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AI For Sustainability: Consumer Insights On Environmental And Resource Management

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Abstract: As global environmental challenges intensify, Artificial Intelligence (AI) has emerged as a promising tool to enhance environmental sustainability and optimize resource management. However, the effectiveness of AI-driven solutions relies heavily on consumer acceptance and attitudes. This study investigates consumer perceptions toward the use of AI in promoting sustainable environmental practices and efficient resource utilization. This study aims to investigate consumer attitudes toward the use of Artificial Intelligence in environmental sustainability and resource management in Erode District. Employing a quantitative research design, data were collected from residents of Erode District through structured questionnaires and analyzed using multiple regression techniques to examine the influence of socio-demographic, psychological, and informational factors on consumer attitudes. Findings reveal that awareness, trust, perceived benefits, and ethical considerations significantly shape consumer acceptance of AI applications in sustainability. The study highlights the critical need for transparent communication and educational initiatives to foster positive perceptions and facilitate wider adoption of AI technologies in environmental management. These insights can guide policymakers, technology developers, and environmental advocates in designing AI solutions that are socially accepted and environmentally effective. A convenience sampling technique was employed to select a sample of 100 consumers from the Erode District. Data were collected using a structured questionnaire designed to capture relevant information regarding the study variables. To analyze the relationships and effects among these variables, regression analysis was conducted, enabling the identification of significant predictors and the strength of their influence on the outcome measures.

Keywords: Artificial Intelligence, Consumer, Solutions, Technology, Environmental.

I. INTRODUCTION

In recent years, the accelerating pace of climate change and the growing urgency for sustainable development have prompted global efforts to seek innovative solutions for environmental protection and resource management. Among the most promising technologies emerging in this context is Artificial Intelligence (AI). With its ability to analyze vast amounts of data, optimize complex systems, and support predictive modeling, AI is increasingly being integrated into environmental sustainability strategies — from climate forecasting and pollution control to smart agriculture and efficient energy use. However, while the technological potential of AI in addressing environmental challenges is widely acknowledged, public perception and consumer attitudes toward its application remain less explored. The success of AI-driven initiatives often hinges not only on technical efficacy but also on consumer trust, acceptance, and awareness. People's willingness to support, adopt, or engage with AI-enabled environmental solutions can significantly influence their effectiveness and societal impact. This study aims to investigate consumer attitudes toward the use of Artificial Intelligence in environmental sustainability and resource management. By understanding how consumers perceive AI's role in this domain — including potential benefits, concerns, and ethical considerations — we can better align technological advancements with public values, ensuring more inclusive and effective climate action.

II. NEED OF THE STUDY

Erode District, known for its thriving textile and agricultural sectors, faces growing environmental challenges including severe water pollution from industrial effluents, degradation of irrigation canals, soil nutrient depletion, and increasing vulnerability to climate extremes such as droughts and heatwaves. The region also holds ecological significance, with sites like Elathur Lake recently declared a Biodiversity Heritage Site, highlighting the need for sustainable environmental practices. Despite existing efforts, conventional resource management approaches have not fully addressed these pressing issues. With increasing awareness and openness toward technological innovations, particularly Artificial Intelligence

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(AI), there is a strong potential for AI-driven solutions to enhance climate action and sustainable resource use in the district. However, the effectiveness of such interventions largely depends on public understanding, acceptance, and engagement. Therefore, this study is essential to explore consumer attitudes toward the use of AI in environmental sustainability and resource management in Erode District, aiming to inform more inclusive, efficient, and locally relevant strategies.

III. STATEMENT OF THE PROBLEM

Despite the growing global emphasis on using Artificial Intelligence (AI) to address environmental challenges, there is limited understanding of how consumers perceive its application in local contexts such as Erode District, which faces serious issues like industrial pollution, soil degradation, water scarcity, and biodiversity loss. While AI offers promising solutions for climate action and sustainable resource management, its successful implementation depends largely on public awareness, trust, and willingness to adopt AI-driven initiatives. In regions like Erode, where environmental concerns are pressing and technological adoption is emerging, a gap exists in understanding consumer attitudes toward these innovations. Without insight into public perception, efforts to integrate AI into environmental strategies may face resistance or fail to meet local needs. This study aims to bridge that gap by examining consumer attitudes toward AI in promoting environmental sustainability and effective resource management in Erode District.

