing circular economy activities.

Understanding and influencing consumer behavior is crucial for the success of circular economy initiatives. AI chatbots can play a vital role in this aspect by providing personalized recommendations and encouraging sustainable consumption practices. Luo *et al.* (2019) found that chatbots significantly increase consumer engagement in recycling programs by offering personalized advice and rewards for sustainable actions. This engagement is essential for creating a more sustainable consumer culture.

While the integration of AI chatbots into the circular economy offers numerous benefits, several challenges need to be addressed.

The deployment of AI chatbots raises ethical concerns, including data privacy, algorithmic bias, and transparency. Ensuring that chatbots operate ethically and transparently is crucial for maintaining public trust and achieving sustainable outcomes (Cimpeanu *et al.,* 2022).

Current AI technologies, including chatbots, have limitations in understanding and processing complex human queries. Improving the natural language processing capabilities and contextual understanding of chatbots is essential for their effective deployment in the circular economy (Cimpeanu *et al.,* 2022).

Scaling AI chatbot solutions to handle large volumes of interactions and data is a significant challenge. Developing robust and scalable AI infrastructures that can support the widespread adoption of chatbots in the circular economy is critical for their success (Lekan *et al.,* 2020).

AI chatbots are poised to play a transformative role in the transition to a circular economy (Lekan *et al.,* 2020; Câmpeanu, 2023; Zota *et al.,* 2023). By facilitating efficient waste management, optimizing resource use, and engaging consumers, chatbots can help create a sustainable and resilient economic system. However, addressing ethical, technological, and scalability challenges is important for realizing the full potential of AI chatbots in the circular economy. As technology continues to evolve, AI chatbots will become increasingly important for achieving circular economy goals, promoting sustainability, and driving economic growth.

### *1.3 Decision-making Process and AI Chatbots*

Several theoretical models explain the decision-making process. The Rational Decision-Making Model posits that individuals make decisions by logically evaluating all available options and selecting the one that maximizes their utility (Gann *et al.,* 2017). This model assumes access to complete information and the ability to objectively analyze outcomes. Herbert Simon's Bounded Rationality Model, on the other hand, suggests that individuals operate within the constraints of limited information, cognitive limitations, and time constraints. Thus, they often settle for satisfactory solutions rather than optimal ones, a concept known as *"satisficing"* (Xu *et al.,* 2019).

The theoretical frameworks in decision-making, such as the Rational Decision-Making Model and the Bounded Rationality Model, provide a structured approach to understanding the stages of the decision-making process, which involve: clearly defining the problem or goal setting the focus for subsequent activities; collecting relevant data, and opinions influences the decision; evaluating the information to understand the strengths and weaknesses of various alternatives; selecting the best option based on the decision criteria; planning and executing the steps necessary to implement the decision; assessing the results to determine effectiveness and learn from the experience (Correia *et al.,* 2008).

Several factors influence the decision-making process, including cognitive biases, emotional states, social influences, and contextual factors. Cognitive Biases represent systematic patterns of deviation from norm or rationality in judgment that can significantly impact decision-making. For example, confirmation bias leads individuals to favor information that confirms their preexisting beliefs, while anchoring bias causes them to rely heavily on the first piece of information they encounter (Tajeddini, 2021). The emotional states presume that emotions play a crucial role in decision-making. Positive emotions can lead to more optimistic decisions, while negative emotions can result in more conservative choices (Eng, 2022). Social influences, like, cultural norms, peer pressure, and social expectations can affect decision-making. For example, individuals may take decisions aligning with their social group's values and preferences to gain acceptance (Xu *et al.,* 2019). Also, the contextual factors in which a

decision is made, such as time pressure, resource availability, and environmental conditions, can shape decision-making processes and outcomes (Eng, 2022).

Factors influencing decision-making manifest differently across various contexts like business, healthcare, and consumer behavior, affecting the process and outcomes of decisions in these domains.

In business, decision-making often involves multiple stakeholders and complex considerations. AI technologies like AI chatbots support business decisions by providing data-driven insights and facilitating scenario analysis (Correia, 2008). Choudhury *et al*. (2024) explored user perspectives on ChatGPT in healthcare, finding that ease of access to information and the quality of responses were crucial for user acceptance and trust in the AI system. Healthcare decisions significantly impact patient outcomes. AI systems can assist in diagnosing diseases, recommending treatments, and predicting patient outcomes, enhancing decision-making processes (Eng, 2022). Ogorevc (2020) discussed how social norms, attitudes, and perceived behavioral control influence decision-making in purchasing organic food. These social feedback loops can significantly affect consumer behavior and decision-making processes. Consumers make various decisions daily, influenced by personal preferences, brand perceptions, and marketing influences. Environmental awareness, for instance, significantly impacts consumers' purchasing intentions for sustainable products (Xu *et al.,* 2019).

AI technologies, such as machine learning algorithms and natural language processing models, have transformed decision-making by providing sophisticated tools for data analysis and decision support. AI chatbots, for instance, enhance decision-making by offering personalized recommendations and relevant information (Sudirjo *et al.,* 2023). In the tourism industry, AI chatbot improves travelers' information search and decision-making processes by providing personalized suggestions for destinations, accommodations, and activities (Sudirjo *et al.,* 2023).

Despite the benefits of AI in decision-making, several challenges remain. Ethical considerations, such as data privacy, algorithmic bias, and transparency, must be addressed to ensure responsible AI use. Integrating AI into decision-making processes requires balancing human judgment and machine intelligence (Luo *et al.,* 2019).

