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Readiness Assessment of Ethiopian Higher Education Institutions for Artificial Intelligence (AI) Adoption

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Abstract: *Artificial Intelligence (AI) is increasingly transforming higher education by creating new opportunities for enhancing teaching, learning, research, and institutional management. However, the successful adoption of AI depends on institutional readiness, technological capacity, human competencies, and supportive governance frameworks. This study assesses the readiness of Ethiopian higher education institutions for AI adoption by examining AI awareness, institutional preparedness, current AI applications, perceived opportunities and challenges, and factors influencing AI adoption practices. A quantitative research approach was employed using data collected from 318 faculty and staff members from selected Ethiopian public universities. Descriptive statistics and Ordered Logit, Ordered Probit, and Ordinary Least Squares (OLS) regression models were used to analyze the data. The findings indicate that Ethiopian higher education institutions demonstrate moderate readiness for AI adoption. While respondents reported growing awareness of AI and recognized its potential benefits for teaching, research, and institutional transformation, institutional support mechanisms, including AI training, policies, technical support, and funding, remain insufficient. AI adoption was positively and significantly influenced by AI knowledge and awareness, institutional readiness, AI integration in teaching and learning, and AI integration in institutional management. Conversely, technical, organizational, and governance challenges significantly constrained AI adoption. The study highlights that institutional readiness is the strongest determinant of AI adoption practices. The study concludes that Ethiopian higher education institutions possess emerging foundations for AI adoption but require strategic interventions to strengthen digital infrastructure, develop AI-related policies, enhance human capacity, and establish effective governance frameworks. The findings provide important implications for policymakers and university leaders seeking to promote responsible and sustainable AI integration in higher education.*

Keywords: Artificial Intelligence, AI adoption, institutional readiness, higher education, digital transformation, Ethiopia

1. Introduction

1.1. Background

Artificial Intelligence (AI) is transforming higher education by enhancing teaching, learning, research, and institutional management through technologies such as machine learning, natural language processing, intelligent tutoring systems, and learning analytics (Popenici & Kerr, 2017; Zawacki-Richter et al., 2019). These technologies support personalized learning, improve student outcomes, automate administrative processes, and facilitate data-driven decision-making. However, their successful implementation depends on adequate digital infrastructure, institutional readiness, skilled human resources, and governance frameworks that address challenges related to data privacy, algorithmic bias, and ethical concerns (European Commission's Joint Research Centre, 2019; Zawacki-Richter et al., 2019).

Globally, universities have increasingly integrated AI to improve educational quality and institutional efficiency (Heredia-Carroza & Stoica, 2023; Hew et al., 2016). In contrast, AI adoption in African higher education remains limited due to inadequate infrastructure, financial constraints, and insufficient institutional capacity (Oyelere et al., 2019). Although Ethiopia has significantly expanded its higher education system and initiated digital transformation efforts, universities continue to face challenges related to educational quality, equity, technological readiness, and resource availability, which constrain effective AI implementation (Ministry of Science and Higher Education, 2022; Semela, 2011; Tadesse, 2014).

Despite the growing international literature on AI in higher education, empirical evidence on AI readiness and adoption in Ethiopian universities remains limited. This study addresses this gap by assessing the readiness of Ethiopian higher education institutions for AI adoption, examining institutional preparedness, AI awareness, opportunities, challenges, and factors influencing AI implementation. The findings provide evidence-based recommendations to strengthen digital infrastructure, institutional capacity, governance, and responsible AI integration, thereby contributing to both the Ethiopian and broader developing-country literature on AI in higher education (Akinwalere & Ivanov, 2022; Zawacki-Richter et al., 2019).

Research Questions

1. What is the level of AI awareness and understanding among faculty and staff in Ethiopian public universities?

2. To what extent are Ethiopian public universities ready for AI implementation in terms of infrastructure, policies, leadership, technical support, and resources?
3. What is the current level of AI integration in teaching, learning, research, and institutional management within Ethiopian public universities?
4. What opportunities and challenges influence the successful adoption of AI technologies in Ethiopian public universities?
5. Which institutional and individual factors significantly affect AI adoption practices in Ethiopian public universities?