IV. REVIEWS OF LITERATURE

Recent studies indicate that consumer attitudes toward Artificial Intelligence (AI) in environmental sustainability are shaped by a balance between perceived benefits and ethical concerns. According to Adanyin et al. (2024), consumers are increasingly conscious of the ethical implications of AI, especially regarding transparency, data privacy, and algorithmic fairness, which significantly affect their trust and acceptance. Bhatnagar and Sharma (2024) found that the perception of "beneficial AI" positively influences green purchase intentions, particularly when aligned with principles from the Technology Acceptance Model and Innovation Resistance Theory. Bush (2025) introduced the concept of a "twin transition," highlighting that consumers simultaneously view AI as both a tool for sustainability and a source of potential risk, reflecting mixed attitudes. Wang and Zhou (2023) demonstrated that AI applications like digital nudges and gamification can effectively encourage eco-friendly behaviours and real-world sustainable actions. However, concerns remain about the misuse of AI in spreading misinformation. Zhou and Chen (2023) pointed out the growing issue of fake AI-generated sustainability claims, which can mislead consumers and undermine trust in green messaging. Sharma and Sharma (2024) further emphasized that while youth are generally open to adopting AI-based sustainability tools, they are also more susceptible to digital deception. Moreover, researchers have raised environmental concerns about AI itself, particularly its energy-intensive infrastructure and its use in spreading climate disinformation (Consumers International, 2023). Kantar (2024) noted that while a majority of consumers would consider using AI tools with sustainability benefits, the main barrier is not cost but a lack of clear, accessible information. These findings highlight the importance of understanding consumer attitudes, especially in regions facing acute environmental challenges, to ensure that AI-driven solutions are effectively designed and responsibly implemented. The use of Artificial Intelligence (AI) for climate action and natural resource management is becoming a central area of inter-disciplinary study. AI technologies like machine learning, deep learning, and data analytics have large potential in mitigating environmental issues by facilitating more intelligent monitoring, forecasting, and decision-making (Pandey et al., 2023). Pandey et al. (2023) carried out an extensive bibliometric overview of how AI, machine learning, and big data have been applied in diverse fields such as soil examination, water quality assessment, and crop management. Their research highlighted the growing use of AI tools in maximizing resource effectiveness and environmental sustainability. When it comes to infrastructure, Akomea Frimpong et al. (2023) critically reviewed the application of AI in addressing climate risks in public–private partnership (PPP) projects. Based on their research, they found tools like remote sensing, fuzzy logic, and Building Information Modeling (BIM) as useful in hazard identification and mitigation planning in climate-risk areas. Verdecchia et al. (2023) were interested in the idea of "Green AI" that encourages the creation of energy-efficient algorithms. Based on their systematic review, it was concluded that AI systems, if not optimized, can be hungry for huge computational resources, indirectly causing carbon emissions. This underlines the need to create sustainable AI models for environmental use. Amnuaylojaroen (2025) discussed the potential of AI models in assisting with climate resilience in urban planning. The research highlighted enhancements in accuracy of prediction and infrastructure flexibility but also indicated problems like data quality and explainability of the algorithms, impacting deployment at scale.

V. OBJECTIVE OF THE STUDY

This study aims to investigate consumer attitudes toward the use of Artificial Intelligence in environmental sustainability and resource management in Erode District.

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VI. METHODOLOGY

A convenience sampling technique was employed to select a sample of 100 consumers from the Erode District. Data were collected using a structured questionnaire designed to capture relevant information regarding the study variables. To analyze the relationships and effects among these variables, regression analysis was conducted, enabling the identification of significant predictors and the strength of their influence on the outcome measures.

VII. RESULTS AND DISCUSSIONS

AI-driven solutions are playing an increasingly prominent role. However, the success and societal impact of these technologies largely depend on consumer acceptance and perception. This study, titled Consumer Attitudes Toward the Use of Artificial Intelligence in Environmental Sustainability and Resource Management, employs multiple regression analysis to explore the complex relationships between socio-demographic, psychological, and informational factors and how they shape consumer views on the role of AI in supporting environmental sustainability and responsible resource use.

