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# Navigating the Ethical Dilemma of Generative AI in Higher Educational Institutions in Nigeria using the TOE Framework

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**Abstract:** *Generative AI tools stand at the threshold of innovation and the erosion of the long-standing values of creativity, critical thinking, authorship, and research in higher education. This research crafted a novel framework from the technology, organization, and environment (TOE) framework to guide higher educational institutions in Nigeria to navigate the ethical dilemma of generative AI. A questionnaire was used to collect data from twelve higher institutions among lecturers, students, and researchers across the six (6) geopolitical zones of Nigeria. The structural equation modeling was used to analyze the data using the SPPS Amos version 23. The results revealed that factors such as perceived risks of generative AI, Curriculum support, institutional policy, and perceived generative AI trends positively impact the need for a generative AI ethical framework in higher educational institutions in Nigeria. Furthermore, the study contributes to the adoption of theory to navigate the ethical dilemma in the use of generative AI tools in higher educational institutions in Nigeria. It also provides some practical implications that suggest the importance of inculcating ethical discussions into the curriculum as part of institutional policy to create awareness and guidance on the use of generative AI.*

**Keywords:** generative AI, higher education, AI ethics, ethical framework, TOE framework.

## INTRODUCTION

The ethical dilemma of the current generative artificial intelligence (AI) has been a concern in education, though the impact of these AI tools has been transformative to learners, teachers, and teaching styles (Akgun & Greenhow, 2022; Flierl, 2023; Thongprasit & Wannapiroon, 2022). The advances in deep machine learning in natural language processing, Baidoo-Anu and Ansah (2023) has led to the production

of more sophisticated Artificial intelligence models trained on massive amounts of digital data such as text, video, images/graphics, and audio. These models called the Generative AI (GenAI) learn from the training examples; identify patterns, generate human-like text interactions, answer questions on general and specific domains, and complete other language-related tasks with high accuracy (Floridi & Chiriatti, 2020). Indeed, the GenAI tools have transformed creation, communication, and access to subject knowledge in a scholarly environment. Thongprasit and Wannapiroon (2022) speculated on the changing paradigm in traditional educational structures where intelligent learning platforms will be the new norm, with people learning anything, anywhere, and at any time at absolute convenience.

Developing countries like Nigeria are enthusiastic about AI technology to solve challenges in their educational system and improve access to education, low teacher-to-student ratio, limited resources, and low-quality learning outcomes (NITDA, 2023). This excitement realigned with UNESCO speculation that AI can potentially help to attain sustainable educational development goals in innovative teaching and learning practices, as well as accelerating access to education (Ibrahim, 2023). However, there are concerns presented by these new technologies in education. Although the ethical impacts of GenAI in education in developing countries like Nigeria are still evolving, and under-researched (Mirbabaie et al., 2022; Onyejegbu, 2023), the impact is undeniable. Chan (2023) revealed a growing concern in the academic communities about the use of generative AI (ChatGPT, Co-Pilot, Bard, Bing, perplexity.ai, etc.), which enables students and researchers to cheat and plagiarize written scholarly papers, and indulge in other attendant intellectual property issues. Similarly, the desire to get it easily has influenced both researchers and students to over-rely on generative AI tools for academic research papers, completing assignment works, and evading plagiarism detection software (Baidoo-Anu and Ansah, 2023; Akgun and Greenhow, 2022; Rudolph, *et al*. 2023). Warschauer *et al.* (2023) added that there are perceived ethical and academic integrity drawbacks to the scholarly community posed by generative AI applications in higher education that have the potential to erode the long-standing tradition of critical thinking, and problem-solving skills.

Therefore, gauging the impacts of generative AI on education, Dwivedi et al. (2023) stressed that opinion is split in the scholarly community on whether the use should be restricted or legislated. Based on the foregoing, it is important to examine the ethical dynamics of generative AI in higher education to uphold the critical thinking, novelty, and integrity that are the hallmarks of the advancement of original academic contributions in research (Wu, 2024). Towards this end, information systems, AI researchers, educationists, and practitioners are uniquely positioned to facilitate the development of an ethical framework to guide generative AI in higher educational institutions.

In Nigeria, the existing frameworks and policies are not adequate to deal with the current issues caused by generative AI in education. One of the main challenges is that the regulatory bodies, the Nigeria Universities Commission (NUC), the National Board for Technical Education (NBTE), and the National Commission for Colleges of Education (NCCE) have no unified consensus on the ethical frameworks and regulatory policies for generative AI in higher education (Onyejegbu, 2023). Despite the guidelines and frameworks provided by the National Information Technology and Development Agency (NITDA), on the deployment and use of information technology solutions in Nigeria (NITDA, 2019), and developing

competencies in digital literacy in education for Nigerians (NITDA, 2023). These provisions are limited and do not cover the nuances of the current generative AI revolutions in higher education in Nigeria to provide an up-to-date ethical framework. Prior studies conducted in Nigeria have investigated the perceived benefits and risks of generative AI (Ibrahim, 2023), the challenges in education (Nosike et al., 2024; Olayinka et al., 2024), and the need for an ethical framework in Nigeria (Corrigan et al., 2023; Ojerinde, 2024; Onyejegbu, 2023). These researches provide little theoretical adaptation and explanation to guide the ethical safe-landing of GenAI in higher education.

Therefore, our research seeks to develop an ethical framework in higher educational institutions (HEIs) in Nigeria, by adapting the technology, organization, and environmental (TOE) framework (Gupta et al., 2024; Nguyen et al., 2022; Wael AL-khatib, 2023). The research questions that can help contribute to the generative AI framework in tertiary education are.

i. What are the technological drivers for the ethical utilization of generative AI tools in higher educational institutions in Nigeria?
ii. What are the different organizational supports needed to navigate the ethical dynamics of generative AI tools in tertiary education?
iii. What are peculiar environmental issues in higher education that can help the ethical adoption of generative AI?

