

Assessing Public Awareness and Attitudes Toward AI in Green Innovation: Evidence from the Udupi Region

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Abstract: *This study tries to find out the public awareness and attitudes toward the use of Artificial Intelligence (AI) in promoting green innovation within the Udupi region. As the global focus on sustainability grows, AI technologies are gradually being adopted to support environmental solutions. However, the success of these innovations depends not only on technological advancement but also on public understanding and acceptance. Through a structured survey conducted among residents of Udupi, this research discovers the level of awareness about AI applications in environmental sustainability, the perceived benefits, and risks etc. The findings reveal varying degrees of awareness, with younger and more educated respondents showing greater familiarity and more positive attitudes.*

Keywords: Artificial Intelligence, Green Innovation, Attitude, Public Awareness

I. INTRODUCTION

Nowadays, there is a rapid advancement of Artificial Intelligence (AI), which has created new untapped potential for addressing the new challenges of the 21st century, basically it is focus on environmental sustainability. Across the globe, AI-driven solutions are getting used in areas such as renewable energy management, smart agriculture, waste reduction, smart waste management, pollution control, and climate change mitigation. By enabling data-driven decision-making and optimizing resource utilization, AI has emerged as a critical tool in promoting green innovation and sustainable development.

Even though the growing importance of AI in protecting the environment is a need in the 21st century yet public acceptance and awareness about such technology are uneven, especially related to public response, attitude, trust, and perception towards the adoption of AI in society. Several factors affect how society perceives the role of AI in delivering sustainable solutions, like cultural values, beliefs, technical knowledge, media exposure, and concern towards environment.

In India, people are not much concerned about environmental degradation, waste management, and the consumption of energy. AI in Green innovation has extreme potential. But the success of these innovations not only depends on the use of technology but also on public acceptance and support. To design effective strategies to promote environmental solutions driven by AI, policymakers, local authorities, and innovators must understand the extent of public awareness, public response, and public attitude

Udupi, a coastal district of Karnataka, popularly known for its enriched natural resources, cultural richness, growing urbanization, and concern towards the environment, especially in relation to protecting the environment, saving coastal ecology, waste management, and for sustainable development, presents an interesting study to know about how the people of Udupi district perceive the role of AI in addressing these challenges.

This study is intended to fill these gaps by assessing public awareness, attitude, and perception towards AI in green innovation with special reference to the Udupi region. This study examines the factors influencing public opinion, like



cultural values, beliefs, media exposure, education, concern towards the environment, and technical literacy, which can provide useful observations for innovators, policy makers, researchers, and practitioners to study AI in environmental sustainability.

II. OBJECTIVES

- To examine public awareness regarding the role of AI in promoting green innovation and sustainability.
- To analyze public perceptions, attitudes, and trust towards using AI in green innovation.
- To examine how technological literacy impacts public support for AI-based sustainability initiatives.
- To analyze the influence of perceived affordability and accessibility of AI-based green technologies on public willingness to adopt them in Udupi.

III. RESEARCH METHODOLOGY

3.1. Research Design

This study administered a descriptive and analytical research design. A descriptive method was applied to study the public awareness and perception, and an analytical method was used to evaluate the relationship between factors like use of media, education, cultural values and beliefs, technical literacy, and environmental concern with the point of view towards AI in green innovation.

3.2. Study Area

This research is conducted in the Udupi region, Karnataka, a region well-known for its distinctive ecological setup and challenges related to environmental concerns. This region provides a suitable environment to study how communities react and how AI responds with its role in green innovation while promoting sustainable practices.

3.3. Population and Sampling

The target respondents used in this study are residents of the Udupi district, including the public, students, entrepreneurs, and professionals. A total sample size of 104 respondents was used for the study, ensuring the adequacy of reliable findings. The stratified random sampling is used for this study, ensuring characterization of demographic elements like age, gender, education level, and occupation.

3.4 Data Collection Methods

Primary Data: Data collected using a structured questionnaire using both closed-ended and Likert scale questions to measure attitudes, perceptions, trust, and awareness toward AI in green innovation.

Secondary Data: Information gathered from research articles, journals, and online resources related to AI, comprehensiveness, sustainability, and green innovation.