General Objective

To assess the readiness of Ethiopian public universities for Artificial Intelligence (AI) adoption and identify the factors influencing AI adoption practices.

Specific Objectives

1. To assess the level of AI awareness and understanding among faculty and staff in Ethiopian public universities.
2. To evaluate institutional readiness for AI implementation in Ethiopian public universities.
3. To examine the current status of AI integration in teaching, learning, research, and institutional management.
4. To identify the opportunities, challenges, and determinants affecting AI adoption in Ethiopian public universities.

2. Methods and Methodologies

2.1. Description of the Study Area

This study examined the current status of artificial intelligence (AI) utilization and integration within the higher education system of Ethiopia, with a specific focus on four prominent public universities: Addis Ababa Science and Technology University, Adama Science and Technology University, Addis Ababa University, and Ethiopian Civil Service University. The research aimed to provide a comprehensive understanding of the key opportunities, challenges, and policy implications arising from the use of AI-driven technologies in the selected institutional contexts.

2.2. Research Design

In this study, I used the Technology Acceptance Model as the foundational framework. According to this model, the acceptance of a new innovation is influenced by perceived advantages and perceived ease of use. Therefore, the primary theoretical model guiding this research was the Technology Acceptance Model. The author employed a cross-sectional survey research design. This research design was essential, as it enabled the smooth execution of various research operations, leading to efficient research and the attainment of maximum information while minimizing effort, time, and financial resources (Kothari, 2004). The research design established the logical connection between the data collected and the conclusions drawn in relation to the initial questions of the study (Yin, 1994).

2.3. Research approach

In the proposal for the study on artificial intelligence and the future of higher education in Ethiopia: practice, challenges, and opportunities, the researchers employed a mixed research approach to generate comprehensive knowledge and theories (George & Bennett, 2004). This methodological choice was influenced by the desire to obtain more reliable data for addressing the research questions. The study utilized both qualitative and quantitative research methods. The qualitative approach explored the attitudes, behaviors, and experiences of the participants through in-depth interviews and open-ended questions, enabling a comprehensive understanding of the phenomenon (Kothari, 2004). Conversely, the quantitative approach involved the collection of statistical data via large-scale surveys using closed-ended questionnaires. The rationale for employing a mixed research method, as highlighted by Kumar (2011), was to enhance the quality of the research by mitigating the biases inherent in relying solely on either quantitative or qualitative methods.

2.4. Data Type and Source

2.4.1. Data Type

The study employed a mixed-methods approach using qualitative and quantitative data from primary and secondary sources. This approach enabled data triangulation, enhanced reliability, and provided a comprehensive understanding of participants' experiences, perceptions, and statistical patterns.

2.4.2. Data Source

The study employed both primary and secondary data sources. Primary data were collected through questionnaires, interviews, focus group discussions, and observations from key stakeholders, while secondary data were obtained from policy documents, reports, scholarly literature, and online sources. The integration of these sources supported a comprehensive and reliable analysis of AI implementation in Ethiopian higher education.

2.5. Instruments and procedure of data collection

2.5.1. Instruments of data collection

The researchers employ both quantitative and qualitative data collection methods to obtain primary and secondary data, utilizing a mixed research approach to address the study's objectives. The data collection instruments employed are outlined below.

Quantitative Data Collection

The quantitative component of the study involved the administration of structured survey questionnaires to a representative sample of higher education institutions in Ethiopia. The survey collected numerical data on various aspects of artificial intelligence implementation, such as the extent of utilization, integration into quality assurance processes, and perceived impact on institutional performance metrics. This quantitative data enabled the researchers to identify trends, patterns, and relationships within the data using statistical analysis techniques.

Qualitative Data Collection

The qualitative component of the study included in-depth interviews and focus group discussions with key stakeholders, such as university administrators, faculty members, students, and university leaders. These qualitative methods provided the researchers with a deeper understanding of the experiences, perceptions, and contextual factors influencing the integration of artificial intelligence and higher education in Ethiopia. The data collected through these methods offered insights that complemented the quantitative findings.

Secondary Data Collection

In addition to the primary data collection, the researchers also reviewed and analyzed secondary data sources, including policy documents, periodic reports, scholarly articles, relevant books, and other published and unpublished materials. This secondary data helped contextualize the findings, establish theoretical and empirical foundations, and provide a comprehensive understanding of the research topic.