Integrating AI technologies, like AI chatbots, can significantly enhance decision-making by providing data-driven insights and personalized recommendations. However, addressing ethical challenges and ensuring responsible AI use is crucial for realizing its full potential. As technology evolves, AI will play an increasingly important role in supporting and enhancing human decision-making.

### *1.4 AI chatbots Usage in Marketing and Its Impact on Decision-making of Sustainable products*

AI technologies are leveraged in marketing to enhance customer experiences, personalize interactions, and optimize marketing strategies. Arsenjevick *et al.* (2019) highlight that AI enables marketers to create highly personalized customer experiences while reducing costs compared to traditional marketing strategies. AI's ability to analyze vast amounts of data allows companies to gain deeper insights into consumer behavior, preferences, and trends, facilitating more targeted and effective marketing strategies.

AI applications in marketing include predictive analytics, customer segmentation, and sentiment analysis. Predictive analytics uses machine learning algorithms to forecast consumer behavior based on historical data, helping marketers anticipate customer needs and preferences. Customer segmentation

involves dividing the customer base into distinct groups based on various characteristics, allowing for more personalized marketing efforts. Sentiment analysis uses natural language processing (NLP) to gauge customer sentiment from social media, reviews, and feedback, providing valuable insights into consumer perceptions and attitudes (Arsenjevick *et al.,* 2019).

Chatbots, as a subset of AI, play a crucial role in modern marketing strategies. They are designed to simulate human conversation and can operate 24/7, providing instant responses to customer inquiries. This continuous availability improves customer satisfaction by offering immediate assistance and reducing wait times. Mufadhol *et al.* (2020) discuss the use of automated chatbot machine learning in business intelligence systems, emphasizing how chatbots can handle numerous customer interactions simultaneously, thereby improving efficiency and customer service quality. Chatbots are employed in various sectors, including retail, finance, healthcare, and entertainment. They can assist customers in finding products, answering frequently asked questions, providing recommendations, and facilitating transactions. By handling routine inquiries, chatbots free up human agents to focus on more complex tasks, enhancing overall productivity and service quality (Mufadhol *et al.,* 2020).

The influence of AI on consumer purchase decisions is profound. Several studies have explored the influence of AI and chatbots on consumer behavior and purchase decisions (Hildebrand *et al.,* 2019; Khoa, 2021; Caldarini *et al.,* 2022). AI can analyze consumer data to identify patterns and predict future behavior, allowing marketers to personalize their messages and offers more effectively. Liu *et al.* (2020) explore how new AI services impact customer willingness to buy. Their findings indicate that AI-driven recommendations and personalized marketing significantly increase the likelihood of purchase by making the shopping experience more relevant and engaging for consumers. Gramegna *et al.* (2020) provide an example from the insurance industry, where an Explainable AI model helps understand why customers buy or abandon insurance policies. Their study shows that AI can identify key factors influencing purchase decisions, such as risk perception and product relevance, enabling insurers to address customer concerns proactively and improve conversion rates. Chatbots also significantly influence purchase decisions by enhancing the shopping experience. Luo *et al.* (2019) investigate the impact of AI chatbots disclosure on customer purchases, finding that transparency about the chatbot's AI nature can affect consumer trust and buying behavior. When consumers are aware they are interacting with an AI, their trust in the information provided can either increase or decrease depending on their perceptions of AI reliability and accuracy. Chatbots contribute to higher conversion rates by providing personalized recommendations, answering product-related questions, and assisting with checkout processes. Their ability to engage customers in real-time, provide personalized suggestions, and offer seamless support throughout the purchase journey makes them invaluable tools in driving sales and enhancing customer satisfaction (Luo *et al.,* 2019). By enhancing customer interactions, providing personalized experiences, and maintaining transparency, chatbots can effectively drive sales and build long-term customer relationships. These findings highlight the importance of integrating advanced AI technologies in marketing strategies to leverage the full potential of chatbots in digital relational sales (Presti *et al.,* 2021).

The marketing of sustainable products presents unique challenges that AI and chatbots can help address. AI chatbots significantly improve the visibility and innovative capabilities of supply chains, thereby enhancing sustainable supply chain performance (Panigrahi *et al.,* 2023). On the other hand consumers are increasingly concerned about environmental issues and seek products that align with their values. AI can identify and target environmentally conscious consumers by analyzing their online behavior,

purchase history, and social media activity. This enables marketers to craft messages that resonate with these consumers and highlight the sustainability features of their products (Kushwaha *et al.,* 2021). AI chatbots can guide consumers in understanding and valuing green certifications, which can enhance the perceived value of sustainable products. Providing information on certifications like Fair Trade, USDA Organic, or Energy Star helps consumers make choices that align with their values (Panigrahi *et al.,* 2023; Streimikiene, 2023).

There is a use of chatbots in the marketing of sustainable products (Mufadhol *et al.,* 2020; Sadiq *et al.,* 2024). The potential of chatbots in promoting and marketing sustainable products is translated by the fact that chatbots can play a vital role in raising awareness about sustainable products, educating consumers about their benefits, and driving purchase decisions. The use of chatbots in marketing sustainable products aligns with the growing consumer demand for eco-friendly and socially responsible products. Consumers today are becoming increasingly concerned about the environmental impact of their purchasing decisions. They seek information about sustainable alternatives and are more likely to support brands that prioritize sustainability. Chatbots can provide valuable information and guidance to consumers in their search for sustainable products. By using AI algorithms to analyze consumer preferences and behavior, chatbots can recommend sustainable products that align with individual consumer values. Moreover, chatbots can also address any doubts or concerns related to the sustainability of products. This can help build consumer trust and confidence, ultimately influencing their purchase decisions in favor of sustainable products (Sadiq *et al.,* 2024). Chatbots can highlight eco-labels, certifications, and the environmental impact of products, which are critical factors for environmentally conscious consumers. According to research by Deng *et al*. (2023), chatbots in sustainable education significantly improve users' understanding and retention of information, which can be applied to marketing contexts to boost consumer knowledge and influence purchasing decisions. Chatbots can further support the marketing of sustainable products by educating consumers about the environmental benefits of their purchases. For instance, chatbots can provide information on product origins, manufacturing processes, and the impact on carbon footprints. This transparency can build trust and encourage consumers to choose sustainable options over conventional products (Mufadhol *et al.,* 2020).

