

Integrating AI in Sustainable Writing: An Empirical Investigation of the Technology Acceptance Model in Asian Social Sciences

Muhammad Farooq ¹, Hafsa Qadir Buzdar ², Yuen Yee Yen ³, Allah Bakhsh ⁴

¹ Multimedia University Cyberjaya, Malaysia, & Department of Business Administration, Emerson University, Multan, Pakistan

² NUML, Multan Pakistan

³ Faculty of Business, Multimedia University, Malaysia

⁴ TIMES Institute Multan Pakistan

muhammad.farooq@mmu.edu.my

Abstract. This empirical study analyzes Asian university students' acceptance of artificial intelligence (AI) writing tools to promote sustainable writing practices using the technology acceptance model (TAM). A survey of 385 students assessed perceived usefulness and ease of use on shaping AI attitudes and intentions. Results indicate the prominence of utility over simplistic usage barriers with manifold ethical obligations for institutional oversight. The findings illuminate AI writing tools' significance in sustainable writing. AI technologies improved grammar, style, readability, and content production for participants. The tools saved time and helped pupils write well. This study illuminates how AI writing tools affect social science writing sustainably. These findings can help teachers use AI tools responsibly and improve students' writing and academic performance. To retain authenticity and academic integrity, the study emphasises ethical issues and responsible AI tool use. Educators and policymakers may responsibly integrate AI tools into social science education by assessing students' aspirations to use AI for sustainable writing and what influences their acceptance. Future study should also examine how AI writing tools promote sustainable writing practises across disciplines.

Keywords: AI Adoption, Sustainable Writing, Social Sciences, Technology Acceptance Model, Perceived Usefulness, Perceived Ease Of Use, Attitude Towards AI

1. Introduction

Sustainability is ability to continue some activity over a period of time (Cambridge 2023). Sustainable writing is about sustaining the writers ability to continue writing even after introduction of Artificial Intelligence (AI) tools. In recent years, the integration of AI technology has shown immense potential for transforming various domains, including the field of social sciences. One area that has gained increasing attention is the application of AI in sustainable writing practices (Fernandez et al., 2023; Zhang et al., 2021). Sustainable writing entails the creation of scholarly content that is environmentally friendly and socially responsible, aligning with the principles of sustainable development. However, the adoption of AI technology in sustainable writing practices within the social sciences remains relatively unexplored (A. V. Y. Lee, 2023).

The need to investigate the integration of AI in sustainable writing practices stems from several reasons (Markowitz et al., 2023). First, AI technology offers numerous advantages that can significantly enhance the writing process in terms of effectiveness, efficiency, and overall academic performance (Quynn & Stewart, 2021). It has the potential to assist students in generating high-quality content, conducting data analysis, and improving the overall research workflow. By harnessing AI capabilities, students may be able to produce scholarly work that is more impactful and aligned with sustainable development goals (Caluori, 2023; Hu, 2023).

Despite the potential benefits, there is a lack of research on social science students' intentions to use AI for sustainable writing. Understanding students' attitudes and perceptions regarding the adoption of AI technology is essential for implementing it successfully into educational contexts. Educators and policymakers can develop strategies to promote the responsible use of AI technology in sustainable writing practices by investigating students' intentions. (Mair, 2022). Consequently, the purpose of this study is to examine students' intentions to employ AI for sustainable writing in the social sciences. This study utilises the technology acceptability model (TAM) to investigate the factors that influence students' acceptability of AI technology for sustainable writing. In particular, the researchers have investigated the relationships between perceived usefulness, perceived ease of use, attitude towards artificial intelligence, and students' intentions to implement AI in their writing practices. Understanding students' intentions and perceptions is crucial for fostering the responsible use of AI technology and promoting sustainable writing practices in the social sciences by creating an enabling environment (Mahalakshmi et al., 2019).

The significance of this study lies in its potential to contribute to the existing literature by exploring the integration of AI technology in sustainable writing practices. The findings are expected to inform educational institutions about the factors that influence students' intentions and guide them in effectively incorporating AI technology into the social science curriculum. Furthermore, understanding students' attitudes towards AI adoption can help policymakers develop policies and initiatives that promote the responsible and sustainable use of AI technology in academic contexts. Over half of U.S. students anticipate increased AI usage in the next six months, contrasting with only 3 percent of university leaders considering themselves frequent AI users. While students express optimism about AI revolutionizing teaching and learning, over 30 percent of U.S. leaders deem AI unethical for higher education, with notable concerns about plagiarism and a majority worldwide advocating for human expertise in generating answers (Coffey, 2023).