2.5.2. Procedure of data collection

Data collection instruments were developed through a review of relevant literature and secondary sources. After a pilot test with participants from selected Ethiopian universities, the instruments were refined before the main survey. Data were collected by trained enumerators under close supervision, with primary data gathered through questionnaires, key informant interviews, and focus group discussions between October and December 2024.

2.6. Target population and sampling Techniques

2.6.1. Target Population

The target population included academic staff, university leaders, quality assurance personnel, students, and other members of the university community from Addis Ababa Science and Technology University, Adama Science and Technology University, Addis Ababa University, and Ethiopian Civil Service University. These institutions were purposively selected to capture a wide range of perspectives: Adama Science and Technology University and Addis Ababa Science and Technology University are specialized institutions focusing on science and technology; Addis Ababa University is the oldest and most resource-rich university in the country; and the Ethiopian Civil Service University serves as a founding institution dedicated to building public sector capacity.

2.6.2. Sampling techniques and sample size determination

The research sites were selected using a purposive sampling technique. The study was conducted at Addis Ababa Science and Technology University, Adama Science and Technology University, Addis Ababa University, and Ethiopian Civil Service University due to their geographic proximity, long-standing academic experience, and well-established internet infrastructure. To collect quantitative data, a simple random sampling method was applied, targeting university staff, university leaders, quality assurance personnel, students, and other members of the university community. The survey sample was drawn by randomly selecting appropriate respondents from each of the target universities. The estimated population sizes of the universities were as follows: AASTU (10,000), ASTU (25,000), AAU (40,000), and ECSU (7,000). These figures were used to determine a statistically significant and representative sample size for the study.

2.6.2.1. Sample size determination

In this study, determining the sample size was a crucial consideration. The sample size was carefully chosen to strike a balance between manageability and representativeness (Kothari, 2004). Among the various sample size calculation methods available in the literature, Yamane's (1967) formula n=N/(1+N(e)2)n = N / (1 + N(e)^2) was used to determine the total sample size. The calculation was based on a ±5% precision level and a 95% confidence level for the total population.

$n = \frac{N}{1+N\,(e)^2}$ Where: N = Total Population

$n = \frac{122{,}000}{1+122{,}000(0.05)^2}$ e =Sampling Error/precision level/

$n = \frac{122{,}0000}{306}$ n = Sample size

n = <u>400</u>

The sample size will be administered proportionally among selected universities for this study.

2.6.2.2. Sampling for Qualitative Data

The study employed a purposive non-probability sampling technique to deliberately select key informants based on their knowledge and capacity to provide relevant data on the research theme. Detailed information was collected through in-depth interviews with key informants, including academic staff, university leaders, quality assurance personnel, students, and other members of the university community at Addis Ababa Science and Technology University, Adama Science and Technology University, Addis Ababa University, and Ethiopian Civil Service University. Specifically, four individuals were selected from each university for the interviews. In addition, three focus group discussions, each comprising eight participants, were conducted at each university to gather further insights on the topic.

2.7. Method of Data Analysis

Quantitative data were analyzed using SPSS through descriptive statistics, correlation tests, and ordinal logistic regression, while qualitative data were examined through thematic analysis. A concurrent mixed-methods approach was used to triangulate findings and provide a comprehensive understanding of the research problem.

2.8. Research Quality Assurance and Ethical Considerations

To ensure the quality and credibility of the study, rigorous data validation, reliability, and ethical procedures were implemented. A pilot study involving participants from selected Ethiopian universities was conducted to refine the research instruments, while expert review and the Content Validity Index (CVI) were used to establish content validity. Data were further validated through screening for missing values, coding errors, and inconsistencies using SPSS. Instrument reliability was assessed using Cronbach's alpha, with a threshold of 0.70 indicating acceptable internal consistency, and the test–retest method was employed to examine the stability of responses over time. Ethical principles were maintained throughout the study by obtaining informed consent, ensuring voluntary participation, protecting participants' confidentiality and anonymity, and using the collected data solely for research purposes in accordance with established research ethics guidelines (Creswell, 2007; Halai, 2006).