IV. DATA ANALYSIS

Descriptive statistics are used to analyze data (frequency distribution, mean, and percentage) and inferential statistics (chi-square test, correlation, and regression analysis) to understand the relationship between variables. For better interpretation and presentation of facts, the study used graphs and charts.

V. SCOPE OF THE STUDY

The study focused on the Udupi region. This study is based on responses collected from the public, which may be biased to some extent, but the study concentrates on public awareness, perception, and attitude that can be useful for innovators and policymakers in supporting AI in green innovation.



VI. LIMITATIONS

This study is restricted to the Udupi Region.

Due to time constraints, the sample size of the study is limited to 104 respondents.

Data collected may include personal bias and a lack of detailed knowledge about AI. Hence, all the responses were collected through a questionnaire.

AI is a new concept, which is a completely new concept for common people. Hence, collecting equivalent data was a little difficult.

VII. REVIEW OF LITERATURE

7.1 Essam Hussain Al Lawati, Musab A. M. Ali, Nooritawati Md Tahir, 23 Aug 2024

Came up with a study which recommends the importance of AI in green innovation can be built with improved public awareness and positive attitude for positive technical advancement, and companies were recommended to increase awareness and adopt green products for more feasible output.

7.2 Qiang Yang, Tingting Sun, Rongrong Li, 25 Dec 2023

The paper identified the relationship between AI and green energy, the role of AI in emphasizing economic development, and how AI affects industrial structure and human capital. A positive correlation found in this study between AI and green innovation and developed countries shows a stronger relationship between AI and green innovation than in most the developing countries.

7.3 Murtaza Hussain, Shaohua Yang, Umer Sahil Maqsood, R. M. Ammar Zahid, 7 Feb 2024

This paper identified that concepts like higher artificial intelligence adoption (AIA) are relatively positive to green innovation, among many Chinese private firms that are built strongly with the help of concerned analysts through increased information sharing and critical observation, and these Private companies are more likely to adopt green innovation than any other mode of business.

7.4 Ying Ying, Shanyue Jin, 1 Mar 2024

This study identified that the effect of board social capital has reduced, highlighting complexity between organizational resources and AI in promoting, although adoption of AI positively impacts innovation related to green products, in which employees and board human capital increases its effect.

7.5 SirinantKhunakornbodintr, 25 Apr 2024

This paper identified that the Integrated AI helps in enhancing the performance of enterprises with green innovation, especially in Chinese firms that follow the net-zero transition goal, and these firms with green technology support excelling in distinct AI integration.

VIII. HYPOTHESIS

H11: There is a significant association between educational qualification and awareness that AI can be used in promoting green innovation and sustainability.

H01: There is no significant association between educational qualification and awareness that AI can be used in promoting green innovation and sustainability.

H12: Public trust in AI positively influences their perception of its role in green innovation.

H02: Public trust in AI does not influence their perception of its role in green innovation.

H13: Technological literacy significantly affects support for AI-based sustainability initiatives.

H03: Technological literacy does not significantly affect support for AI-based sustainability initiatives.

H14: Perceived affordability and accessibility of AI-based green technologies significantly influence public willingness to adopt them in Udupi.

H04: Perceived affordability and accessibility of AI-based green technologies do not significantly influence public willingness to adopt them in Udupi.



IX. CONCEPTUAL FRAMEWORK

The 21st century is witnessing rapid changes in technology and the adoption of AI (Artificial Intelligence) in different sectors, playing a significant role in driving innovation. Artificial intelligence contributes to sustainability by offering advanced tools like monitoring, smart energy management, sustainable urban planning, and the use of analytical tools. Both AI and green innovation together contribute a significant role in accomplishing the objectives of SDGs (United Nations Sustainable Development), especially SDG 13 for Climate action, SDG 11 for Sustainable cities and communities, and SDG 7 for Affordable and Clean Energy.

From the regional context, understanding public perception is equally important as innovations from industries. Especially in a region like Udupi, which is known for its rice culture, ecological features, and growing need for technology, demands a study on community perception about AI-driven solutions. Local community attitude may be formed by factors like demographic factors (age, gender, educational level), cultural values and beliefs, occupation (service sector, agriculture, fisheries), and media exposure about AI and sustainability.

Theoretically, two concepts drawn from the theory of public awareness and the technical acceptance model suggest that attitude, awareness, risk perception, trust, and usefulness of technology influence acceptance of technology. Local community perspectives on AI in sustainability in the Udupi region are different from the global discourse.