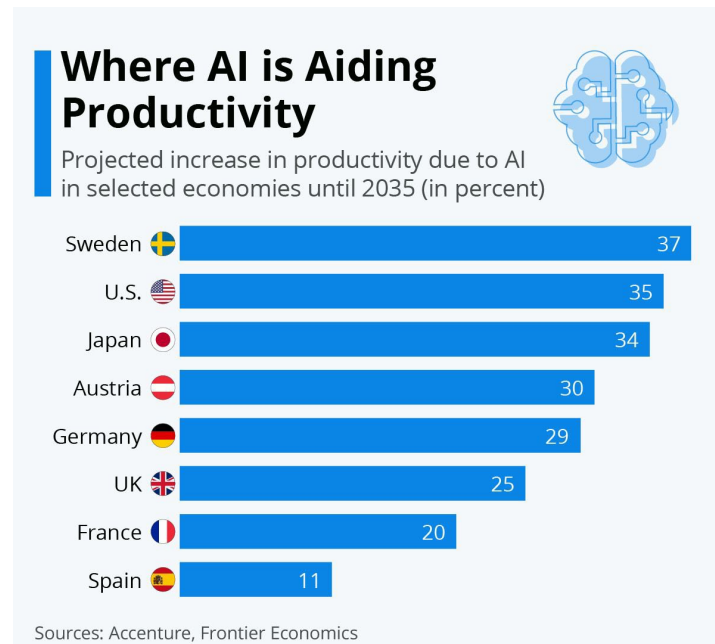


Fig.1: Projected Increase in Productivity Due to AI

2. Literature Review

The technology acceptance model (TAM) provides a theoretical framework for understanding individuals' acceptance and adoption of new technologies. TAM posits that perceived usefulness and perceived ease of use are key determinants of users' attitudes and intentions towards adopting a technology. Perceived usefulness refers to the degree to which individuals believe that using a particular technology will enhance their performance and effectiveness in completing tasks (Cassetta et al., 2022). Individuals' intentions to employ ai technology for sustainable writing are heavily influenced by their perception of its utility. Students in the social sciences may view AI as a useful resource for improving the quality and efficacy of their writing (Stevens & Voegelé, 2019). Tools propelled by artificial intelligence can assist with tasks such as extracting insights from large datasets, automating citation formatting, and enhancing language usage. When students perceive ai to be beneficial for sustainable writing, they are more likely to embrace its implementation. The influence of perceived usability on AI acceptability for sustainable writing students' intentions to implement ai technology for sustainable writing are also influenced by the perceived simplicity of its use. If students perceive AI tools as user-friendly and straightforward to navigate, they are more likely to surmount any perceived barriers or complexities associated with the technology (McCrary & Holmes, 2022).

User-friendly interfaces and intuitive features can enhance the ease of use, making AI technology more accessible and appealing to students (Esplugas, 2023; Perkins et al., 2023). When AI technology is perceived as easy to use, students are more inclined to integrate it into their sustainable writing practices (U. Lee et al., 2023; Moore et al., 2023). Attitude towards AI plays a mediating role in the TAM framework, influencing the relationship between perceived usefulness, perceived ease of use, and intentions to use AI for sustainable writing. Students' attitudes towards ai are shaped by their beliefs, experiences, and perceptions of its capabilities and limitations(Philippon, 2010). Positive attitudes towards AI can foster greater acceptance and adoption of ai technology for sustainable writing. Conversely, negative attitudes or misconceptions may hinder the adoption process (Farooq & Raju, 2019). Understanding students' attitudes towards ai is crucial for effective implementation and integration of ai technology in social science education.