3. Results and Discussion

3.1. Background information about our Respondents

3.1.1. Institution of Respondents

The following table presents the institutional affiliation of respondents who participated in addressing the research questions identified in this study. The respondents were primarily drawn from four public universities that possess relatively advanced digital infrastructure compared to other higher education institutions in the country. These institutions include Addis Ababa Science and Technology University, Ethiopian Civil Service University, Addis Ababa University, and Adama Science and Technology University.

Table 1: Institution of Respondents

Institution of respondents					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Addis Ababa Science and Technology University	129	40.3	40.6	40.6
	Ethiopian Civil Service University	84	26.3	26.4	67.0
	Addis Ababa University	59	18.4	18.6	85.5
	Adama Science and Technology University	46	14.4	14.5	100.0
	Total	318	99.4	100.0	
Missing	System	2	.6		

Total	320	100.0		

As shown in the table above, 40.6% of the respondents are from Addis Ababa Science and Technology University, 26.4% are from Ethiopian Civil Service University, 18.6% are affiliated with Addis Ababa University, and 14.5% are from Adama Science and Technology University.

These findings indicate that the majority of respondents were drawn from Addis Ababa Science and Technology University and Ethiopian Civil Service University, suggesting a stronger representation from institutions with comparatively advanced digital infrastructure.

Awareness and Understanding of AI

AI awareness and understanding are key components of institutional readiness for AI adoption. This study assessed faculty and staff awareness, institutional AI discussions and research, and availability of AI training programs using a five-point Likert scale. The findings indicate the level of preparedness of Ethiopian higher education institutions for AI integration.

Table 2: Awareness and Understanding of AI

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Faculty and staff at my institution are aware of AI and its potential applications in higher education.	Count Row N %	17 5.3%	37 11.6%	73 23.0%	138 43.4%	53 16.7%	3.54
AI-related discussions and research are encouraged within my institution	Count Row N %	32 10.1%	72 22.7%	86 27.1%	79 24.9%	47 14.8%	3.21
My institution provides training and awareness programs on AI.	Count Row N %	42 13.2%	90 28.2%	73 22.9%	77 24.1%	37 11.6%	2.93

The findings show moderate AI awareness among faculty and staff (M = 3.54), but limited institutional support, including AI discussions (M = 3.21) and training programs (M = 2.93). This indicates that while AI awareness is increasing, stronger capacity-building and institutional support are needed for effective AI adoption (Davis, 1989; Zawacki-Richter et al., 2019; UNESCO, 2021).

Institutional Readiness for AI Implementation

Institutional readiness is essential for successful AI adoption in higher education. This study assessed IT infrastructure, AI policies, leadership commitment, technical support, and funding through a five-point Likert scale to evaluate the preparedness of Ethiopian higher education institutions for AI implementation.

Table 3: Institutional Readiness for AI Implementation

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
My institution has the necessary IT infrastructure (e.g., servers, internet access, AI tools) to support AI adoption	Count Row N %	12 3.8%	41 13.0%	73 23.1%	132 41.8%	58 18.4%	3.58
My institution has a formal strategy or policy for integrating AI into	Count Row N %	18 5.6%	63 19.7%	127 39.7%	73 22.8%	39 12.2%	3.16

education and administration.							
Leadership at my institution is committed to promoting AI integration in academic and administrative processes	Count Row N % 	17 5.4%	70 22.2%	131 41.6%	64 20.3%	33 10.5%	3.08
Faculty and staff receive adequate technical support for adopting AI technologies	Count Row N % 	26 8.2%	63 19.9%	128 40.5%	73 23.1%	26 8.2%	3.03
There is sufficient funding allocated for AI-related initiatives in my institution.	Count Row N % 	26 8.2%	68 21.5%	147 46.5%	55 17.4%	19 6.0%	3.04

The findings indicate moderate institutional readiness for AI adoption. While IT infrastructure showed relatively strong readiness (M = 3.58), AI policies, leadership commitment, technical support, and funding remained moderate. The results highlight the need to strengthen institutional strategies, resources, and support systems for sustainable AI implementation (Tornatzky & Fleischer, 1990; UNESCO, 2021).