X. THEORETICAL BACKGROUND

This study with a content of public awareness and attitudes towards green innovation from AI, grounded with a theoretical base that clarifies how aware, understand, accept, and respond to technologies that influences sustainability.

Technology Acceptance Model According to Davis TAM theory, both PU (perceived usefulness and PEOU (Perceived Ease of Use) directly affect shaping attitude and behavior to accept and adopt any new technology.

The diffusion of innovation theory of Rogers identified how persuasion (attitude), confirmation, knowledge stage (Public awareness), decision, and implementation help in spreading new technologies. Due presence of diverse socio-economic groups may influence their adoption pattern depending on education, cultural orientation, and exposure.

The framework of planned behavior by Ajzen explained that attitude towards subjective norms, perceived behavioral control, and behavior influence an individual's intent to act. Not only the personal belief solely influential on public attitude towards green innovation with AI, but it also depends on social preferences (community, institution, and peer), and willingness to adopt AI-based practice.

This theory describes that public response to technology plays a significant role in balancing potential risk with perceived benefits. When it comes to AI, the most concerning areas are the side effects of technological deployment on the environment, data risk, and job displacement. To shape trust in innovation, representation of AI by the media and public awareness are equally important. AI for green innovation can be adopted by the local public, depending on the social, economic, cultural, and institutional environment influences how local people understand and respond to the adoption of AI based on local values, beliefs, traditional values, and occupation.

This theory specifically showcases the balance between social equity, economic growth, and environmental protection. AI-generated solutions offered optimization of resource use and climate change mitigation. Public awareness and support are extremely crucial for the success of AI-driven innovations.

These theories bring out the need for public awareness to drive knowledge and exposure at the same time; public attitude gets shaped by social influence, risk, cultural values, and perceived benefits.

Theories like (TAM) technology acceptance model, (DOI) diffusion of innovation, and (TPB) theory of planned behavior explain how adoption is influenced by relative and behavioural factors, while the context of risk and sociotechnical norms highlights conceptual influences. Therefore, the theoretical background helps to analyse how communities in the Udupi region evaluate, respond, and understand AI in green innovation with a multi-dimensional lens.



XI. DATA ANALYSIS AND INTERPRETATION

Table 1

Descriptive Statistics

	Age	Gender	Educational Qualification	Occupation
N	104	104	104	104
Range	3	1	2	4
Mean	2.09	1.60	2.94	1.34
	.049	.048	.027	.068
Std. Deviation	.505	.493	.273	.691
Skewness	1.089	-.398	-5.207	2.857
	.237	.237	.237	.237
Kurtosis	4.045	-1.878	29.315	10.154
	.469	.469	.469	.469

Source: Primary Data

The descriptive statistics provided insight into the sample’s demographic characteristics. The respondents (N = 104) show that the majority belonged to the middle age group (mean = 2.09) with relatively low variation, while gender distribution (mean = 1.60) indicates a fairly balanced representation of male and female participants. In terms of educational qualification, most respondents possessed higher academic degrees (mean = 2.94), with responses highly clustered toward postgraduate levels, as reflected in the strong negative skewness and high kurtosis values. Occupational status (mean = 1.34) revealed that a large proportion of the sample was concentrated in the lower occupational categories, likely students, or early-career professionals, with a positively skewed and peaked distribution. Overall, the demographic analysis suggests that the sample was dominated by well-qualified young respondents, providing relevant insights into the study context.

Hypothesis Testing:

H₁₁: There is a substantial association between Education Qualification & the Awareness of AI in Green Innovation.

Table 2

Chi-Square Test Result for Educational Qualification and AI Awareness

Test	Chi-Square	df	Asymp. Sig.	Minimum Expected Cell Frequency
Educational Qualification	179.212 ^a	2	.000	34.7.
AI Awareness	60.077 ^b	3	.000	26.0.

Source: Primary Data

The chi-square test results demonstrate that educational qualification ($\chi^2 = 179.212$, $df = 2$, $p < 0.05$) and AI awareness ($\chi^2 = 60.077$, $df = 3$, $p < 0.05$) vary significantly among respondents. This indicates that the sample is heterogeneous in the context of education and awareness of AI’s role in sustainability. While the chi-square confirms significant



variation, it does not establish a direct relevance between education and awareness; therefore, regression analysis was employed to test the research hypothesis (H11).