Existing literature provides insight into the factors that influence AI adoption, including perceived usefulness , perceived ease of use, and attitudes towards AI([Anonymous], 2023; Borger et al., 2023; Wang, 2023; Watts & Bode, 2023). However, research focusing specifically on students' intentions to

use ai for sustainable writing in the social sciences is required. This study seeks to fill a gap in the literature by investigating students' intentions to implement AI for sustainable writing in the social sciences by integrating the tam framework and examining previous research (Liu et al., 2021). However, the specific application of AI in sustainable writing practices within the social sciences remains a relatively understudied area. (Donnelly, 2019). The table below synthesizes the earlier articles and key aspects of AI where core focus is limited to new technologies adoption, plagiarism, and CRM systems. There is less focus on sustainability and sustainability writing in educational context.

Table 1. key findings of systematic literature review

Study	Objective	Key findings	Sustainable writing themes	Key aspects
(Jung & Pfister, 2020)	Propose a blockchain-based solution for consent in CTS	Blockchain enhances transparency and security in consent management	Ethical development, data integrity, transparency	Blockchain technology
(Song et al., 2022)	Introduce ai-driven CRM technology	AI in CRM enhances customer interactions and loyalty	Enhanced customer engagement, personalized interactions	AI-driven CRM system
(Tanveer et al., 2020)	Explore ai's impact on education and academic policy	AI improves learning outcomes and personalized education	Personalized learning, data-driven feedback	AI integration in educational systems
(A. V. Y. Lee, 2023)	Propose ai-enabled evaluation for feedback in online courses	AI facilitates timely and meaningful feedback	Timely feedback, enhanced learning experiences	AI-enabled evaluation system
(Gonzalez-Carrillo et al., 2021)	Present uncode, an auto-grading tool for programming assignments	Uncode provides clear grading code and formative feedback	Formative feedback, error identification and correction	Uncode auto-grading tool
(Curzi et al., 2020)	Discuss satellite constellations and sustainable operations	Machine learning and ai improve satellite constellation management	Efficient integration, resource and infrastructure sharing	Satellite constellations, machine learning, ai
(Mishra et al., 2023)	Conduct bibliometric analysis on SDGS	Identify research productivity, collaboration, and core topics	Progress, challenges, trends related to SDGS	Research productivity, collaboration on SDGS
(McClements et al., 2021)	Address challenges in the food supply chain	Robotics, ml, nanotechnology enhance food production system	Quality, nutrition, safety, sustainability of food supply	Robotics, machine learning, nanotechnology in food prod.
(Dhanwani et al., 2021)	Explore smart earth technologies for pollution monitoring	Smart technologies tackle air and water degradation challenges	Pollution-free environment, environmental monitoring	Smart earth technologies
(Cunningham et al., 2020)	Discuss digital transformation in healthcare	Digital health pathways improve patient experience and outcomes	Redesigned care delivery, seamless care experiences	Digital health pathways
(Farooq et al., 2022)	Sustainable waste management using AI sensors	AI companies focus more on technical side, ignoring the marketing and human acceptance aspect	More focus on human interactions studies required	Sustainable solution, students advocacy for AI companies

3. Methodology

This quantitative study examines students' intentions to employ AI for sustainable writing in the social sciences. The study allows for a comprehensive understanding of students' perspectives, attitudes, and intentions regarding the adoption of ai in sustainable writing. On the premise literature review, a questionnaire was developed to capture quantitative data from a larger student sample. The questionnaire was created to measure the variables identified in the literature review: perceived usefulness, perceived ease of use, attitude towards AI and intention to use AI for sustainable writing. The questionnaire contains questions adapted from existing scales and tailored to the context of ai adoption in the context of sustainable writing practises in the social sciences.

The survey questionnaire was administered online to a diverse sample of students from different social science disciplines. Efforts was made to ensure a representative sample to enhance the generalizability of the findings. Participants was provided with clear instructions and informed consent before completing the questionnaire. As the data was collected from higher education institutions of three universities using referral sampling, thus the total population of the students was more than 1 million and required sample for the population was 385.

The collected quantitative data was analyzed using statistical techniques, particularly structural equation modeling (SEM). SEM allows for the examination of relationships between variables and the testing of the proposed research model. The relationships between perceived usefulness, perceived ease of use, attitude towards AI, and intention to use AI for sustainable writing was analyzed using SEM (Farooq et al., 2019). SEM analysis has provided insights into the strength and direction of these relationships, allowing for a comprehensive understanding of the factors influencing students' intentions to adopt ai in sustainable writing practices. The analysis was performed using appropriate statistical software, considering factors such as model fit, coefficient values, and significance levels.