## LITERATURE REVIEW

The review of related studies is organized as follows, we first reviewed the generative AI ethical issues in Nigeria, and we also reviewed the Technological, Environment and Organizational (TOE) framework adopted in this research. Particularly, we look at the specific construct in each of the technology, organization, and environment contexts adopted in this study. Finally, we reviewed the TOE theoretical framework and how it guides the research framework and the development of hypotheses.

### Generative AI Ethical Issues in Education

Ethics as a subdomain of Philosophy establishes the parameters of morality and a benchmark for how human actions can be measured. It provides baselines for evaluating the rights or wrongs associated with human actions (Schlagwein & Willcocks, 2023). Recently, generative AI Ethics has taken Centre stage because the tools have become ubiquitous with their attendant impacts in education (Khlaif et al., 2023). Ethics becomes a viable solution to frame the discussions and use of generative AI tools for teaching, research, and learning. Schlagwein and Willcocks (2023) summarized that ethical theories broadly focus on the means, processes, and methods collectively termed (deontological) and those that focus on the results or outcomes termed (teleological) ethics. Studies in ethical AI in education investigate these methods and the results that are related to the use of generative AI (Siau & Wang, 2020). The ethical adoption of generative AI in education has become crucial because it is believed that the adoption has potential impact on the long standing ethos of science and scholarship such as critical thinking, integrity, and novelty (Wu, 2024). Generative AI ethics in education stresses that the use for teaching, learning and research comply with the accepted methods and the results. Therefore, it is important to comprehend the likely moral and ethical challenges that are associated with GenAI to devise ethical guidelines and policies

for safe adoption in education.

Corrigan *et al*.(2023) revealed that the concern about AI in society has galvanized efforts towards different policies and guidance across the board. Similarly, some of those efforts included the United Nations Educational, Scientific and Cultural Organization (UNESCO) global and more inclusive approach to AI ethics provided in November 2021 (UNESCO, 2021). In the broad view of generative AI ethics in education, some of the concerns raised consistently in literature are cognitive morality (Kumar & Choudhury, 2023), accuracy (Findley, 2023); academic integrity (Rudolph et al., 2023), privacy (Mhlanga, 2023); bias (Neeley, 2023); and equitable access to technology (Whang, 2023).

Particularly, in Nigeria there are pointers in literature to navigating the ethical challenges associated with generative AI ethics in higher educational institutions. National strategy for Artificial Intelligence Strategy hinted at a critical look at bias, transparency, accuracy, and governance (NITDA, 2024), while Onyejegbu (2023) raised issues of unity in formulating ethical policies by the regulatory bodies, Ojerinde (2024), caution on over-reliance on GenAI. Additional suggestions include taking responsibility for the use of GenAI, transparency, ethical training and dialogues, and a comprehensive ethical framework (Dwivedi et al., 2023; Olayinka et al., 2024; Shahzad et al., 2024; Zlateva et al., 2024). From these baselines, we explore the theoretical background to craft an ethical framework for higher education in Nigeria.

**Theoretical Background**

There are different theoretical lenses for investigating technological adoption in society, these include the diffusion of innovation (DOI) model, technology acceptance model (TAM), theory of planned behavior (TPB), Unified Theory of Acceptance and Use of Technology (UTAUT), technology task fit model, inter-organizational system model and institutional theory (Malik et al., 2021; Mangundu, 2024). Al-Hadwer et al. (2021) posited that these theories focused on individual and behavioral intention in their conceptualization. This research adopted the technology-organization-environment (TOE) framework propounded by (Tornatsky & Fleischer, 1990), this is because the TOE framework has strengths over the behavioral and individual consideration models since it focuses on both internal and external factors on technological adoption decisions. Malik et al. (2021) believe that the tripod stand of the TOE framework is flexible, comprehensive, and adaptable to investigate the adoption of new technology. Therefore, the TOE framework adopted in this study to investigate the ethical adoption of generative AI in higher educational institutions considers the interactions of technology, organizations, and the operating environment. The TOE framework has a wide application in research on technology adoption and implementation in organizations, and it has become a viable framework for understanding the interplay between technology, organization, and environment (Nguyen et al., 2022). The TOE framework has been adopted in prior studies where technology adoptions in organizations have been studied, Matshwane and Marnewick (2024) used the TOE framework to investigate service delivery in local municipalities in South Africa. The study considered factors such as Technology (IT landscape, compatibility, IT risks), Organization (technology adoption, size, skill development), and environment (regulations, and political landscape). The finding of the paper suggests that effective deployment and integration of IT is not only dependent on technological factors but also on organizational and environmental factors. Hashimy *et al.* (2023) used the TOE framework to explore the adoption of blockchain technology to business processes

by using different TOE constructs such as technology (relative advantage, complexity), organization (i.e., competency, top management support), and environment (competitive pressure or trend). According to the study, the intention to embrace blockchain technology is positively impacted by competitive pressure, competency, top management backing, and the technology's relative benefit. In a related study, El-Haddadeh et al. (2021) used a TOE-based model to describe how UK enterprises used big data analytics and created value to achieve sustainable development goals. According to their research, adoption decisions and value generation are greatly influenced by the environment (government policy, legislation), organization (organizational readiness, information technology infrastructure capability), and technology (perceived benefits, technical complexity). Related studies by (Gupta et al., 2024) used the TOE framework to explore the adoption of Gen AI in retail business, while wael AL-khatib (2023) agreed that TOE framework is a valid theory to explore GenAI adoption. Kalmus and Nikiforova (2024) combined TOE with innovation resistance theory (IRT) to study educators' resistance of GenAI. Prior studies revealed that the TOE framework is dynamic and contextual in explanations based on contexts, types of technology, organizations, and the level of development in a country (Maroufkhani et al., 2023). In this study, we first identified the relevant constructs from the well-cited research that have dominantly proven to be more important in measuring technology adoption in organizations. We adopted these related constructs to craft a novel framework for the ethical adoption of generative AI in higher educational institutions in Nigeria. These constructs were mapped to the TOE framework presented in the research model as in Figure 1.