Current Use of AI in Teaching and Learning

AI utilization in teaching and learning reflects the practical adoption of AI beyond institutional readiness. This study assessed AI use in student services, teaching, learning management systems, and research analytics using a five-point Likert scale to determine the current level of AI integration in Ethiopian higher education.

Table 4: Current Use of AI in Teaching and Learning

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
AI is used to support student services, such as career counseling and academic advising.	Count Row N % 	36 11.5%	57 18.2%	60 19.1%	85 27.1%	76 24.2%	3.34
My institution uses AI tools to enhance teaching and learning.	Count Row N % 	25 8.2%	95 31.3%	64 21.1%	77 25.3%	42 13.8%	3.19
AI-powered learning management systems (e.g., adaptive learning platforms, chatbots) are available and used by faculty and students	Count Row N % 	22 7.1%	61 19.7%	80 25.8%	104 33.5%	42 13.5%	3.40
AI-driven research tools and data analytics are commonly utilized by faculty and students.	Count Row N % 	27 8.5%	56 17.7%	84 26.6%	108 34.2%	41 13.0%	3.25

AI use in Ethiopian higher education is at a moderate level, with the highest adoption in AI-powered learning management systems (M = 3.40), student services (M = 3.34), and research tools (M = 3.25). However, pedagogical use remains limited (M = 3.19), indicating the need for stronger institutional support

and faculty capacity development (Rogers, 2003; Zawacki-Richter et al., 2019).

AI in Administrative and Institutional Processes

AI integration in administrative processes reflects institutional digital transformation and readiness. This study assessed AI use in administrative tasks, institutional collaboration, ethical guidelines, and AI-based decision-making using a five-point Likert scale to evaluate AI adoption in Ethiopian higher education governance.

Table 5: AI in Administrative and Institutional Processes

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
AI is used in administrative tasks such as admissions, student records management, and faculty workload distribution.	Count Row N %	13 4.3%	50 16.5%	108 35.6%	61 20.1%	71 23.4%	3.42
My institution collaborates with external organizations (e.g., tech companies, government agencies) to enhance AI implementation.	Count Row N %	6 1.9%	22 7.1%	118 37.8%	93 29.8%	66 21.2%	4.46
Ethical considerations and guidelines for AI use are clearly defined and enforced in my institution.	Count Row N %	15 4.8%	49 15.8%	112 36.1%	93 30.0%	41 13.2%	3.31
AI-based decision-making tools are used to improve institutional operations and strategic planning.	Count Row N %	17 5.5%	62 20.1%	83 26.9%	111 35.9%	36 11.7%	3.28

The findings reveal that AI integration in administrative and institutional processes is emerging but remains uneven. While external collaboration for AI implementation is relatively strong (M = 4.46), the application of AI in administration, governance, and decision-making remains moderate. This indicates that Ethiopian higher education institutions are building foundations for AI-enabled management but require stronger governance structures, ethical frameworks, and strategic capacity to achieve sustainable digital transformation (Tornatzky & Fleischer, 1990; UNESCO, 2021).

Opportunities Associated with the Integration of AI-Driven Technologies

AI adoption offers opportunities to enhance teaching, research, institutional management, and competitiveness in higher education. This study assessed perceived AI benefits, including personalized learning, innovation, research collaboration, administrative efficiency, curriculum development, and data-driven decision-making, using a five-point Likert scale among Ethiopian higher education institutions.

Table 6: Opportunities Associated with the Integration of AI-Driven Technologies

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
AI-driven technologies enable innovative teaching methods that transform traditional classroom practices.	Count	2	4	19	138	141	4.52
	Row N %	0.7%	1.3%	6.2%	45.2%	46.2%	
The integration of AI opens new avenues for advanced research and interdisciplinary collaboration.	Count	3	9	29	167	99	4.14
	Row N %	1.0%	2.9%	9.4%	54.4%	32.2%	
AI applications create opportunities to enhance the global competitiveness of our institution.	Count	3	6	46	110	127	4.79
	Row N %	1.0%	2.0%	15.4%	36.9%	42.6%	
	Count	1	11	29	168	96	4.14