The measurement scales used in the survey questionnaire was designed to assess the technology acceptance models(Sophea et al., 2022). The data was collected on Likert scale ranging from "strongly disagree" to "strongly agree." perceived usefulness was measured to measure participants' perceptions of the extent to which ai technology is useful for sustainable writing in social sciences. Perceived ease of use was measured to measure participants' perceptions of the ease and user-friendliness of ai technology for sustainable writing. To make sure the model works properly and questionnaire face validity and content validity is ok a pilot test was conducted. After making sure the validity and reliability of scale the final data was collected.

4. Results

The respondents' demographics in this study indicate that the majority of participants were male (55%), followed by females (40%), with a small percentage opting not to disclose their gender (5%). In terms of age, the largest group fell within the 18-25 age range (41%), while the other age categories had varying proportions, including 29% aged 26-35, 15% aged 36-45, 13% aged 46-55, and 1% each for the 56-65 and below 18 age groups. Regarding the respondents' country of origin, china and pakistan each accounted for 30% of the participants, with Malaysia comprising the remaining 40%. Lastly, when considering ai app usage frequency, the majority of respondents reported using ai apps monthly (52%), followed by bi-annually (21%), annually (6%), weekly (16%), and daily (4%). A small percentage of respondents (1%) reported using AI apps only once in their life.

Table 2. demographics of the respondents

Demographic	Count	Percentage
Gender		
Female	154	40%
Male	212	55%
Prefer not to disclose	19	5%

Demographic	Count	Percentage
Age		
Below 18	4	1%
18-25	158	41%
26-35	112	29%
36-45	58	15%
46-55	50	13%
56-65	4	1%
65+	-	0%
Country		
China	115.5	30%
Malaysia	154	40%
Pakistan	115.5	30%
Ai app usage for software		
Daily	12	4%
Weekly	18	16%
Monthly	92	52%
Bi-annually	114	21%
Annually	141	6%
Once in life	51	1%

PLS SEM Analysis

Partial least squares structural equation modeling (Pls-SEM) is a statistical technique used to analyze complex relationships between latent variables in a structural equation model. In the current study, Pls-SEM is employed to examine the relationships between sustainable writing practices, AI technology acceptance, and the perspectives of AI students. Pls-SEM was chosen as the analytical method due to its suitability for exploratory research and its ability to handle small sample sizes, non-normal data distributions, and complex models. It allows for the assessment of both the measurement model (validity and reliability of constructs) and the structural model (relationships between constructs), providing valuable insights into the factors influencing sustainable writing practices from the perspective of ai students. The subsequent section figures and table explain the results of SEM analysis.