## Conceptual Model and Hypotheses Formulation

### The technological Contexts-related factors to generative AI ethics in education

The technological context is one of the fundamental foundations of any novel innovation. Within the TOE framework, the technology context includes the characteristics which include the usefulness of the technology and the complexity (adapted as perceived risk in our conceptualizations) of the generative AI technology to education (Tornatsky & Fleischer, 1990). From the literature, the factors that influence the use of generative AI technology in educational institutions adopted in this study are the perceived benefits or the relative advantage associated with technological innovation and the perceived risks (Özer, 2024).

### Perceived Benefits of Generative AI

Generative AI technology has played a crucial role in teaching and learning by enhancing the way we seek information, teach, conduct assessments, and interact between teachers and learners (Susarla et al., 2023). One of the specific areas of generative AI in Education includes Adaptive and Personalized Learning Systems (Özer, 2024)**.** Generative AI-enabled educational algorithms analyze students' data based on learning preferences, styles, and performance to create customized learning paths for the student, an approach referred to as an Adaptive Learning System (ALS). Chen *et al.* (2020) supported this view that ALS is an advancement of traditional instructional methods by using intelligent tools and adaptive systems for the realization of personalized learning experiences that meet individual needs. Susarla *et al.* (2023) identified the benefits of generative AI in research to include enhancement of research data collection or literature search, problem formulation, research design, data analysis, data interpretation, and help in the entire writing process. In summary, integrating generative AI tools into education has the potential to positively turn-around educational systems for teaching learning, and research. The benefits of generative

AI impact the adoption-led decisions in educational institutions. Prior studies have substantiated that the perceived benefits of generative AI in educational institutions positively impact adoption intention (Akgun & Greenhow, 2022; Özer, 2024). Institutions of higher learning benefit from generative AI, which creates new opportunities for teaching, learning, and research. In line with prior studies, we assumed in this study that the perceived benefits of generative AI facilitate students' and lecturers' willingness to adopt it. Therefore, the following:

**Hypothesis 1 (H1)**. The perceived benefit of generative AI is positively associated with the need for ethical impact.

**Perceived Risks of Generative AI in Education**

The perceived risks of generative AI in education as adapted were originally termed as technological complexity in the contexts of the TOE framework (El-Haddadeh et al., 2021). It is a differentiation from the often simplistic techno-optimistic narrative that stresses that AI is adjudged harmless (Onyejegbu, 2023). In practice, the use of Gen AI in higher education comes with some unintended negative effect (Mirbabaie et al., 2022), that impacts critical thinking, intellectual properties, and academic integrity (Özer, 2024; Susarla et al., 2023; Wu, 2024), academic misconduct such as plagiarism (Chan, 2023), changed in the information-seeking process in education, and the potency to over-rely on generative AI-mediated tools (Kasneci *et al.* (2023). Additionally, Baidoo-Anu and Ansah (2023) posited that some inherent limitations in the use of generative AI tools in education include generating inaccurate information from the biases in data training, which may aggravate the existing biases. As a consequence, these have the potential to erode the long-standing tradition of integrity, problem-solving and critical thinking skills in education. Mirbabaie *et al.* (2022) identified four core risks of generative AI including devaluing human skills, eroding human self-determination, removing human responsibilities, and reducing human control in teaching and learning. Moreover, Özer (2024) pointed out that disparity in access to the internet that powers the generative AI tools can exacerbate the existing digital divide in developing countries and can hinder the abilities of the some learners to benefit from generative AI tools and resources. In this study, perceived risk of generative AI in education include issues that have the potential to encourage academic misconduct, stifling critical thinking, intellectual property issues, and academic integrity (Chan, 2023; Wu, 2024). It is assumed that these issues are perceived to affect the ethical issues in generative AI. Hence, the following:

**Hypothesis 2 (H2**). Perceived risk is positively associated with the need for the ethical impact of generative AI.

Closely related to hypothesis 2 above, it is perceived that the use of generative AI in education has also inadvertently attracted the attendant perceived risks in higher education (Khlaif et al., 2023). Hence, this hypothesis:

**Hypothesis 3 (H3).** The perceived benefit of generative AI is positively associated with the risks.

**Organizational Context-related factors to generative AI ethics**

The use of generative AI in higher educational institutions depends on the understanding and support from the institution to embrace the benefits and mitigate the risks. This can be done by supporting initiatives that can help with the ethical guidelines. Recently, Chan (2023) revealed that educational organizations stand at the dividing line between generative AI benefits and the associated ethical issues. The institutional support from the management in higher education institutions is crucial to the success of the evolving impacts of generative AI in education. These roles have been identified to include top management support (Matshwane and Marnewick, 2024) and institutional policy Chan (2023). The level of support from the stakeholders in higher educational institutions in Nigeria can impact the ethical adoption of generative AI and can guide in the right direction in teaching and learning (Olayinka et al., 2024). Management support is largely impacted by the degree to which the management understands the capabilities of the technological innovation (Maroufkhani et al., 2023). The support of the management is significant as it ensures the political will, resource availability, technological support, training, and other active supports that can provide soft-landing in the use of Gen AI tools (Hashimy et al., 2023). Thus, the following:

**Hypothesis 4 (H4)**. Top management support is positively associated with the ethical adoption of generative AI.

Another support from the stakeholders in higher educational institutions which is critical to awareness, policy, and ethics of generative AI is inculcating the GenAI ethics in the curriculum (Onyejegbu, 2023). This is important in higher educational institutions in Nigeria where the awareness, adoption, and ethical issues of generative AI are misunderstood. Therefore, there is a need to address these issues in the curriculum so that students and lecturers can engage meaningfully in the classroom (Abdulkadir, 2024; Onyejegbu, 2023). Hence, this study posits that:

**Hypothesis 5 (H5).** Curriculum support for the use of generative AI is positively associated with the mitigation of ethical issues.

