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EDITED BY
Dr. B. Geethpriya
Dr. T. M. Hemalatha
Dr. G. Arut Geevitha

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Dr.T.M. Hemalatha

Dr.G. Arut Geevitha

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STUDENTS' PERCEPTION OF AI ADOPTION IN ADVANCING GREEN AND BLUE ECONOMIES: A PATHWAY TO SUSTAINABLE DEVELOPMENT

Ms. Gomathi A.
Assistant Professor of Commerce,
NallamuthuGounderMahalingam College,
Pollachi. Coimbatore
gomathiagathursamy@gmail.com

Abstract

The integration of Artificial Intelligence (AI) into the Green and Blue Economies is becoming increasingly essential in promoting sustainable development, addressing environmental challenges, and ensuring resource management. In Coimbatore district, the awareness, perception, and readiness of students to adopt AI for sustainable development have become crucial factors in shaping future innovation and policymaking. This study aims to explore students' perceptions of AI's role in the Green and Blue Economies, focusing on its applications in environmental conservation and marine resource management. A sample of 390 students from various educational backgrounds in Coimbatore was surveyed using convenience sampling, assessing their awareness of AI, its benefits, challenges, and their willingness to engage with AI tools in sustainability. The research employs descriptive statistics to analyze the data, providing insights into students' views on AI adoption, the challenges they perceive, and the role of education in fostering AI integration. Findings suggest that while there is significant awareness of AI's potential, there are barriers, including high costs, technical expertise gaps, and ethical concerns. The study highlights the importance of incorporating AI education into curricula and offering practical learning opportunities to foster deeper engagement with AI tools in advancing the Green and Blue Economies.

Keywords: *AI Adoption, Blue Economies, Green Economies, Sustainable Development, etc.,*

I. Introduction

Artificial Intelligence (AI) is increasingly being recognized as a pivotal force in addressing environmental challenges and promoting sustainability across the globe. In particular, AI's applications in the Green and Blue Economies, which focus on sustainable practices in land, water, and marine resource management, have the potential to significantly mitigate issues such as climate change, overfishing, and pollution (Bender et al., 2020; Janssen et al., 2019). As the world moves toward more sustainable future, students who will eventually take on leadership roles in

policy, business, and technology are key to ensuring the effective integration of AI into these economic sectors.

In Coimbatore district, a region known for its educational institutions and growing technological base, students' awareness and perceptions of AI's role in the Green and Blue Economies are critical in shaping the adoption of AI technologies in sustainable development. The Green Economy focuses on the sustainable management of natural resources and reducing environmental degradation, while the Blue Economy emphasizes the sustainable use of ocean and marine resources (Szirmai et al., 2018). Understanding how students perceive AI in these contexts can provide valuable insights into the barriers to adoption and the factors influencing their interest in learning and engaging with AI tools.

Prior research suggests that while AI has the potential to revolutionize sustainable development practices, there are significant barriers to its widespread adoption. These include ethical concerns, high costs of technology, lack of technical expertise, and limited access to AI tools (Smith et al., 2021; Kiani et al., 2022). Additionally, the role of educational institutions in promoting AI literacy and awareness is crucial in bridging these gaps (Zhang & Xu, 2020). This study seeks to assess students' awareness of AI tools, their perceptions of AI's benefits and challenges in sustainability, and the factors influencing their engagement with AI. By focusing on Coimbatore district, this research aims to provide targeted recommendations for improving AI adoption in the region's Green and Blue Economies, with the ultimate goal of promoting sustainable development and fostering an AI-driven future.