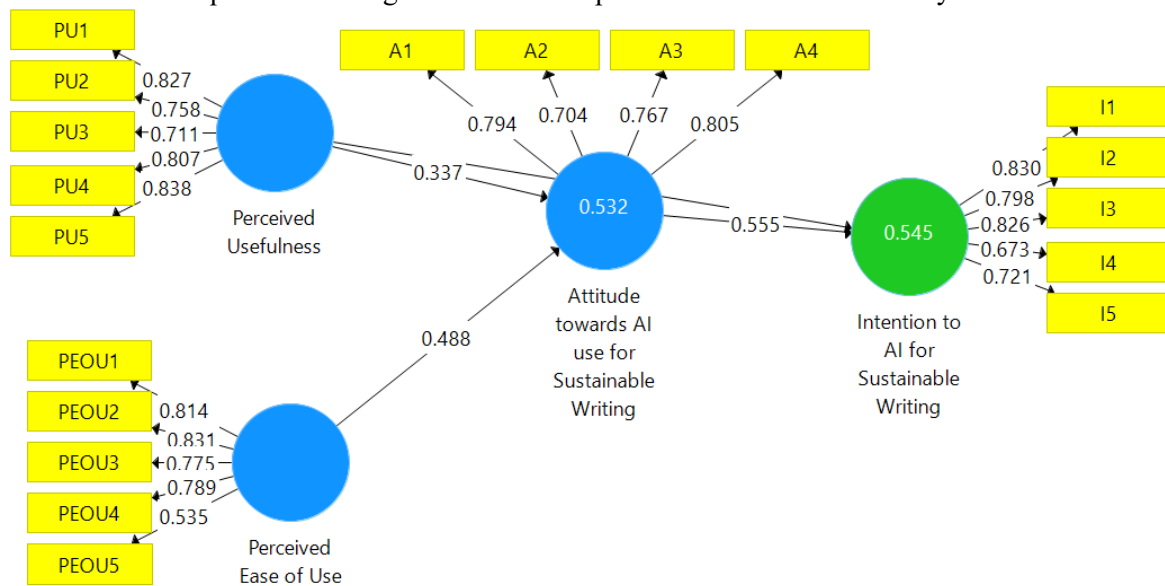


Fig.2: measurement results of SEM analysis

Table 3. construct validity and reliability statistics.

	Cronbach's alpha	Rho a	CR	AVE
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Attitude towards ai use	0.768	0.773	0.852	0.590
Intention to ai use	0.829	0.837	0.880	0.596
Perceived ease of use (PEOU)	0.805	0.815	0.868	0.572
Perceived usefulness (PU)	0.848	0.850	0.892	0.624

Discriminant validity statistics

Table 4. fornell larker statistics

	Attitude towards ai use	Intention to ai use	PEOU	PU
Attitude towards ai use	0.768			
Intention to ai use	0.710	0.772		
PEOU	0.672	0.691	0.757	
PU	0.604	0.591	0.547	0.790

Table 5. cross loadings

items	Attitude towards AI use	Intention to AI use	PEOU	PU
A1	0.794	0.500	0.558	0.549
A2	0.704	0.471	0.443	0.432
A3	0.767	0.628	0.488	0.420
A4	0.805	0.575	0.569	0.456
I1	0.665	0.830	0.624	0.472
I2	0.550	0.798	0.522	0.368
I3	0.583	0.826	0.540	0.402
I4	0.425	0.673	0.470	0.533
I5	0.488	0.721	0.494	0.520
Peou1	0.593	0.499	0.814	0.497
Peou2	0.519	0.565	0.831	0.452
Peou3	0.453	0.607	0.775	0.413
Peou4	0.482	0.515	0.789	0.423
Peou5	0.462	0.422	0.535	0.247
Pu1	0.483	0.533	0.480	0.827
Pu2	0.440	0.421	0.469	0.758
Pu3	0.507	0.459	0.319	0.711
Pu4	0.448	0.432	0.497	0.807
Pu5	0.499	0.477	0.399	0.838

Table 6. HTMT score

	Attitude towards ai usage	Intention to ai usage	PEOU	PU
Attitude towards ai usage				
Intention towards ai usage	0.879			
PEOU	0.849	0.848		
PU	0.747	0.708	0.659	

Structural model results

Reliability results:

The reliability analysis, demonstrates good internal consistency for the constructs in the study. The cronbach's alpha values range from 0.768 to 0.848, exceeding the recommended threshold of 0.7, indicating high reliability. Similarly, the Rho_a values range from 0.773 to 0.850, further confirming the reliability of the measurement model. Composite reliability (CR) values range from 0.852 to 0.892, exceeding the recommended threshold of 0.7, which indicates satisfactory reliability. The average variance extracted (AVE) values range from 0.572 to 0.624, all above the recommended threshold of 0.5, indicating convergent validity and suggesting that the constructs explain a significant proportion of the variance within the observed indicators.

The construct validity results confirm the discriminant validity of the constructs. The fornell-larcker

criterion shows that the square root of the AVE for each construct is greater than the corresponding correlation coefficients with other constructs. This indicates that each construct shares more variance with its own indicators than with the indicators of other constructs, supporting discriminant validity. Moreover, table 4 displays the cross loadings, which demonstrate that the indicators within each construct exhibit higher loadings on their corresponding construct than on other constructs, further confirming discriminant validity.