**Environmental context-related factors and generative AI**

The environmental consideration in the TOE framework focuses on technological trends, government regulation, and policies (Matshwane & Marnewick, 2024). As the use of generative AI in educational contexts gains momentum and becomes a trend, it is important to inculcate ethical frameworks and guidelines to ensure responsible adoption. DeMaere et al. (2022) revealed that higher educational institutions in Africa have a challenging digital transformation environment because of the current need to integrate fourth industrial revolution (4IR) technologies into higher education. Despite the uncertain technological environment, Mangundu (2024) stressed that having a workable information technology (IT) environment has become essential for sustaining teaching and learning, research, and community engagement activities. Therefore, the establishment of a functional IT environment that caters to the current generative AI operation is necessary for the attainment of higher education goals to remain competitive. Rubino and Vitolla (2014) emphasized the need for IT systems to be able to meet the dynamics of internal and external stakeholders' environment by establishing a set of policies, and rules that can guarantee successful adoption. Based on this, institutional policy can be initiated by either the government regulatory bodies or each institution of higher learning in Nigeria. Such policy can impact the

ethical use of generative AI in education. Similarly, Abdulkadir (2024) noted that the development of robust regulatory policies that balance innovation with ethical considerations to promote responsible AI adoption in Nigeria is very crucial. Therefore, the absence of clear regulatory frameworks and policies governing generative AI deployment creates uncertainty and may deter successful adoption in higher education environments. Therefore, this hypothesis:

**Hypothesis 6 (H6)**. Institutional policy for the use of generative AI is positively associated with the ethical impact.

Within the environmental context of the TOE framework, another construct that affects generative AI ethical adoption is the perceived technology trend, which is the extent to which the organization jumped on the bandwagon of the latest innovative technology. Prior research associated with technological trends in generative AI technological adoption and its associated issues identified trends as a driver for AI technology (Nguyen et al., 2022). Hence, we consider the trend in technology as a driver for generative AI adoption and associated ethical considerations in higher education.

**Hypothesis 7 (H7)**. The generative AI trend is positively associated with the ethical impact.

Therefore, the TOE framework was used as a theoretical lens to investigate the phenomenon of the ethical adoption of generative AI in higher educational institutions in Nigeria. The aim is to unravel how the contextual application of this framework could be used to explain the adoption and guide the ethical issues in generative AI in higher educational institutions. This study used the TOE framework as a supporting theory as evidence from past studies (Gupta et al., 2024; Matshwane & Marnewick, 2024; Wael AL-khatib, 2023). Figure 2 is a graphical presentation of how the TOE framework can be applied in the context of ethical generative AI adoption in higher educational institutions in Nigeria.

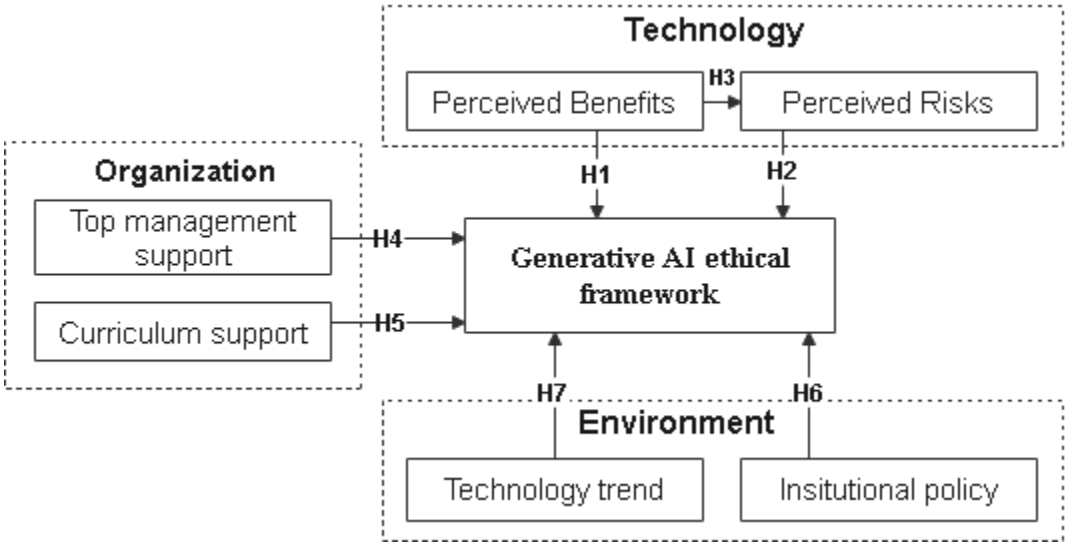



**Figure 1: Research Conceptual Framework**

## METHODOLOGY

The study was undertaken within the context of the use of generative AI in higher educational institutions in Nigeria and the need for an ethical framework by adapting the TOE framework. A quantitative approach was used to obtain data on various aspects of the use of generative AI and the need for an ethical framework. A multiple case study research approach was adopted (Yin, 2014) by using twelve tertiary educational institutions representing two educational institutions each from the six geopolitical zones in Nigeria.

A purposive sampling method was adopted for this study. This sampling method helped with the selection of the units of analysis from the entire population expected for this study (Mlitwa & VanBelle, 2011). The participants were purposively selected based on predetermined characteristics such as (each tertiary educational institution selected had a level of internet services either provided by the educational institution or a viable internet service provider (ISP) that the students could leverage for the use of generative AI tools, and the community had an awareness of generative AI). A questionnaire was used to obtain data from the selected students, and lecturers on the experiences and opinions on generative AI use in their respective institutions and the ethical impacts.