Kushwaha *et al*. (2021) discuss MarkBot, a language model-driven chatbot designed for interactive marketing of sustainable products. MarkBot engages customers in conversations about sustainability, answering questions and providing insights into the eco-friendly aspects of products. This interactive approach not only informs consumers but also fosters a deeper connection with the brand, enhancing loyalty and encouraging repeat purchases.

The integration of AI and chatbots into marketing strategies offers numerous benefits, from enhanced customer experiences and personalized interactions to improved efficiency and higher conversion rates. AI's ability to analyze data and predict consumer behavior allows for more targeted and effective marketing strategies, while chatbots provide instant, personalized support that can significantly influence purchase decisions. Furthermore, AI chatbots play a crucial role in promoting sustainable products by educating consumers and highlighting the environmental benefits of their choices.

## 2. Research Model and Hypotheses

AI chatbots engage users by providing personalized and contextualized information about environmental protection, making the content more relevant and easier to absorb. This personalized approach

increases user engagement and awareness of the importance of environmental sustainability (Vinuesa *et al.,* 2020; Chi, 2024). The ability of chatbots to adjust their messaging based on user preferences ensures that consumers are informed about environmental issues in ways that resonate with them (Vinuesa *et al.,* 2020). AI chatbots also help in resolving environmental-related queries. By effectively answering questions and providing solutions related to environmental practices, chatbots encourage users to reflect on the environmental impact of their actions. This creates a learning environment where users are more likely to gain a deeper understanding of environmental concerns (Chi, 2024).

According to Chi (2024), chatbots are proven to significantly influence users' pro-environmental attitudes by educating them on how their actions can impact the environment. This is achieved through direct communication, which fosters environmental consciousness and even leads to an increased willingness to contribute to environmental causes. These factors combine to establish a direct, positive, and significant link between AI chatbots use and enhanced environmental awareness.

*$H_1$: The usage of AI chatbots has a positive, direct, and significant effect on awareness about the environment*.

The paper of Sidlauskiene *et al.* (2023) provides valuable insights into the role of AI chatbots in enhancing consumer interaction and perceived value in general, but it does not specifically address their impact on the perceived value of sustainable products. Instead, it focuses more on the overall customer experience, purchase intentions, and general utility that AI chatbots provide in conversational commerce. The research examines how AI chatbots improve customer satisfaction and engagement through personalized recommendations, real-time support, and seamless interactions.

According to Yin *et al.* (2021), AI technology in online shopping platforms delivers personalized product recommendations and customer service. This personalization directly increases the perceived value by making the shopping experience more relevant and personalized to individual consumer needs. The accuracy and insight capabilities of AI technology allow consumers to evaluate product attributes, including sustainability factors, which increase both the perceived utility value (i.e., usefulness, convenience, and cost-saving) and perceived hedonic value (i.e., pleasure and satisfaction from making eco-friendly choices). Through interactive customer service and constant feedback loops, AI chatbots engage consumers more deeply in the purchase process, which enhances customer satisfaction and perceived enjoyment. This engagement makes sustainable products more attractive, reinforcing their perceived value as consumers feel better informed and more connected to their purchases.

*$H_2$: The usage of AI chatbots has a positive, direct, and significant effect on perceived value of sustainable products*.

Previous studies (Soares *et al.,* 2022; Chi, 2024) show that the functionality and personalized interaction provided by AI chatbots play a major role in shaping consumer attitudes toward the purchase of sustainable products, improving both their understanding and perceived value of eco-friendly products. By providing personalized content about sustainable products and highlighting their environmental benefits, chatbots enhance the consumer's understanding and attitude toward purchasing these products. This effect is supported by the finding that customization leads to more positive attitudes toward pro-environmental behaviors and products (Soares *et al.,* 2022; Chi, 2024). One of the critical ways chatbots influence attitudes is through their problem-solving capabilities. By resolving customer queries related to sustainable products, such as eco-certifications or product origins, chatbots instil

greater trust and confidence to consumers. This significantly improves their attitude towards purchasing these products because their concerns are addressed in real-time (Chi, 2024). Chatbots create interactive and engaging shopping experiences that foster positive consumer attitudes. The ability to interact in a human-like manner, provide real-time answers, and offer insights about sustainability attributes of products leads to a more informed and favorable disposition toward purchasing environmentally friendly products (Soares *et al.,* 2022; Chi, 2024).

*$H_3$: The usage of AI chatbots has a positive, direct, and significant effect on attitudes toward purchases of sustainable products.*

Environmental awareness leads consumers to be more conscious about the impact of their choices on the environment (Liang *et al.,* 2024). This heightened consciousness influences their perception of value, particularly in sustainable products, as consumers view products that align with their environmental values as more valuable. For example, health-conscious consumers tend to prefer products that not only benefit their health but also minimize environmental harm, increasing their perceived value (Albornoz *et al.,* 2024).