Additionally, the heterotrait-monotrait (HTMT) ratio of correlations, as shown in table 5, provides evidence of discriminant validity. The HTMT scores are all below the recommended threshold of 0.85, indicating that the correlations between constructs are smaller than the correlations within constructs, providing further support for discriminant validity. These findings suggest that the constructs in the study are distinct from one another and measure different underlying concepts, establishing the validity of the measurement model.

Structural model results:

The structural model hypotheses results reveal significant relationships between the study's constructs. First, the path coefficients reveal that attitudes towards the use of ai for sustainable writing have a significant positive effect on the intention to use ai for sustainable writing ($T = 8.257$, $p 0.001$). This suggests that individuals with more favorable attitudes towards the use of ai for sustained writing are more likely to intend to utilise ai for such purposes. The perceived simplicity of use has a significant positive effect on attitudes towards the use of ai for sustainable writing ($T = 8.499$, $p 0.001$). This suggests that when individuals perceive ai to be simple to use for sustainable writing, they develop more positive attitudes towards its application.

Thirdly, perceived utility has a significant positive influence on attitudes towards the use of ai for sustainable writing ($T = 6.08$, $p 0.001$). This finding suggests that individuals who view ai as beneficial for sustainable writing purposes are more likely to adopt a positive attitude towards its implementation. In addition, perceived utility has a significant positive influence on the intention to use ai for sustainable writing ($T = 4.255$, $p 0.001$). This suggests that individuals who perceive ai to be beneficial for sustainable writing are more likely to convey positive intentions regarding its use.

In addition, the total indirect effects validate the significance of the relationships, reinforcing the impact of attitude towards ai use for sustainable writing, perceived convenience of use, and perceived utility on intention to use ai for sustainable writing. The specific indirect effects disclose that perceived usefulness and perceived simplicity of use indirectly influence intention to use ai for sustainable writing via their effects on attitude towards ai use for sustainable writing.

Overall, the results suggest that attitudes towards ai use for sustainable writing, perceived simplicity of use, and perceived utility play significant roles in determining individuals' intentions to use ai for sustainable writing purposes. These findings highlight the significance of fostering positive attitudes, enhancing perceived simplicity of use, and promoting perceived utility of ai technologies in order to encourage their adoption in sustainable writing practises.