AI-powered systems provide novel ways to personalize learning experiences for diverse student needs.	Row N %	0.3%	3.6%	9.5%	55.1%	31.5%	
The use of AI supports the development of data-driven strategies for institutional decision-making.	Count	8	8	42	138	101	4.23
	Row N %	2.7%	2.7%	14.1%	46.3%	33.9%	
AI integration encourages strategic partnerships with technology firms and research organizations.	Count	6	11	50	132	107	4.06
	Row N %	2.0%	3.6%	16.3%	43.1%	35.0%	
AI tools enable the rapid analysis of large data sets, which can inform curriculum improvements.	Count	8	5	44	130	121	4.14
	Row N %	2.6%	1.6%	14.3%	42.2%	39.3%	
The adoption of AI enhances opportunities for developing new academic programs aligned with emerging trends.	Count	4	16	41	138	103	4.29
	Row N %	1.3%	5.3%	13.5%	45.4%	33.9%	
AI solutions improve the efficiency of administrative tasks, freeing up resources for academic innovation.	Count	5	11	67	107	114	4.03
	Row N %	1.6%	3.6%	22.0%	35.2%	37.5%	
Integrating AI contributes to building a culture of innovation that positively impacts the institution's reputation.	Count	9	29	33	128	101	3.94
	Row N %	3.0%	9.7%	11.0%	42.7%	33.7%	

The findings show highly positive perceptions of AI opportunities in Ethiopian higher education. Respondents recognized AI's potential to transform teaching, enhance research collaboration, personalize learning, improve decision-making, and strengthen institutional competitiveness. These results suggest that stakeholders view AI as a driver of educational transformation, consistent with the Diffusion of Innovation theory and previous evidence on AI's role in advancing higher education (Rogers, 2003; Zawacki-Richter et al., 2019; UNESCO, 2021).

Challenges Associated with the Integration of AI-Driven Technologies

AI adoption in higher education faces various institutional, technological, financial, and organizational challenges. This study assessed perceived barriers in Ethiopian higher education institutions, including infrastructure, human capacity, funding, policies, resistance to change, data security, ethics, leadership, and external collaboration, using a five-point Likert scale.

Table 7: Challenges Associated with the Integration of AI-Driven Technologies

Exogenous Variables		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Limited digital infrastructure and connectivity significantly hinder the effective use of AI technologies.	Count	5	3	23	125	150	4.35
	%	1.6%	1.0%	7.5%	40.8%	49.0%	
There is a shortage of skilled personnel who can develop, implement, and maintain AI systems within the institution.	Count	1	18	54	135	100	4.02
	%	0.3%	5.8%	17.5%	43.8%	32.5%	
Insufficient funding and financial resources pose a major barrier to integrating AI-driven tools.	Count	3	12	55	112	124	4.12
	Row N %	1.0%	3.9%	18.0%	36.6%	40.5%	
Existing institutional policies and frameworks are inadequate for	Count	3	17	73	128	87	3.91
	%	1.0%	5.5%	23.7%	41.6%	28.2%	

addressing the complexities of AI adoption.							
Resistance among faculty and staff to change traditional practices impedes AI implementation.	Count	3	20	75	126	80	3.86
	Row N %	1.0%	6.6%	24.7%	41.4%	26.3%	
Concerns regarding data security, privacy, and ethical implications restrict the use of AI technologies.	Count	17	23	66	124	79	3.73
	%	5.5%	7.4%	21.4%	40.1%	25.6%	
The rapid pace of AI advancements challenges the institution's ability to continuously update its systems.	Count	10	26	72	113	86	3.78
	%	3.3%	8.5%	23.5%	36.8%	28.0%	
Lack of collaboration with external AI experts and industry partners limits the full benefits of AI integration.	Count	3	25	50	138	90	3.94
	%	1.0%	8.2%	16.3%	45.1%	29.4%	
Integrating AI requires substantial changes to established educational processes, which can be disruptive.	Count	3	20	60	145	80	3.91
	%	1.0%	6.5%	19.5%	47.1%	26.0%	
The absence of a clear strategic vision and leadership for AI initiatives undermines effective integration.	Count	6	20	50	120	107	4.00
	N %	2.0%	6.6%	16.5%	39.6%	35.3%	

The findings indicate that AI adoption in Ethiopian higher education is constrained by major challenges, particularly limited digital infrastructure (M = 4.35), financial constraints (M = 4.12), shortage of skilled personnel (M = 4.02), and weak strategic leadership (M = 4.00). These challenges reflect interconnected technological, organizational, and environmental barriers, highlighting the need for investment, capacity development, and effective governance to support sustainable AI integration (Tornatzky & Fleischer, 1990; UNESCO, 2021; Zawacki-Richter et al., 2019).