Products with a focus on sustainability often come with a strong social narrative, such as promoting environmentally friendly practices or reducing carbon footprints. Consumers who are environmentally aware value the social impact of these products more highly, thus increasing the perceived social value. The research indicates that consumers who are aware of environmental issues seek products that contribute to societal well-being, adding an extra layer of value (Albornoz *et al.,* 2024).

As consumers become more aware of the environment, they develop an emotional connection to products that reflect their ecological values. This connection leads to a higher perceived emotional value for sustainable products, as consumers feel good about making purchases that contribute to environmental preservation. The emotional bond fosters repeat purchases and loyalty towards brands promoting sustainability (Albornoz *et al.,* 2024).

Through these mechanisms, environmental awareness enhances the perceived value of sustainable products, influencing consumer attitudes and willingness to purchase environmentally friendly products. This aligns with the general theory of perceived value, where increased awareness leads to a more favorable evaluation of a product's utility, social impact, and emotional connection.

*$H_4$: Awareness about the environment has a positive, direct, and significant effect on perceived value of sustainable products.*

Previous studies have reported that awareness of the environment influences pro-environmental behavior (Xu *et al.,* 2019; García-Salirrosas *et al.,* 2024). There is an evidence that indicates a positive relationship between environmental awareness and attitudes toward environmental behavior and the likelihood of individuals engaging in green purchasing (Hlaváček *et al.,* 2023; García-Salirrosas *et al.,* 2024).

The study of Khaleelia *et al.* (2020) highlights that environmental knowledge, both subjective and objective, has a significant influence on shaping consumer attitudes toward sustainable products. The more informed consumers are about environmental issues, the more likely they are to develop positive attitudes towards green products. This is because their awareness leads to a better understanding of the long-term benefits of environmentally friendly products, enhancing their attitudes toward purchasing

these items. In the research conducted by Khaleeli *et al.* (2020), environmental awareness directly influenced consumers' attitudes toward environmentally friendly products. This relationship was supported by empirical data, showing a significant positive correlation between consumers' environmental knowledge and their attitudes toward green products. The study also noted that the more consumers are aware of environmental issues, the more likely they are to have a positive attitude toward products that align with sustainability values.

*$H_5$: Awareness about the environment has a positive, direct, and significant effect on attitudes toward purchases of sustainable products.*

Previous studies (Pham *et al.,* 2022; Bilal *et al.,* 2023) reveal that perceived emotional and social value also plays a critical role. Consumers tend to have a more favorable attitude toward purchasing sustainable products when they believe those products align with their personal values and contribute to social good. This emotional connection enhances their overall attitude toward sustainable purchases. Regarding consumer attitudes, Pham *et al.* (2022) identified individual willingness or interest in adopting a specific attitude. In addition, the study explains that perceived value and consumer attitudes are important elements of consumer behavior toward particular products or services. The perception of earned value resulting from an online luxury retailer is likely to lead to a more optimistic consumer behavior, such as positive attitudes. Thus, the following hypothesis is proposed:

*$H_6$: Perceived value has a positive, direct, and significant effect on attitudes toward purchases of sustainable products.*

Consumers easily shift to buy sustainable products from other companies. Therefore, maintaining consumer loyalty is very important for companies. When consumers determine an environmentally friendly lifestyle, what is considered in choosing sustainable products is that they generally tend to be more expensive than conventional products. Several elements, such as brand image, environmental awareness, transparency of environmentally friendly features, and environmentally friendly marketing, can influence purchase intention (Nurapni *et al.,* 2024). Products that are environmentally friendly are more likely to be purchased by customers who are highly interested in such products. Lestari *et al.* (2021) highlight that environmental awareness raises consumer responsibility towards eco-friendly purchases. Consumers with higher awareness feel a sense of duty toward the environment and are more likely to shift their purchasing behaviors toward sustainable products. This sense of responsibility significantly increases their purchase intention, as they perceive buying green products as a way to contribute to environmental protection. Environmental awareness fosters a deeper understanding of the impacts of consumer behavior on the environment, which translates into a preference for sustainable products. The papers show that individuals who are more aware of environmental issues are more likely to choose products with eco-friendly attributes, thereby increasing their purchase intentions for such products.

*$H_7$: Awareness about the environment has a positive, direct, and significant effect on purchase intention of sustainable products.*

The perceived value and emotional satisfaction derived from sustainable products play a significant role in shaping purchase intention. Consumers who perceive sustainable products as valuable in terms of functionality (e.g., quality, durability, and eco-friendliness) and emotional fulfilment (e.g., feeling good about contributing to environmental causes) are more likely to develop strong purchase intentions (Gann *et al.,* 2017; Hudayah *et al.,* 2023).

The perception that purchasing sustainable products enhances one's social image or aligns with societal norms also boosts purchase intention. When consumers believe that buying green products helps them gain social approval or contributes to a greater environmental good, their intention to purchase these products increases. The study also highlights that conditional incentives, such as government subsidies or discounts, can further elevate purchase intention by increasing the perceived value of sustainable products (Machmud *et al.,* 2021; Hudayah *et al.,* 2023).

Environmental awareness amplifies the effect of perceived value on purchase intention. Consumers with a higher level of environmental concern are more likely to prioritize the functional and social benefits of sustainable products, which strengthens their intention to purchase sustainable products (Hudayah *et al.,* 2023).

In summary, the perceived value (comprising functional, emotional, social, and conditional aspects) significantly drives the intention to purchase sustainable products.

*$H_8$: Perceived value of sustainable products has a positive, direct, and significant effect on purchase intention of sustainable products*.