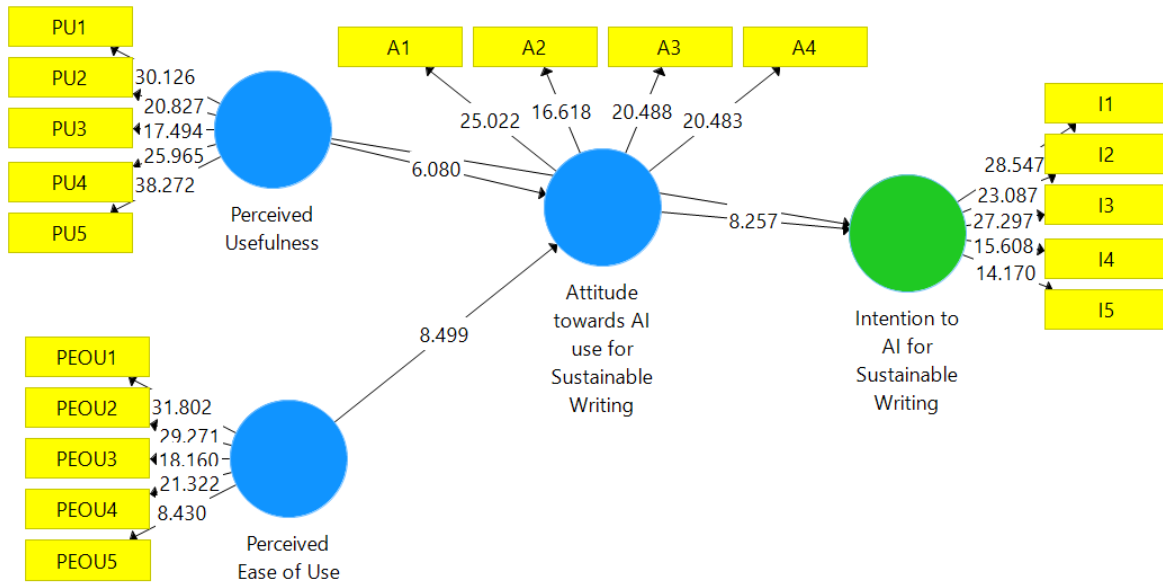


Fig.3: SEM structural model results

Table 7. SEM structural model results

Effect type	Relationships	T	P
Path coefficients	Attitude towards ai use -> intention to use ai	8.257	0.000
	Perceived ease of use -> attitude towards ai use	8.499	0.000
	Perceived usefulness -> attitude towards ai use	6.080	0.000
	Perceived usefulness -> intention to ai use	4.254	0.000
Total indirect effects	Attitude towards ai use -> intention towards ai use	8.257	0.000
	Perceived ease of use -> attitude towards ai use	8.499	0.000
	Perceived usefulness -> attitude towards ai use	6.080	0.000
	Perceived usefulness -> intention to use ai	4.254	0.000
Specific indirect effects	Perceived usefulness -> attitude towards ai use -> intention to ai	5.366	0.000
	Perceived ease of use -> attitude towards ai -> intention to ai	5.182	0.000
Total effects	Attitude towards ai use -> intention to ai use	8.257	0.000
	Perceived ease of use -> attitude towards ai use	8.499	0.000
	Perceived ease of use -> intention to ai use	5.182	0.000
	Perceived usefulness -> attitude towards ai use for sustainable writing	6.080	0.000
	Perceived usefulness -> intention to ai use	8.204	0.000

Numerous students highlighted the perceived benefits of ai technology, such as increased efficiency, precision, and access to pertinent information. They believed that ai could improve their writing process by providing valuable insights, automating specific duties, and increasing overall productivity. Familiarity and technological competence: it was discovered that students' familiarity and comfort with technology, including ai tools, played an important role in their intentions to adopt ai for sustainable writing. Those with greater technological proficiency and competence were more eager to incorporate ai into their writing practises. Significant results from the SEM analysis supported the proposed research model. Positive and significant relationships were found between perceived efficacy and intention to use ai, as well as between perceived simplicity of use and intention to use ai. These results suggest that students who perceive ai to be beneficial and simple to use are more likely to employ it for sustainable writing in the social sciences.

The statistical results of the SEM analysis were presented as path diagrams and indexes of model fit. The visual representation and statistical interpretation of the relationships between variables, including the direct and mediating effects, was performed. The interpretation of the results requires a

discussion of the strength and significance of the variable relationships. The findings were discussed considering the existing literature, with an emphasis on the contributions and implications for the incorporation of ai into sustainable writing practises. Further examination and correlation of the qualitatively identified factors with the quantitative results provided a comprehensive understanding of students' intentions to utilise ai for sustainable writing in the social sciences. The results of both the qualitative and quantitative analyses provide valuable insights into the factors that influence students' intentions to use ai for sustainable writing. These findings have aided educators, policymakers, and stakeholders in promoting the incorporation of ai technology into social science education and nurturing sustainable writing practises.

5. Discussion:

The study's findings offer valuable insight into the factors that influence the intention to use ai for sustainable writing. The results indicate that attitudes towards ai use for sustainable writing have a significant positive effect on the intention of individuals to use ai for sustainable writing. This suggests that individuals with positive attitudes towards the use of ai for sustainable writing are more likely to exhibit higher adoption intentions for ai technologies. In the context of sustainable writing, these findings emphasise the significance of promoting positive attitudes towards ai and raising awareness of its potential benefits. In addition, the study demonstrates that perceived simplicity of use and perceived utility play significant roles in shaping individuals' attitudes towards the use of ai for sustainable writing. When individuals perceive ai as simple to use and beneficial for sustainable writing, they develop more favorable attitudes towards its adoption, as shown by the findings. This highlights the significance of devising ai systems that are user-friendly and offer evident benefits for sustainable writing practises. Improving the usability and utility of ai technologies can positively affect people's attitudes and, as a result, increase their intent to use ai for sustainable writing. The study also establishes the indirect effects of perceived ease of use and perceived utility on intention to use ai for sustainable writing via their influence on attitudes towards ai use for sustainable writing. This indicates that these factors indirectly influence the intentions of individuals by molding their attitudes. Therefore, interventions and strategies aimed at enhancing perceived ease of use and perceived usefulness can cultivate positive attitudes and increase the intent to employ ai technologies for sustainable writing practises.