To ensure the appropriateness of the questions, a pretest study was conducted with the help of five experts (one from the National Information Technology Development Agency (NITDA) a body saddled with the adoption of technology in Nigeria, two independent researchers with vast knowledge of AI and ethical frameworks, and two staff from institution research and academic planning unit). These experts assisted in crafting the constructs and the questionnaire based on contextual relevance to the ethical framework of generative AI in higher educational institutions in Nigeria. Based on expert advice, a total of 34 items were used to define the constructs. To determine the instruments' reliability, a pilot test of the questionnaire was later conducted with 20 respondents. Upon completion of the survey, the participants were asked if they encountered any difficulties answering the questions. In order to increase comprehension and clarity, significant changes were made to concepts like the GenAI ethical framework (AIEF) and institutional policy (IP). Additionally, 370 of the 406 questionnaires that were manually sent to respondents were filled out and collected. Every questionnaire that was recovered was examined to find any missing information or unfinished answers. As a result, 360 valid questionnaires were left for analysis after 10 cases were eliminated. Due to the extensive coverage of the geopolitical scene, the data collection process took almost three months.

**Table 1. Demographic Descriptive statistics**

| **Demographics** | **Distributions** | **n = 360** |
|---|---|---|
| Gender | Male<br>Female | 241 (66.9%)<br>119 (33.1%) |
| Age group | 18 – 25 years<br>26 – 35 years<br>36 – 45 years<br>46 years and above | 243 (67.5%)<br>65 (18.1%)<br>26 (7.1%)<br>26 (.1%) |
| Type of Institutions | University<br>Polytechnics<br>Colleges of Education | 170 (47.2%)<br>133 (36.9%)<br>57 (15.8%) |
| Status in the institution | Students<br>Graduate/Researchers<br>Lecturer | 229 (63.6%)<br>81(22.5%)<br>50(13.9%) |

From the analysis in Table 1, 229 (63.6%) of the respondents were undergraduate students, 81(22.5%) were researchers who were mostly graduate students, and 50(13.9%) were lecturers.

**Data Analytical tools**: the data was analyzed using SPSS for descriptive statistics and AMOS23 (Version 20) was used for structural equation modeling (SEM) of the research framework.

**Operationalization of the Research Framework and instrument**

The research framework was derived from the TOE framework, expert advice, and prior literature on the ethical adoption framework of generative AI in higher education. The research instrument was structured into two parts: the initial segment is the demographic data such as gender, age, type of institutions, and status of the respondents in the institution of learning as shown in Table 1. These were evaluated on a dichotomous scale, such as 1 = yes, 2 = no, male or female, etc. Similarly, the questionnaire's portion was based on the research framework. The research framework variables, perceived benefits (PAIB), and perceived risk (PAIR) were used to measure the technology component, while top management support (MGS) and curriculum support (CS), were measured as the organizational component. Lastly, Gen AI trends (AIT) and institutional policy (IP) were used to measure the environmental context. The constructs were measured on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). The items, constructs, and their sources are shown in Table 2.

**Table 2**. Items, constructs values, and sources

| **Constructs** | **Items** | **FL** | **α** | **CR** | **AVE** | **Source** |
|---|---|---|---|---|---|---|
| Perceived AI ethical framework (AIEF) | | | **0.856** | **0.857** | **0.548** | Olayinka et al., (2024); Shahzad et al., (2024); and Zlateva et al., (2024) |
| | AIEF1 I am aware gen AI has some ethical issues in education | **0.83** | | | | |
| | AIEF2 I should be transparent about the use of generative AI in my work | **0.85** | | | | |
| | AIEF3 I think that the GenAI use policy will mitigate the risks in academic work | **0.80** | | | | |
| | AIEF4 I think the GenAI policy will enhance the benefits of academic work | **0.57** | | | | |
| Gen AI top management support (MGS) | | | **0.744** | **0.754** | **0.508** | Nguyen et al. (2022) |
| | MGS1 My institution has strong support for gen AI use and ethics in teaching and learning | **0.77** | | | | |
| | MGS2 My institution has staff that guide in Gen AI ethics for students and lecturers | **0.63** | | | | |
| | MGS3 There is an internet connection to support AI tools use | **0.73** | | | | |
| Perceived curriculum support (CS) | | | **0.830** | **0.831** | **0.553** | Onyejegbu (2023) |
| | | | | | | |
| | CS1 I know there is a need for gen AI ethics in the curriculum | **0.73** | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | CS2 I have heard about gen AI use ethics in my class | **0.79** | | | | |
| | CS3 I believe the teaching of gen AI ethics will enhance ethical knowledge | **0.82** | | | | |
| | CS4 I believe that the inclusion of gen AI in the curriculum will mitigate the risks | **0.62** | | | | |
| Perceived benefits of generative AI (PAIB) | | | **0.790** | **0.776** | **0.469** | Özer (2024) |
| | PAIB1 Gen AI enhances assignment/research paper ideas | **0.81** | | | | |
| | PAIB2 Provides instant data analysis/feedback | **0.82** | | | | |
| | PAIB3 Provides summarization/paraphrase tools | **057** | | | | |
| | PAIB4 Access to advanced sources and tools? | **0.63** | | | | |
| | PAIB5 Increased productivity | | | | | |
| Perceived risks of generative AI (PAIR) | | | **0.808** | **0.815** | **0.473** | Wu (2024) |
| | PAIR1 I am aware of bias in the GenAI result | **0.74** | | | | |
| | PAIR2 Inaccurate results are sometimes generated by generative AI | **0.79** | | | | |
| | PAIR3 Gen AI use undermines academic integrity and ethics | **0.65** | | | | |
| | PAIR4 Generative AI's potential to stifle critical thinking requires ethical guidance | **0.73** | | | | |
| | PAIR5 Gen AI compromises authorship in academic papers. | **0.50** | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Generative AI technology trend (AIT) | | | **0.816** | **0.815** | **0.471** | Nguyen et al. (2022) |
| | AIT1 I use generative AI in academic work because it is a trend | **0.64** | | | | |
| | AIT2 I use generative AI in academics to be competitive | **0.64** | | | | |
| | AIT3 Generative AI trend does not consider ethics in education | **0.71** | | | | |
| | AIT4 Generative AI use trend in academics does not come with policy | **0.66** | | | | |
| | AIT5 Gen AI trend use in academic erodes ethical scholarship | **0.77** | | | | |
| Gen AI Institutional policy in academic work (IP) | | | **0.808** | **0.812** | **0.592** | Kalmus and Nikiforova (2024) |
| | IP1 Institutional policy is required to allow GenAI use | **0.70** | | | | |
| | IP3 Current institutional policy is not adequate to support GenAI use in courses | **0.85** | | | | |
| | IP4 There is no awareness of the Gen AI ethics policy in my institution | **0.75** | | | | |