When consumers hold positive attitudes toward sustainable products (due to environmental, health, or social reasons), these attitudes significantly increase their intention to purchase. For instance, consumers with favorable attitudes towards organic textiles, driven by health concerns or environmental awareness, are more likely to purchase such products (Koklic, 2011; Abrar *et al.,* 2018; Mostaghel *et al.,* 2021; Fahlevi *et al.,* 2023).

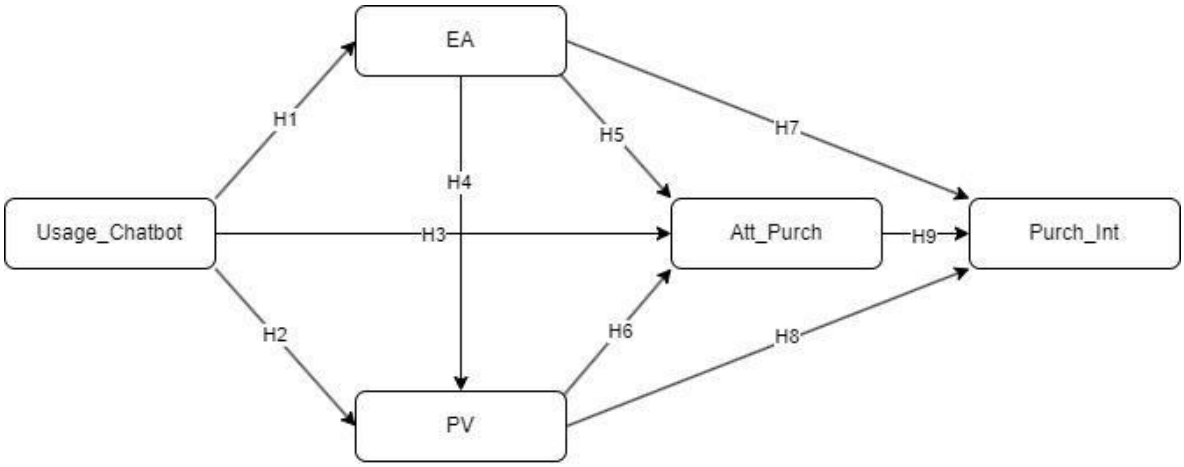
The study of Fahlevi *et al.* (2023) explores the relationship between consumer attitudes and purchase intentions for green agricultural products, using factors like consumer awareness, health consciousness, consumption values, and social influence.

It demonstrates that positive consumer attitudes significantly influence purchase intention, confirming that stronger positive attitudes towards sustainable products lead to a higher likelihood of purchase.

It also highlights the role of social influence and health consciousness in shaping attitudes toward green products. Social influence, in particular, was found to be the most important factor affecting purchase intention.

Mostaghel *et al.* (2021) investigate ethical purchase intentions within the framework of Circular Business Models. It defines ethical purchase intention as the decision to buy products and services that minimize harm to society and the environment. Attitudes are shown to mediate the relationship between perceived value and purchase intention. Customers with a positive attitude toward sustainability are more likely to show ethical purchase intentions. The paper also discusses how functional, social, and epistemic value influence ethical purchase intentions. Consumers who perceive higher value in sustainable products are more likely to express an intention to purchase.

*$H_9$: Attitudes toward purchases of sustainable products have a positive, direct, and significant effect on purchase intention of sustainable products.*




*Source:* created by the authors.

*Figure 1*. **Conceptual Model**

In *Figure 1* we present the conceptual model of our research. The model illustrates the relationships between AI chatbots usage, environmental awareness (EA), perceived value (PV), attitudes toward sustainable purchases (Att_Purch), and purchase intention (Purch_Int). The model hypothesizes that AI chatbots usage directly influences environmental awareness ($H_1$), perceived value ($H_2$), and attitudes toward sustainable purchases ($H_3$). Additionally, environmental awareness influences perceived value ($H_4$), attitudes toward sustainable purchases ($H_5$), and purchase intention ($H_7$). Similarly, perceived value is expected to impact attitudes toward sustainable purchases ($H_6$) and purchase intention ($H_8$). Finally, attitudes toward sustainable purchases have a direct effect on purchase intention ($H_9$).

## 3. Research Methodology

For primary data collection purposes an online questionnaire was applied. Overall, 562 fully completed questionnaires were received. The majority of respondents (56.8%) are between 18-25 years old, with a smaller portion (21.7%) aged 26-40, followed by 16% in the 41-55 age group, and 5.5% over 55 years old. Most respondents (42.9%) have a high school diploma or equivalent, while 29.5% hold a Bachelor's degree, 15.5% have a Master's degree, and 6.2% have completed a Doctorate. A minority have middle school education (1.8%) or professional/technical studies (3.9%). 31% of respondents have a net monthly income between €400-€800, while 28.5% earn less than €400, 19.2% between €800-€1.200, 9.6% between €1.200-€1.600, and 11.7% earn over €1.600. The sample consists of 61.6% female respondents and 38.4% male respondents. The majority of respondents (74.2%) come from an urban environment, while 25.8% are from rural areas.