Factors affecting Artificial Intelligence Adoption in Ethiopian Public Universities

The table presents Ordered Logit, Ordered Probit, and OLS regression results examining factors influencing AI adoption practices in Ethiopian public universities. The models assess the effects of AI awareness, institutional readiness, AI integration in teaching and management, implementation challenges, and age on AI adoption, providing a comparative analysis of the determinants across estimation methods.

Table 8: Factors affecting Artificial Intelligence Adoption in Ethiopian Public Universities

Exogenous variables	**Ordered Logit Model** (AI Adoption Practices)	**Ordered Probit Model** (AI Adoption Practices)	**OLS Regression** AI (AI Adoption Practices)
AI Knowledge and Awareness	0.841*** (0.319)	0.432** (0.175)	0.192** (0.0942)
Institutional Readiness for AI Implementation	1.246*** (0.218)	0.687*** (0.113)	0.338*** (0.0638)
AI Integration in Teaching and Learning	0.291*** (0.103)	0.148*** (0.0524)	0.0612*** (0.0233)
AI Integration in Institutional Management	0.502*** (0.173)	0.258*** (0.0685)	0.410*** (0.149)

AI Implementation Challenges (TOG) *(Technical, Organizational & Governance)*	-0.678*** (0.248)	-0.332*** (0.128)	-0.213*** (0.0683)
Age of our respondents	-0.0685*** (0.0226)	(0.0923) -0.0414***	-0.0197*** (0.00642)
Observations		223	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All models controlled for respondents' institution, frequency of digital resource use, AI use in registrar services, AI-driven pedagogical change, institutional AI discussions, and AI professional development.

The regression results indicate that AI knowledge and awareness, institutional readiness, AI integration in teaching and learning, and AI integration in institutional management positively and significantly influence AI adoption practices across the Ordered Logit, Ordered Probit, and OLS models. Institutional readiness emerged as the strongest predictor, highlighting the importance of infrastructure, leadership, capacity, and supportive systems. Conversely, AI implementation challenges and respondents' age negatively affected AI adoption. These findings support the Technology–Organization–Environment (TOE) Framework, the Diffusion of Innovation Theory, and the Unified Theory of Acceptance and Use of Technology (UTAUT), emphasizing that knowledge, facilitating conditions, and organizational capacity are critical for successful technology adoption (Tornatzky & Fleischer, 1990; Rogers, 2003; Venkatesh et al., 2003). The results also align with previous studies emphasizing the importance of digital infrastructure, faculty competencies, leadership support, and effective governance for AI integration in higher education (Zawacki-Richter et al., 2019; Crompton & Burke, 2023).

4. Conclusion and Recommendation

4.1. Conclusion

This study concludes that Ethiopian public universities have an emerging foundation for AI adoption, with moderate AI awareness and strong recognition of AI opportunities in teaching, research, and institutional management. However, institutional readiness remains limited due to gaps in infrastructure, policies, leadership, funding, technical support, and human capacity. Regression results show that AI awareness, institutional readiness, and AI integration significantly enhance adoption, while technical, organizational, and governance challenges hinder progress. Therefore, strengthening digital infrastructure, AI governance, faculty capacity, and strategic investment is essential for sustainable and responsible AI integration in Ethiopian higher education.

4.2. Recommendations

Based on the findings, Ethiopian higher education institutions should strengthen AI readiness through comprehensive policies, digital infrastructure investment, faculty capacity development, financial and technical support, and ethical governance frameworks. Universities should expand partnerships, integrate AI into teaching, research, and administration, while policymakers should develop supportive national AI strategies. Future research should further examine AI maturity, student competencies, and the long-term impact of AI on higher education.

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