Each of the items and the constructs were adapted from previous research as indicated in the sources, while the item questions were adapted to reflect the generative AI adoption, use, and ethical frameworks as relevant to higher educational institutions in Nigeria.

## RESULTS

### Common Method Bias

This study used SPSS software to evaluate the possibility of common method bias (CMB) by using Harman's one-factor test. This approach was adopted due to its simplicity and diagnostic efficacy (Howard & Henderson, 2023). The result of Harman's one-factor test from our study revealed that a single component contributed only 13.352% of the variation, which is considerably lower than the benchmark

criteria of 50% (Podsakoff et al., 2003). This implies strongly that the integrity of this study is not affected by common method bias.

**Measurement model**

In this study confirmatory factor analysis was conducted to deduce the measurement model, we examined the model fit, reliability, and validity of the model among the relational constructs (Shahzad et al., 2024). Factor loading for each of the items was assessed, some items with low factor loadings (<0.5) such as IP2, IP5, PAIB5, CS1, and MGS4 were removed. In SPSS-AMOS, the construct model fit is determined by the values of the ratio of minimum discrepancy (CMIN/df), comparative fit index (CFI), Tucker–Lewis index (TLI), normed fit index (NFI), incremental fit index (IFI), relative fit index (RFI), (root mean square error of approximation (RMSEA) and standardized root mean squared residual (SRMR). As proposed by Hair et al. (2018), the value of CMIN/df must be less than 3, while RMSEA and SRMR must be less than 0.08. More so, the values of CFI, TLI, NFI, IFI, and RFI must exceed 0.9. The model fit was assessed by using the model goodness of fit indexes and all values were within the acceptable levels (CMIN/df = 1.610, CFI = 0.948, GFI = 0.907, TLI = 0.941, RMSEA =0.041, SRMR = 0.0480) as in table 3.

**Table 3. Model fit**

| Fit indices | Recommended criteria | Obtained value |
|---|---|---|
| CMIN/df | <3 | 1.610 |
| GFI | >.90 | 0.907 |
| CFI | >.90 | 0.948 |
| TLI | >.90 | 0.941 |
| SRMR | <.80 | 0.0480 |
| RMSEA | <.80 | 0.041 |

**Reliability**

Construct reliability was determined with the help of Cronbach's alpha (α), average variance extracted (AVE), and composite reliability (CR). Cronbach's alpha (α) was used to assess the internal consistency of the items in the constructs (Shahzad et al., 2024). Internal consistency helps to establish the inter-item correlation among constructs and the closeness of each variable to each other (Hair et al., 2018). The acceptable value for Cronbach's for the construct reliability is 0.7 and above, therefore values greater than 0.7 were accepted in this study as robust models. From the research model, the construct generative artificial intelligence adoption and ethical framework (AIEF) with four variables has a Cronbach alpha of 0.856, similarly, the construct, perceived generative artificial intelligence benefits (PAIB) with four items has a Cronbach alpha of 0.790, while perceived generative artificial intelligence risks (PAIR) with five variables has a Cronbach alpha of 0.808, top management support (MGS) with three items has 0.744, curriculum support to aid generative AI ethics and regulations (CS) with four items has 0.830, perceived generative artificial intelligence institutional policy (IP) with three items has 0.808, and lastly, the perceived generative AI trend (AIT) with 3 items has 0.815. The entire construct in the model satisfied the Cronbach alpha values, indicating that the variables within the constructs are reliable. Furthermore, all variables exhibit good internal consistency, as evidenced by the composite reliability (CR) score

exceeding the acceptable threshold of 0.70. Comparably, the average variance extraction (AVE) method examines the variance between latent constructs using a threshold value of 0.5 in order to assess convergent validity. Three of the constructs have AVE close to 0.5, while the others have 0.5 and above. The detail is shown in Tables 2 and 5.

**Table 5. Reliability and convergent validity**

| Construct | No of Items | Cronbach Alpha (α) | Composite Reliability (CR) | AVE |
|---|---|---|---|---|
| AIEF | 4 | 0.856 | 0.857 | 0.548 |
| PAIB | 4 | 0.790 | 0.776 | 0.469 |
| PAIR | 5 | 0.808 | 0.815 | 0.473 |
| MGS | 3 | 0.744 | 0.754 | 0.508 |
| CS | 4 | 0.830 | 0.831 | 0.553 |
| IP | 3 | 0.808 | 0.812 | 0.592 |
| AIT | 3 | 0.816 | 0.815 | 0.471 |

**Discriminant Validity**

In this study, discriminant validity was measured in two methods using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio (Shahzad et al., 2024). The Fornell and Larcker criterion was measured by examining correlation values of the cross-loading of the construct to ensure that the square root of the average variance extracted (AVE) was higher than the correlation coefficient of the vertical and horizontal rows and columns. In addition, HTMT was used to measure the discriminant validity because it is thought to be a more effective approach than the Fornell-Larcker criteria as it shows clear differences amongst variables where the correlation ratio is less than 0.90 (Gafen & Straub, 2005). All of the required values of the HTMT and Fornell-Larcker in this study were within the required limit and judged suitable for discriminant validity test. Table 6 shows the discriminant validity for the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio.