All the five measurement scales operationalizing the constructs and making up the questionnaire are widely used and adapted from the international literature to the national context. A scale specifically developed by the authors assessed the respondents' interaction with AI-driven chatbots and their perceived usefulness in influencing sustainable purchasing decisions. The scale for AI chatbots usage, developed by the authors, contains 5 items that assess the utility, efficiency, and overall user experience of AI chatbots in the process of purchasing sustainable products. The scale developed by Mostaghel *et al*. (2021) for perceived value was adapted and consists of 16 items, divided into three dimensions: social value (4 items), functional value-quality (4 items), functional value-price (4 items) and epistemic value (4

items). The scale used to measure environmental awareness, adapted from Arzu *et al.* (2020), includes 40 items, addressing key concerns such as pollution, resource usage, and ecological impact etc. The attitude scale, developed by Malik (2017), includes 5 items, which capture the respondent's attitudes toward the benefits and societal impact of using sustainable products. The purchase intention scale, also developed by Malik (2017), consists of 3 items. These items assess the likelihood of purchasing sustainable products in the future based on current attitudes. All items were measured using the five-point Likert scale (1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree), except usage of AI chatbots that was measured using an ordinal rating scale (1-Not at all, 2-To a very small extent, 3-To a small extent, 4-To a large extent, 5-To a very large extent).

The primary objective of the data analysis was to test the research hypotheses (see Figure 1. The proposed conceptual model). In the first stage, the reliability of the measurement scales was tested using Cronbach's α coefficient and composite reliability (CR). Next, confirmatory factor analysis (CFA) was conducted for each dimension and construct within the proposed conceptual model. The method used in this case was principal component analysis (PCA). Factor loadings were determined for each item. If a construct had multiple dimensions, factor loadings were calculated for each dimension as well. Composite reliability (CR) and average variance extracted (AVE) were used to verify convergent validity. The tool used to test discriminant validity was the heterotrait-monotrait ratio of correlations (HTMT) (Henseler *et al.,* 2015). The proposed research hypotheses were tested using structural equation modeling (SEM) and path analysis. The software used throughout the entire statistical data processing process were: SPSS 23, Amos 23, and Excel.

## 4. Empirical Results

In *Table 1*, we can observe that all the scales used to measure the dimensions/constructs are reliable. The values of Cronbach's α (Nunnally, 1978) and composite reliability (Fornell *et al.,* 1981) are well above the minimum threshold of 0.700.

**Table 1. Scale reliability and convergent validity**

| No. | Constructs/*Dimensions* | Cronbach's α | CR | AVE |
|---|---|---|---|---|
| 1 | Usage of AI Chatbots | 0.939 | 0.934 | 0.804 |
| 2 | Perceived Value of Sustainable Products | 0.765 | 0.895 | 0.810 |
| *2.1* | *Social Value* | *0.920* | *0.943* | *0.806* |
| *2.2* | *Functional Value-Quality Ratio* | *0.881* | *0.918* | *0.738* |
| *2.3* | *Functional Value-Price Ratio* | *0.820* | *0.883* | *0.655* |
| *2.4* | *Epistemic Value* | *0.848* | *0.900* | *0.693* |
| 3 | Awareness | 0.790 | 0.858 | 0.549 |
| *3.1* | *Food Consumption* | *0.783* | *0.848* | *0.483* |
| *3.2* | *Means of Transport and Individual Housing* | *0.788* | *0.850* | *0.487* |
| *3.3* | *Energy Consumption* | *0.884* | *0.907* | *0.450* |
| *3.4* | *Waste* | *0.846* | *0.885* | *0.525* |
| *3.5* | *Water Consumption* | *0.795* | *0.860* | *0.553* |
| 4 | Attitude Toward the Purchase of Sustainable Products | 0.790 | 0.930 | 0.767 |
| 5 | Intention to Purchase Sustainable Products | 0.901 | 0.939 | 0.837 |

*Source:* created by the authors.

In the next stage, confirmatory factor analysis was performed. To determine the number of factors, the following statistical tools were used: The Kaiser criterion (1960) and Cattell's scree test (1966). During

this stage, factor loadings were also determined for each item and for each dimension (in the case of constructs with multiple dimensions). All factor loading values exceed the minimum threshold of 0.400 (Field, 2009).

Convergent validity was verified using composite reliability (CR) and average variance extracted (AVE). The dimensions "Social Value", "Functional Value-Quality Ratio", "Functional Value-Price Ratio", and "Epistemic Value" within the construct "Perceived Value of Sustainable Products" demonstrate a high level of convergent validity. A high level of convergent validity was also obtained for the dimensions "Waste" and "Water Consumption" within the construct "Awareness". Additionally, the constructs "Usage of AI Chatbots", "Perceived Value of Sustainable Products", "Awareness", "Attitude Toward the Purchase of Sustainable Products", and "Intention to Purchase Sustainable Products" all present a high level of convergent validity. The CR values exceed the minimum threshold of 0.700, and the AVE values are above the minimum limit of 0.500 (Fornell *et al.,* 1981). For the dimensions "Food Consumption", "Means of Transport and Individual Housing", and "Energy Consumption", the AVE values fall below the minimum threshold of 0.500 (average variance extracted ranges between 45% and 48.7%). The average variance extracted is a more conservative tool for estimating the validity of the measurement model, and *"on the basis of pn (composite reliability) alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error"* (Fornell *et al.,* 1981, p. 46). In conclusion, we can affirm that the level of convergent validity for the three dimensions mentioned above is acceptable, as CR values range between 0.848 and 0.907.

Discriminant validity was tested using the heterotrait-monotrait ratio of correlations (HTMT). In *Table 2* below, we can observe that all values are lower than the maximum limit of 0.900. In this case, we can conclude that there is a high level of discriminant validity (Gold *et al.,* 2001; Teo *et al.,* 2008).

**Table 2. Discriminant Validity**

| | Usage of AI Chatbots | PV | EA | Att_Purch | Purch_Int |
|---|---|---|---|---|---|
| **Usage of AI Chatbots** | | | | | |
| **PV** | 0.429 | | | | |
| **EA** | 0.326 | 0.471 | | | |
| **Att_Purch** | 0.380 | 0.520 | 0.674 | | |
| **Purch_Int** | 0.397 | 0.593 | 0.656 | 0.761 | |

*Source:* created by the authors.