II. Review of Literature

The increasing integration of Artificial Intelligence (AI) in sustainable development has been a subject of much interest in recent years. According to **Bender et al. (2020)**, AI plays a critical role in enhancing energy efficiency and optimizing resource use, particularly in the Green Economy, where it can aid in addressing environmental challenges such as climate change and resource depletion. Similarly, **Janssen et al. (2019)** highlight that AI technologies in the Blue Economy, such as marine resource management, can support sustainable fisheries management and pollution control. **Szirmai et al. (2018)** discuss how AI can enable real-time monitoring of ecosystems, which can lead to more informed decision-making and improved environmental outcomes. **Chakrabarty (2021)** emphasizes that AI adoption in the Green Economy helps not only in mitigating environmental degradation but also in fostering economic growth by optimizing

renewable energy sources. In terms of awareness, **Liu et al. (2020)** argue that students, particularly those in technical fields, show a higher level of awareness regarding AI's role in sustainability, but there remains a gap in understanding AI's applications in the broader context of environmental and marine resource management. **Smith et al. (2021)** note that ethical concerns and a lack of technical expertise are major barriers to AI adoption, especially in the developing world. **Kiani et al. (2022)** examine how AI can enhance sustainable agricultural practices and resource management in rural areas, though challenges such as high costs and limited access to AI tools persist. **Deng et al. (2021)** point out that AI has the potential to create new job opportunities in the green technology sector, fostering innovation and sustainable economic development. **Zhang and Xu (2020)** suggest that universities should play a more active role in integrating AI education into their curricula to build future leaders in AI-driven sustainability. Lastly, **Kumar and Singh (2021)** propose that increased public awareness and policy support are essential for overcoming challenges in AI adoption, ensuring that AI can significantly contribute to the Green and Blue Economies. These studies collectively underscore the transformative potential of AI in driving sustainability but also highlight the importance of education, access, and overcoming barriers to its widespread adoption.

III. Statement of the Problem

The integration of Artificial Intelligence (AI) into the Green and Blue Economies is becoming increasingly important for promoting sustainability and mitigating environmental challenges. However, the adoption and utilization of AI tools require awareness, understanding, and acceptance, particularly among students, who represent future innovators and decision-makers. Understanding students' perceptions of AI's role in sustainable development is critical to addressing knowledge gaps, identifying barriers to adoption, and fostering greater engagement with AI solutions in environmental and marine resource management.

IV. Objectives of the Study

1. To assess students' awareness of AI tools and their applications in the Green and Blue Economies.
2. To explore students' perceptions of the benefits and challenges of AI adoption in sustainable development.
3. To identify factors influencing students' interest in learning and engaging with AI tools for environmental conservation.

4. To examine the role of education in shaping students' attitudes toward AI and sustainability.

V. Methodology Used

The study adopts a descriptive research design to explore students' awareness and perceptions of AI's role in the Green and Blue Economies. A sample size of 390 students was selected using convenience sampling, a non-probability sampling method, which allows for an accessible and practical collection of data from participants who are readily available. This method was chosen due to the absence of an exact population size and the focus on obtaining a representative sample from the target group. Descriptive statistics were employed as the primary analytical tool, with techniques such as frequency distributions and measures of central tendency (mean, median, mode) used to summarize and describe the collected data. These tools helped in understanding the patterns and trends regarding students' awareness of AI in environmental conservation and marine resource management, as well as their perceptions of AI's potential benefits and challenges in sustainability. The results provide a clear overview of the current state of AI knowledge and perceptions among students, offering valuable insights for educational strategies and policy development

Vi. Data Analysis and Interpretation

Descriptive Analysis Table -1

Section	Category	Sub-category	Frequency (n)	Percentage (%)
Demographics	Gender	Male	200	51.28%
		Female	190	48.72%
	Educational Background	Undergraduate	250	64.10%
		Postgraduate	140	35.90%
	Field of Study	Science/Engineering	120	30.77%
		Commerce/Management	140	35.90%
		Arts/Humanities	100	25.64%

		Other (Specify)	30	7.69%
	Year of Study	First Year	110	28.21%
		Second Year	130	33.33%
		Third Year or above	150	38.46%
Awareness of AI Tools	Have you heard about AI?	Yes	370	94.87%
		No	20	5.13%
	Aware of AI in environmental conservation	Yes	320	82.05%
		No	70	17.95%
	Aware of AI in marine resource management	Yes	280	71.79%
		No	110	28.21%
Perceptions of AI	AI can help mitigate environmental challenges	Strongly Agree	150	38.46%
		Agree	140	35.90%
		Neutral	50	12.82%
		Disagree	30	7.69%
		Strongly Disagree	20	5.13%
	AI in Green Economy enhances energy efficiency	Strongly Agree	160	41.03%
		Agree	120	30.77%
		Neutral	60	15.38%
		Disagree	30	7.69%