**Table 6. Fornell–Larcker criterion**

| | AVE | AIEF | PAIB | PAIR | MGS | CS | IP | AIT |
|---|---|---|---|---|---|---|---|---|
| **AIEF** | 0.548 | ***0.74*** | | | | | | |
| **PAIB** | 0.469 | 0.264 | ***0.69*** | | | | | |
| **PAIR** | 0.473 | 0.385 | 0.663 | ***0.69*** | | | | |
| **MGS** | 0.508 | 0.298 | 0.598 | 0.539 | ***0.71*** | | | |
| **CS** | 0.553 | 0.100 | 0.117 | 0.170 | 0.132 | ***0.74*** | | |
| **IP** | 0.592 | 0.125 | 0.061 | 0.126 | 0.071 | 0.075 | ***0.77*** | |
| **AIT** | 0.471 | 0.003 | 0.062 | 0.070 | 0.077 | 0.582 | 0.107 | ***0.69*** |

**Heterotrait-Monotrait ratio (HTMT)**

| | AIEF | PAIB | PAIR | MGS | CS | IP | AIT |
|---|---|---|---|---|---|---|---|
| **AIEF** | | | | | | | |
| **PAIB** | 0.27 | | | | | | |
| **PAIR** | 0.39 | 0.67 | | | | | |
| **MGS** | 0.29 | 0.60 | 0.54 | | | | |
| **CS** | 0.10 | 0.11 | 0.17 | 0.13 | | | |
| **IP** | 0.76 | 0.06 | 0.12 | 0.071 | 0.07 | | |
| **AIT** | 0.01 | 0.06 | 0.07 | 0.078 | 0.58 | 0.12 | |

## Structural Model Analysis and Hypothesis Testing

The structural model shows the causal relationships between latent variables in the conceptual model (Shahzad et al., 2024). This study investigated the impact of the perceived generative AI benefits (PAIB), perceived risks (PIAR), top management support (MGS), curriculum support (CS), generative AI trend (AIT), and institutional policy (IP) on the perceived ethical framework (AIEF) of generative AI. The two hypotheses in the research model (H1, and H4,) were unsupported (see Table 7 and Figure 2). Concerning the technological context, the perceived generative AI risks (PAIR) having values ($\beta = 0.167$, $p < 0.01$) impact positively on the need for the ethical framework (AIEF) of generative AI. In addition, the perceived benefits of generative AI having values ($\beta = 0.847$, $p<0.001$) impact positively on the perceived risks. Similarly, from the organizational context, the perceived curriculum support (CS) having values ($\beta = .186$, $p < 0.001$) impacts positively the perceived need for an ethical framework (AIEF) of generative AI. More so, from the environmental context, the perceived institutional policy having values ($\beta = .099$, $p < 0.05$)

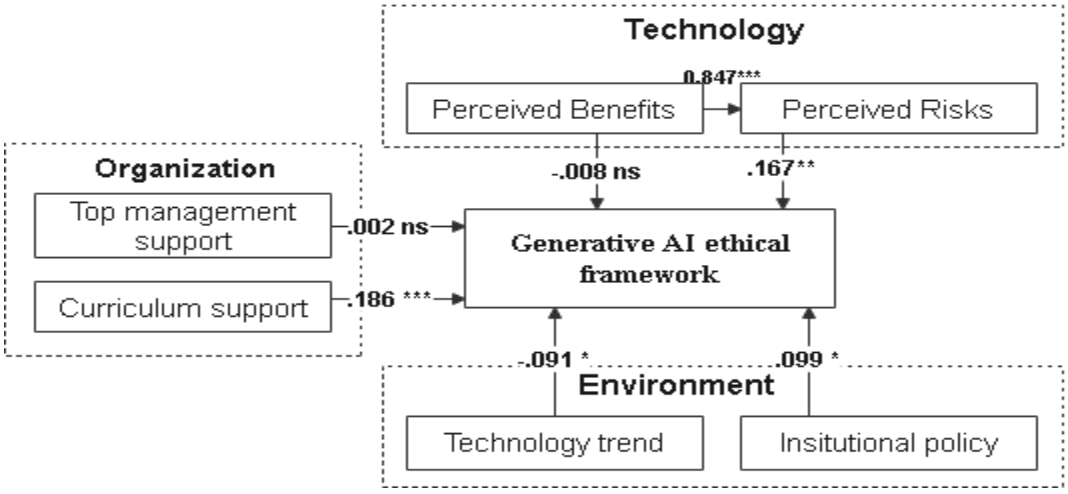
impacts positively on the perceived need for the ethical framework (AIEF) of generative AI. Lastly, the perceived generative AI trend (AIT) having values (β=-0.091, p<0.05) impacts positively on the perceived need for the ethical framework of generative AI. The detail is shown in Table 7 and the structural model is in Figure 2.