H₁₂: Public trust in AI positively influences their perception of its role in green innovation.

Table 3: Chi-Square Test Result for attitudes and perception on trust in AI-enabled technologies and the environmental role of AI

	Chi-Square	Df	Asymp. Sig.	Minimum Frequency	Expected Cell
Perception on the Environmental Role of AI	86.577 ^a	4	.000	20.8	
Trust in AI-enabled technologies	101.192 ^a	4	.000	20.8	

Source: Primary Data

The chi-square analysis demonstrated that both **perception of the environmental role of AI** ($\chi^2 = 86.577$, $df = 4$, $p < 0.05$) and **trust in AI-enabled technologies** ($\chi^2 = 101.192$, $df = 4$, $p < 0.05$) were statistically significant. These results indicate that respondents' views regarding AI's contribution to environmental protection and their trust in AI-enabled technologies were distributed without variation across the sample. Instead, there were significant variations in how participants perceived the contribution of AI in sustainability and the extent to which they trusted AI-enabled technologies. This highlights the diversity of attitudes and perceptions among respondents, reinforcing the need to further examine how trust in AI shapes positive perceptions of its role in sustainability.

H₁₃: Technological literacy affects support for AI-based sustainability initiatives.

Table 4: Confidence in Using Modern Technologies and Its Role in AI Sustainability Support Descriptive Statistics

	How confident are you in using modern technologies (smartphones, apps, digital payments, etc.)?
N	104
Range	2
Mean	1.11
	.033
Std. Deviation	.339
Skewness	3.334
	.237
Kurtosis	11.437
	.469

Source: Primary Data

The analysis of confidence in using modern technologies shows a **mean score of 1.11**, indicating that, on average, participants reported a high level of confidence. Since the data is highly positively skewed (Skewness = 3.334), the **median** is likely lower than the mean, reflecting that most respondents clustered at the higher end of confidence, while a few extremely low scores pulled the mean upward. Similarly, the **mode** would represent the most common response, which is expected to align with the greater confidence category, given the sharp peak (Kurtosis = 11.437). This suggests that while most respondents are consistently confident, a small proportion with very low confidence levels affects the overall distribution.



Table 5: The regression displays that there is a **positive relationship between** people’s trust in AI-enabled technologies and their belief that AI can help protect the environment.

	Model
	1
R	.322 ^a
R Square	.103
Adjusted R Square	.095
Std. Error of the Estimate	.874

Source: Primary Data

The regression results present that there is a **small positive relationship** between people’s trust in AI-enabled technologies and their belief that AI can help protect the environment. The value of **R = .322** means the connection is weak but still present. The **R Square = .103** tells us that trust in AI explains about **10% of the belief** that AI can contribute to sustainability, while the rest is influenced by other factors. The adjusted R Square (.095) gives a similar result, and the standard error (.874) means there is still quite a bit of variation in responses. This means that while trust in AI has some effect on how people see its role in protecting the environment, **many other components also play an important role.**

Table 6: Coefficients show that trust in AI-enabled technologies has a clear and positive effect on how people see AI’s role in protecting the environment.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.621	.790		2.052	.043
	Educational qualifications of the respondents	.028	.267	.010	.103	.918

Source: Primary Data

The results show that trust in AI-enabled technologies has a clear and positive effect on how people see AI’s role in protecting the environment. The constant value (2.494) is the baseline perception when trust is at its lowest. The coefficient for trust (B = 0.450, p = .001) means that for every one-step increase in trust on the Likert scale, people’s belief in AI’s contribution to sustainability also increases by about 0.45 points. The standardized coefficient (Beta = .322) shows that this effect is moderate but meaningful. Since the result is statistically significant (p = .001), we can confidently say that higher trust in AI makes people more likely to believe AI can help the environment.

ANOVA Test result for perception of awareness of AI can be used in promoting green innovation and sustainability.

Education	Sum of Squares	df	Mean Square	F	Sig.



Between Groups	.255	2	.127	.232	.794
Within Groups	55.505	101	.550		
Total	55.760	103			

Source: Primary Data

The test ANOVA shows that there is **no significant difference** in people's awareness of how AI can be used in areas like precision farming, waste management, or renewable energy. The result ($F = 0.232$, $p = .794$) means that the level of awareness is **similar in all groups**, and some small differences are found not statistically meaningful. In simple terms, most respondents have about the same level of awareness regarding AI's role in promoting sustainability.