The indicators determined for assessing the consistency of the proposed conceptual model are found in *Table 3*.

**Table 3. Model fit indices**

| Measures | Recommended Criteria | Structural Model |
|---|---|---|
| $\chi^2$/d.f. (p-value) | <5 | 3.109 (0.078) |
| GFI | >0.8 | 0.998 |
| AGFI | >0.8 | 0.967 |
| NFI | >0.9 | 0.997 |
| CFI | >0.9 | 0.998 |
| RMSEA | <0.08 | 0.061 |

*Source:* created by the authors.

Considering the values obtained from the statistical data analysis, we can conclude that the model is consistent (see *Table 3*). In the final stage, the research hypotheses within the proposed conceptual model were tested. *Table 4* includes all the results obtained from testing the research hypotheses $H_1 \rightarrow H_9$.

**Table 4. Hypothesis testing results**

| Hypothesis | β | p | Result |
|---|---|---|---|
| $H_1$: Usage_Chatbot → EA | 0.331 | 0.000 | Accepted |
| $H_2$: Usage_Chatbot → PV | 0.278 | 0.000 | Accepted |
| $H_3$: Usage_Chatbot → Att_Purch | 0.112 | 0.002 | Accepted |
| $H_4$: EA → PV | 0.355 | 0.000 | Accepted |
| $H_5$: EA → Att_Purch | 0.469 | 0.000 | Accepted |
| $H_6$: PV → Att_Purch | 0.210 | 0.000 | Accepted |
| $H_7$: EA → Purch_Int | 0.264 | 0.000 | Accepted |
| $H_8$: PV → Purch_Int | 0.218 | 0.000 | Accepted |
| $H_9$: Att_Purch → Purch_Int | 0.426 | 0.000 | Accepted |

*Source:* created by the authors.

In *Table 4*, we can observe that the usage of chatbots has a direct, positive, and significant influence on environmental awareness (β=0.331; p=0.000<0.050), on perceived value (β=0.278; p=0.000<0.050), and on attitudes toward the purchase of sustainable products (β=0.112; p=0.002<0.050). Consequently, the research hypotheses $H_1$, $H_2$, and $H_3$ are accepted.

Furthermore, the research hypotheses $H_4$, $H_5$, and $H_7$ are also accepted. Environmental awareness has a direct, positive, and significant influence on perceived value (β=0.335; p=0.000<0.050), on attitudes toward the purchase of sustainable products (β=0.469; p=0.000<0.050), and on the intention to purchase sustainable products (β=0.264; p=0.000<0.050). Perceived value has a direct, positive, and significant influence on attitudes toward the purchase of sustainable products (β=0.210; p=0.000<0.050) and on the intention to purchase sustainable products (β=0.218; p=0.000<0.050), while attitudes toward the purchase of sustainable products have a statistically significant influence on the intention to purchase sustainable products (β=0.426; p=0.000<0.050), thus research hypotheses $H_6$, $H_8$, and $H_9$ are also accepted.

## Conclusions, implications, limitations and future research directions

This study aimed to explore the influence of AI chatbots on the purchase intentions of sustainable products, analysing the direct effects of chatbots usage on environmental awareness, perceived value, attitudes, and purchase intentions. The research was conducted using a structural equation modelling (SEM) approach and tested nine hypotheses to assess the relationships between these variables.

The study found that the usage of AI chatbots has a positive, direct, and significant influence on environmental awareness. Chatbots play a crucial role in raising awareness by providing users with personalized information about sustainability and environmental issues. This finding is consistent with previous research (e.g., Vinuesa *et al.,* 2020) that suggests chatbots can educate consumers on the environmental impacts of their actions, fostering greater consciousness and understanding of sustainability. The results showed a significant positive effect of chatbots usage on the perceived value of sustainable products. By offering personalized recommendations and information about the eco-friendly attributes of products, chatbots enhance the utility and emotional value perceived by consumers. This leads to an increased perception of the worth and benefits of sustainable products, making them

more attractive to potential buyers. Chatbots usage also has a positive and significant influence on consumer attitudes toward purchasing sustainable products. The interactive nature of chatbots and their ability to resolve customer queries in real-time help to improve consumer trust and confidence, ultimately shaping a more favourable attitude towards eco-friendly products. The research confirmed that environmental awareness has a significant positive effect on the perceived value of sustainable products. As consumers become more aware of environmental issues, they place higher value on products that align with their ecological values, leading to an increased perception of both the functional and emotional benefits of these products. Environmental awareness was also found to have a strong positive effect on attitudes toward purchasing sustainable products. Consumers who are more informed about environmental concerns tend to develop more favourable attitudes toward products that contribute to sustainability, consistent with prior studies in the field of environmental psychology (e.g., García-Salirrosas *et al.,* 2024). The perceived value of sustainable products has a significant positive effect on consumer attitudes toward purchasing these products. When consumers believe that sustainable products provide value in terms of quality, price, or emotional satisfaction, they are more likely to develop positive attitudes toward buying them. The study showed a significant positive relationship between environmental awareness and the intention to purchase sustainable products. Consumers who are more conscious of environmental issues are more inclined to make eco-friendly purchases, driven by their desire to reduce their environmental footprint. Perceived value was found to have a significant positive impact on the intention to purchase sustainable products. Consumers who perceive high value in sustainable products are more likely to act on their purchase intentions, motivated by the functional, social, and emotional benefits of these products. Lastly, the research demonstrated that positive attitudes toward sustainable purchases significantly increase purchase intention. Consumers with favourable attitudes towards eco-friendly products are more likely to follow through with their intentions to buy, confirming the importance of shaping consumer attitudes to drive sustainable purchasing behaviour.