**Table7. Hypothesis testing**

| Hypothesis | Variables | Estimate | CR | p-Value | Findings |
|---|---|---|---|---|---|
| **H1** | AIEF<--- PAIB | -.008 | -.171 | .864 | Unsupported |
| **H2** | AIEF<--- PAIR | .167 | 3.010 | 0.003 | **Supported** |
| **H3** | PAIR<--PAIB | 0.847 | 9.751 | *** | **Supported** |
| **H4** | AIEF<--- MGS | .002 | .035 | .972 | Unsupported |
| **H5** | AIEF<--- CS | .186 | 3.687 | *** | **Supported** |
| **H6** | AIEF<--- IP | .099 | 2.021 | .043 | **Supported** |
| **H7** | AIEF<--- AIT | -.091 | -2.034 | .042 | **Supported** |

**Note:** *** p-value < 0.001, ** p-value < 0.01, * p-value < 0.05, p-value > 0.05 = Unsupported.

From the hypotheses tested, perceived generative AI risks (PAIR), curriculum support (CS), perceived institutional policy (IP), and perceived generative AI trend (AIT) supported the need for the ethical framework.




**Note:** *** *p*-value < 0.001, ** *p*-value < 0.01, * *p*-value < 0.05, ns not significant.

**Figure 2.** Path coefficient for the Research Framework structural model

## DISCUSSION OF RESULTS AND RESEARCH IMPLICATIONS

### Theoretical Implications

This study adopted the Technological, Organizational, and Environment (TOE) framework to investigate the ethical adoption of generative AI in higher educational institutions in Nigeria. First, we adapted the relevant constructs from the TOE frameworks and from the literature that are relevant to higher education in Nigeria to assess their relationship with the ethical issue of generative artificial intelligence. Additionally, from the technological contexts two factors were considered from past studies (Özer, 2024; Wu, 2024), these were perceived benefits and perceived risks. The findings from the hypothesis showed that the perceived risk was positively associated with the adoption and the need for an ethical framework to mitigate the risks of generative AI tools. On the other hand, the perceived benefit was not positively correlated with the ethical framework. This realigned with the need for an ethical framework in the use of generative AI in education, as the understanding of the perceived risks created ethical issues, and the need for the ethical framework (Corrigan, *et al*. 2023).

Secondly, from the organizational context, two constructs relevant to higher educational institutions were applied to the need for the ethical adoption of generative AI. From the hypotheses, top management support was not positively correlated to the generative AI ethical framework, but curriculum support was positively supported. This re-echoes a prior study on the need to strengthen generative AI awareness and compliance in education through the use of generative AI ethics-based curricula in the classroom (Akgun & Greenhow, 2022; Onyejegbu, 2023). Embedding a generative AI ethics-based curriculum is a positive leveler for mitigating the ethical risks in higher education. The last construct in the TOE framework is the environment. We conceptualized the education environment and adopted two constructs such as institutional policy and the generative AI trend and how it is related to the need for an ethical framework. From the hypothesis, the generative AI trend was positively correlated with the need for an ethical framework; similarly, the institutional policy was also positively correlated. Bailey (2023) stressed that the use of generative AI is a response to the new trend in machine intelligence. These constructs contained in the TOE framework adopted in this study could positively influence the ethical adoption of generative AI applications in educational institutions. The theoretical consideration could guide the effective application of generative AI in education to solve some practical ethical problems existing in education, especially in developing countries such as Nigeria.

### Implications

Generative AI tools stand at the threshold of innovation and the erosion of the long-standing values of education and good science in higher education. The findings of this study present important positions that can help navigate the ethical threshold in educational practice. First, it provides actionable guidelines to the policy and decision-makers working with the regulatory bodies in Nigerian higher educational institutions to develop national generative AI policies to guide students and educators. Secondly, from the hypothesis on perceived benefits of generative AI which was not positively correlated to the need for an ethical framework, this study implies that most users of generative AI in tertiary institutions of learning in Nigeria adopt the use of generative without the proper understanding of the need for ethical issues. This calls for awareness of some ethical issues intervening between the adoption and the perceived ethical

concern of generative AI for academic work. This is important as Akgun and Greenhow (2022) added that most users of generative AI expect the tools to be objective and value-neutral and do not seem to preempt associated ethical issues. Similarly, this study advocates the need for more management support in higher education to support the astronomic emergence of generative AI which has outpaced the existing best practices and policies to control ethics in academia. In Nigeria, especially, this has left educators and learners to struggle with myriad ethical concerns in the use of these generative AI tools (Ojerinde, 2024). This ethical framework can be formulated by the regulatory bodies in education or institution-based to help educators and students understand the limits of generative AI and the personal responsibilities in the use of the tools. Based on this finding, the role of human engagement in the process of knowledge discovery, creation, assessment, and dissemination, which are deeply rooted in education cannot be relinquished to generative AI tools (Susarla et al., 2023). Lastly, the inclusion of ethical generative AI into the curriculum was seen as an effective way to guide generative AI in higher education.

## CONCLUSIONS, LIMITATIONS, AND FUTURE SCOPE

Generative AI adoption in education in a developing like Nigeria offers potential benefits to students, lecturers, and researchers in the form of access to research sources, pedagogical mediation, and personalized learning that can deliver relevant content and feedback to learners. However, there is a need to be cautious about the generative AI ethical issues to control the over-reliance on AI tools. To maximize the benefits of generative AI in higher education in Nigeria, there is a need for a dynamic ethical framework from the regulatory bodies in education that can champion institutional policy and ensure that the GenAI technology is optimized for benefit and not harm. This ethical framework can also ensure that appropriate transparent processes and accountability are in place at the tertiary level of education in classroom assignments, studies, and research. Leaders and policymakers in higher educational institutions in Nigeria should be engaged with developments in GenAI ethics for education to empower students, lecturers, and researchers.

### Future Research

This study used only the TOE framework to investigate the need for an ethical framework in the ethical adoption of GenAI in higher education. To ensure a more robust and dynamic framework that can cater for the ever changing AI technology in education, this study suggests that other theories can be combined to devise an ethical framework for the use of generative AI in higher education.

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