6. Conclusion:

This study contributes to a greater comprehension of the factors that influence the intention to use ai for sustainable writing. Individuals' intentions are significantly influenced by attitudes towards ai use for sustainable writing, perceived simplicity of use, and perceived utility. Promoting positive attitudes, improving the usability, and emphasizing the utility of ai technologies can encourage their incorporation into sustainable writing practises (Segers, 2023; Yang et al., 2023). Individuals and organisations can increase their writing efficacy, productivity, and environmental sustainability by leveraging ai technologies in the field of sustainable writing. Future research may investigate additional variables and factors that may influence the intention to use ai for sustainable writing, as well as strategies for overcoming potential adoption barriers (Cress & Kimmerle, 2023; Kahveci, 2023; Ross, 2023). Overall, the findings of this study are useful for researchers, practitioners, and policymakers who seek to promote sustainable writing practises through the adoption of ai technologies.

Several recommendations can be made to promote the adoption of ai for sustainable writing practises based on the findings of this study. Efforts should be made to educate individuals on the advantages of using ai for sustainable writing in order to raise awareness and encourage positive attitudes. This can be accomplished through awareness campaigns, training programmes, and educational initiatives that emphasise the potential of ai technologies to enhance writing efficacy, productivity, and environmental sustainability. By fostering a favourable perception of ai, individuals will be more inclined to investigate and employ these writing technologies.

It is essential to design ai systems and tools that are intuitive, user-friendly, and accessible to individuals with varying levels of technical expertise. User-centered design principles should be applied to ensure that ai applications for sustainable writing are user-friendly and require minimal effort and a short learning curve. This can include providing explicit instructions, user-friendly interfaces, and interactive features that allow for seamless integration into writing workflows. Accentuate the value of ai for sustainable writing: it is essential to communicate the tangible benefits and value-added characteristics of ai technologies to encourage their adoption. Individuals can recognise the practical benefits of integrating ai into their writing practises by highlighting how ai can improve writing quality, provide real-time feedback, automate repetitive tasks, and contribute to environmental sustainability.

Case studies, success tales, and empirical evidence demonstrating the positive impact of ai can further Encourage collaboration and interdisciplinary research: collaboration between researchers, practitioners, and policymakers from different disciplines can facilitate the development and implementation of ai solutions for sustainable writing. Interdisciplinary research initiatives can address the complex challenges and ethical considerations associated with ai adoption, aligning sustainable writing practises with larger environmental and social objectives. Innovative methods and best practises can be identified and implemented by fostering collaboration and knowledge sharing.

As ai technologies continue to develop, it is crucial to remain abreast of the most recent developments and advances in the field. Researchers and practitioners should engage in continuous research and development to investigate new ai applications, algorithms, and frameworks that can further improve sustainable writing practises. Supporting initiatives that promote open-source ai tools, data sharing, and collaboration can also expedite the development and adoption of ai in the context of sustainable writing. By implementing these recommendations, stakeholders can foster the widespread adoption of artificial intelligence technologies for sustainable writing. Not only will this enhance writing practises, but it will also contribute to environmental sustainability by reducing paper consumption, optimising resource utilisation, and fostering efficient and effective writing processes.

With proliferating AI permeation, academia must balance productivity gains with psychological costs of diminishing autonomy. While continually refining accessibility and personalization, transparent protocols governing appropriate kinds of writing support are imperative to uphold integrity. Beyond initial enthusiasm, probing problematic addictions or diminishing confidence arising from consistent robotic co-creation can illuminate sustainable partnerships. Intent safeguarding originality, institutions must monitor not just similarity limits but also original thought cultivation as AI Penfolds student minds continually reconciling inner muses with artificial guides.

7. Limitations

The current study has following limitations. Data was collected form university students only, keeping in view resources limitations online google form was used for data collection. Using convenience sampling data was collected from universities in Asia particularly university located in capital of china, pakistan, and Malaysia. Keeping in view privacy concerns of the universities and students, the list of universities is not provided in the study. In addition study has used cross sectional method for data collection. Future researchers are advised to collected more response form universities and add more constructs of tam to validate the technology acceptance model.

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