This study contributes to the growing body of literature on AI chatbots, environmental awareness, and sustainable consumer behaviour. The findings indicate that AI chatbots are powerful tools for enhancing environmental awareness and promoting sustainable consumption. By offering personalized, real-time information, chatbots help to shape consumer perceptions of value and attitudes towards sustainable products, ultimately influencing their purchase intentions.

The results suggest that AI chatbots could be integrated into marketing strategies aimed at promoting eco-friendly products, helping businesses foster stronger relationships with environmentally conscious consumers. Moreover, this research underscores the importance of raising environmental awareness to increase the perceived value of sustainable products, as well as the critical role of attitudes in driving purchase decisions.

This study contributes to the growing body of literature on artificial intelligence (AI) in marketing by focusing on chatbots' influence on sustainable consumption. The research highlights the role of AI chatbots in promoting environmental awareness and shaping consumers' attitudes toward sustainable goods, expanding the understanding of chatbots applications beyond their traditional roles in customer service and e-commerce.

The research bridges the gap between sustainability-focused consumer behavior models and technology acceptance theories. By incorporating elements such as environmental awareness, perceived value, and

attitudes toward sustainability, it offers a comprehensive framework to explain how AI chatbots can influence purchase intentions in the context of sustainable products.

This research validates the theoretical assumption that environmental awareness and perceived value are significant predictors of purchase intentions, especially in the domain of sustainable goods. The findings also align with behavioral theories suggesting that personalized and real-time information from AI systems can directly influence decision-making processes, reinforcing models such as the Theory of Planned Behavior and Rational Choice Theory in the context of AI-enabled marketing.

From a practical point of view, our research highlights the fact that marketers can integrate AI chatbots into their digital strategies to effectively target environmentally conscious consumers. AI chatbots can provide instant answers to consumers' sustainability-related questions, guide them through eco-friendly product options, and highlight green certifications, thus improving the perceived value of sustainable goods.

Businesses should leverage AI chatbots to resolve customer queries and reduce uncertainties related to sustainable product attributes (e.g., environmental impact, cost-benefit analysis), ultimately improving customer satisfaction and loyalty. Also businesses should consider AI chatbots as an important tool to drive the sales of sustainable products. By enhancing the perceived value through personalized interactions and addressing consumers' environmental concerns, chatbots can increase the likelihood of eco-friendly purchase decisions, positioning businesses as leaders in sustainability.

While the findings of this study provide valuable insights, there are several limitations that should be acknowledged. First, the study is based on self-reported data, which may be subject to social desirability bias. Second, the sample is limited to a specific population, and the results may not be generalizable to other cultural or demographic contexts. Future research could address these limitations by employing longitudinal designs or exploring the effects of AI chatbots on sustainable consumption in different geographic regions.

Additionally, while this study focused on the direct effects of chatbots usage on consumer behavior, future research could explore potential moderating factors such as consumer trust, technological literacy, or brand loyalty. Investigating these variables could provide a deeper understanding of how AI technologies influence sustainable purchasing behaviors across diverse consumer groups.

In conclusion, AI chatbots represent a promising tool for promoting sustainability in consumer markets. By leveraging their ability to enhance environmental awareness, perceived value, and positive attitudes, businesses can encourage more environmentally responsible purchasing decisions and contribute to the transition towards a more sustainable economy.

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**Acknowledgements**

We gratefully acknowledge for the constructive comments from two anonymous reviewers. All remaining errors are ours.

**DIRBTINIO INTELEKTO POKALBIŲ ROBOTŲ ĮTAKA KETINIMUI PIRKTI TVARIUS PRODUKTUS**

**Luminița-Ștefania Bozdog, Remus Ionut Naghi, Gheorghe Preda, Sorin Ioan Prada**

***Santrauka.*** Straipsnyje tiriama dirbtinio intelekto pokalbių robotų įtaka vartotojų ketinimams pirkti tvarius produktus. Pagrindinis tikslas yra įvertinti, kaip dirbtinio intelekto pokalbių robotų naudojimas veikia aplinkosaugos sąmoningumą, suvokiamą vertę ir požiūrį į tvarius produktus ir tai, kaip šie veiksniai veikia pirkimo ketinimą. Duomenys buvo surinkti pasitelkus internetinį klausimyną, kuriame dalyvavo 562 respondentai. Duomenys išanalizuoti pritaikius struktūrinių lygčių modeliavimą (SEM). Rezultatai atskleidė, kad dirbtinio intelekto pokalbių robotai žymiai padidina aplinkosaugos sąmoningumą, suvokiamą vertę ir teigiamą požiūrį į tvarius produktus. Be to, aplinkosaugos sąmoningumas ir suvokiama vertė teigiamai veikia tiek požiūrį, tiek ketinimus pirkti. Šiame tyrime pabrėžiamas dirbtinio intelekto pokalbių robotų, kaip galingo įrankio skatinant tvarų vartojimą, potencialas, akcentuojamas jų vaidmuo formuojant ekologišką pirkimo elgseną. Būsimuose moksliniuose tyrimuose turėtų būti nagrinėjamas moderuojantis tokių kintamųjų kaip pasitikėjimas ir technologinis raštingumas poveikis.

*Reikšminiai žodžiai:* dirbtinio intelekto pokalbių robotai; tvarūs produktai; aplinkosaugos sąmoningumas; ketinimas pirkti; suvokiama vertė.