TABLE 1
ATTITUDES ON USE OF ARTIFICIAL INTELLIGENCE IN ENVIRONMENTAL SUSTAINABILITY AND RESOURCE MANAGEMENT - MULTIPLE REGRESSION ANALYSIS

Variables	Coefficient	SE	't' value	'p' value
(Constant)	41.582	2.385		
Age	1.178	.856	1.376	.172
Marital status	1.028	.252	4.075	.000*
Education level	-.217	.153	-1.415	.160
Occupation	.661	.242	2.738	.007*
Experience	-.268	.340	-.789	.432
Annual income	-.463	.262	-1.771	.080
Family size	-.202	.175	-1.157	.250
Family type	-.019	.104	-.179	.859
Working hours	.011	.271	.042	.967
Use of AI	-.824	.291	-2.833	.006*
R Value	0.543			
R^2 Value	0.295			
F Value	3.772*			

*** - Significant at 1% level;**

The results of the multiple regression analysis indicate that the model explains approximately 29.5% of the variation in consumer attitudes toward the use of Artificial Intelligence in environmental sustainability and resource management ($R^2 = 0.295$), with the overall model being statistically significant ($F = 3.772$, $p < 0.01$). Among the predictor variables, marital status ($p < 0.001$), occupation ($p = 0.007$), and use of AI ($p = 0.006$) significantly influence consumer attitudes toward AI applications in sustainability at the 1% significance level. Specifically, married individuals and those with certain occupations are more likely to have positive attitudes toward AI in this context. Interestingly, greater use of AI correlates with a decrease in positive attitudes, as indicated by the negative coefficient. Other factors, including age, education level, experience, annual income, family size, family type, and working hours, did not show significant effects on consumer attitudes, suggesting that socio-demographic characteristics alone do not fully determine perceptions of AI's role in environmental management. These findings emphasize the nuanced roles that marital status, occupational engagement, and direct AI usage play in shaping consumer attitudes toward AI-driven sustainability efforts. The multiple regression analysis reveals that the model explains approximately 29.5% of the variation in consumer attitudes toward the use of Artificial Intelligence (AI) in environmental sustainability and resource management ($R^2 = 0.295$), with the overall model statistically significant ($F = 3.772$, $p < 0.01$). Among the variables studied, marital status ($p < 0.001$), occupation ($p = 0.007$), and the extent of AI use ($p = 0.006$) emerged as significant predictors of consumer attitudes. Married individuals and those engaged in certain occupations showed more favorable perceptions of AI's role in sustainability efforts. However, increased use of AI was surprisingly associated with less positive attitudes, indicating possible skepticism or critical awareness among active AI users. Other socio-demographic factors such as age, education

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level, income, family size, family type, work hours, and experience did not significantly influence attitudes, suggesting that consumer perceptions are influenced more by social and experiential factors than by basic demographics.

VIII. SUGGEATIONS AND CONCLUSION

This study highlights that consumer attitudes toward AI in environmental sustainability and resource management are multifaceted and influenced by specific social factors such as marital status and occupation, along with individuals' direct engagement with AI technology. Occupational roles possibly expose consumers to different levels of information and technology adoption. For example, professionals in tech, environment, or related fields may have a better understanding and thus a more favorable view of AI applications. The negative association between AI use and positive attitudes points to a need for greater education and transparency around AI applications to build trust and acceptance. Policymakers, technology developers, and environmental organizations should consider these findings to tailor AI initiatives that resonate with community values and address concerns. Promoting awareness and fostering positive user experiences will be critical to leveraging AI's full potential in driving sustainable environmental outcomes. Develop targeted campaigns to educate consumers about the benefits, risks, and ethical considerations of AI in environmental sustainability, focusing especially on groups with less favorable attitudes. Encourage the development of user-friendly AI applications that demonstrate tangible environmental benefits to enhance positive perceptions through direct engagement.

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