ANOVA Test result for perception on belief in AI-based green technologies would be affordable and accessible to people in the Udupi region

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.087	3	.029	.111	.954
Within Groups	26.288	100	.263		
Total	26.375	103			

Source: Primary Data

The ANOVA results measured whether there are any significant differences in perceptions of the affordability and accessibility of AI-based green technologies among respondents in the Udupi region. The analysis produced an **F-value of 0.111 with a significance level of $p = .954$** , which is far above the 0.05 threshold. This signifies that there are **no statistically significant differences** in perceptions across the groups. In other words, respondents, regardless of their background or group classification, generally share similar views about the affordability and accessibility of AI-based green technologies in the Udupi region. These findings suggest a broad consensus among participants, with only minimal variation in responses that is not statistically meaningful.

XII. FINDINGS

Different age group influences understanding and adoptability towards AI-driven products. Younger respondents (21-30 years old) are more likely to find sustainable benefits generated from AI-based innovations than respondents of 18-20, 41-50, and above 50 years of age.

Out of the total respondents, 59.8% of respondents are female, and only 40.2% of respondents are male.

Most of the respondents, around 95.3% are postgraduates, and this study reflects the perspectives of highly educated individuals. The skewness and kurtosis values highlight that responses are concentrated around a specific group, that is, postgraduates.

Many the respondents were early-career professionals or students, and fewer respondents are in higher occupational categories. Dominant response from well-qualified young individuals makes it relevant for the study.

Based on chi-square analysis, AI awareness and educational qualification have less relevance among respondents. Both AI awareness and education are heterogeneous; however, the study confirms the importance of the presence of both variables, but without forming any direct relationship between them.

Participants have diverse responses towards AI sustainability. In which the perception of participants towards environmental protection using AI and trust towards AI-enabled solutions significantly differ.

The study identified majority of respondents are technically confident, and a small group of respondents are less confident.



The study highlights that the perception about trust towards AI is influenced by its environmental role, but at the same time, other determinants are also equally important.

The analysis confirms that the participants share a similar understanding, and greater trust in AI-based technology enhances a positive perception of AI's role in promoting sustainability.

Irrespective of the respondent's classification and background, their view on AI-driven innovation is similarly viewed and perceived. There is no significant difference in how affordability and accessibility of AI in green innovation are perceived.

XIII. SUGGESTIONS

The above finding suggested that most of the younger generation are most likely to adapt to AI easily, but for the older generation, concerned training should be given to utilize the practical benefits of AI-driven sustainability.

As the study revealed majority of respondents are female. To ensure future balanced participation, encourage the involvement of more males in adopting AI for sustainability.

The study can be confidently used by academicians, postgraduates, policy makers, and professionals to utilize as change agents to promote AI-based innovation for sustainability.

Creating and building trust in AI-based innovation through ethical AI practices, transparent policies, and success stories should be encouraged.

To form a direct relationship between awareness and education, more research and strategies are needed that can determine relevance, like accessibility, affordability, and cultural attitude.

Focusing and encouraging innovations in AI-based green technologies to make technology practical and make it more affordable for all groups.

XIV. CONCLUSION

This study on "Assessing Public Awareness and Attitudes Toward AI in Green Innovation: Evidence from the Udupi Region" intended to study factors like attitude, awareness, technical literacy, adoption, and perception towards AI in sustainability related to green innovation. In the group of respondent's young locals are more likely to adopt AI-based green innovation, where elders need to be trained to use AI's especially male participants, must be encouraged to use AI-driven solutions. Being aware of AI solutions and education does not have any direct relationship, but trust and confidence play a very significant role in designing a positive attitude in public. Promoting transparency, adopting ethical practices, and the invention of cost-effective solutions can change public attitude positively towards AI-generated solutions; at the same time, affordability and accessibility in all groups are perceived similarly. This study suggested that academicians, professionals, and policymakers act as change agents to promote AI in fostering trust, awareness, and adoption. Overall, in the Udupi region, AI has strong potential to advance sustainability if it is backed by inclusive strategies, practical accessibility, and balanced participation.

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