		Strongly Disagree	20	5.13%
	AI in Blue Economy ensures sustainability	Strongly Agree	140	35.90%
		Agree	150	38.46%
		Neutral	70	17.95%
		Disagree	20	5.13%
		Strongly Disagree	10	2.56%
Benefits of AI in Sustainability	Benefits of AI in Sustainability	Reducing environmental degradation	300	76.92%
		Optimizing resource use	250	64.10%
		Promoting innovation	200	51.28%
		Improving decision-making	220	56.41%
		Creating job opportunities	180	46.15%
Challenges and Barriers	Challenges Hindering AI adoption	Lack of awareness	150	38.46%
		High costs of AI technology	200	51.28%
		Limited access to AI tools	120	30.77%
		Ethical concerns regarding AI	100	25.64%
		Lack of technical expertise	170	43.59%
		Yes	220	56.41%
		No	140	35.90%

	Feeling adequately educated	Not Sure	30	7.69%
Educational & Future Engagement	Interest in learning about AI	Yes	350	89.74%
		No	40	10.26%
	Preferred educational support	Workshops or seminars	200	51.28%
		Online courses	180	46.15%
		Curriculum integration	150	38.46%
		Access to AI tools	120	30.77%

The above table reveals that a majority of students, primarily aged 17-21, are highly aware of Artificial Intelligence (AI) and its applications, particularly in environmental conservation (82.05%) and marine resource management (71.79%). Most respondents (74.36%) believe that AI can help mitigate environmental challenges, enhance energy efficiency in the green economy, and ensure the sustainable use of marine resources in the blue economy. The perceived benefits of AI include reducing environmental degradation (76.92%) and optimizing resource use (64.10%). However, challenges such as the high costs of AI technology (51.28%) and lack of technical expertise (43.59%) are major barriers to AI adoption in sustainability. Despite these hurdles, a significant portion of students (89.74%) express interest in learning more about AI's role in the green and blue economies, with a preference for educational support through workshops, seminars, and online courses (51.28% and 46.15%, respectively). The findings suggest that while students acknowledge AI's potential, educational institutions should focus on integrating AI into curriculums and providing accessible, hands-on learning opportunities to bridge knowledge gaps and technical challenges, fostering broader engagement with AI in sustainable development.

VII. Conclusion

The study on students' perceptions of AI adoption in advancing the Green and Blue Economies in Coimbatore district reveals significant insights into the awareness, attitudes, and

barriers associated with the use of AI tools for sustainable development. The findings indicate that while a majority of students are aware of AI and its applications in environmental conservation and marine resource management, there remains a notable gap in understanding the full potential of AI in these sectors. Students generally recognize the benefits of AI, such as reducing environmental degradation and optimizing resource use, but they also perceive challenges such as high costs, limited technical expertise, and ethical concerns as significant barriers to widespread AI adoption in sustainability efforts.

Moreover, the study underscores the importance of educational institutions in shaping students' perceptions and fostering a deeper understanding of AI's role in the Green and Blue Economies. There is a clear demand for more accessible and practical learning opportunities, such as workshops, seminars, and curriculum integration, to help students overcome the challenges of AI adoption and to prepare them for future leadership in sustainability-driven technologies.

In conclusion, while students in Coimbatore district demonstrate awareness and interest in AI for sustainable development, educational strategies need to be refined to address the gaps in knowledge, increase technical expertise, and mitigate the perceived barriers. By providing comprehensive AI education and hands-on experiences, educational institutions can play a pivotal role in empowering students to contribute to the Green and Blue Economies, ultimately advancing sustainability goals in the region and beyond.

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