LEVERAGING ARTIFICIAL INTELLIGENCE FOR INNOVATIVE RESEARCH IN BUSINESS AND ENTREPRENEURSHIP EDUCATION IN SOUTH-EAST UNIVERSITIES

Odunukwe, Chiamaka Maryann (PhD)[1] & Ukaegbu, Chinenyenwa Silver (PhD)[2]
University of Nigeria, Nsukka
Nigeria
[1]Chiamaka.odunukwe.pg91071@unn.edu.ng [2]chinenyenwaukaegbu@gmail.com

Abstract

The study investigated the role of Artificial Intelligence (AI) in enhancing research methodologies in Business and Entrepreneurship Education across public universities in South-East Nigeria, with particular attention to its roles, applications, challenges, and strategies for effective integration. Four research questions guided the study. A qualitative research design was adopted. The population comprised 505 Business Education lecturers and PhD students in eight public universities in South-East Nigeria, from which 120 participants, comprising 40 lecturers and 80 PhD students, were purposively selected. Data were collected using a semi-structured interview guide containing open-ended questions. The interview responses were analyzed using descriptive content analysis, whereby similar responses were categorized and the frequency of mentions was determined. The results were presented using grouped bar charts and supported with narrative interpretation. Findings indicated that participants recognized AI as useful in several aspects of research methodology, particularly literature review support, methodological accuracy enhancement, simulation-based analysis and predictive modelling and forecasting. Challenges identified included inadequate infrastructure, the high cost of AI tools, limited technical expertise and ethical concerns. Participants recommended training workshops, improved ICT infrastructure, institutional policy frameworks, and collaboration with EdTech firms as strategies for effective AI integration. The study recommended that universities strengthen institutional capacity and professional development while incorporating AI literacy into relevant curricula to promote effective and ethical use of AI in research.

Keywords: Artificial Intelligence, Research Methodologies, Business and Entrepreneurship Education, University Research, South-East Nigeria

Introduction

The rapid advancement of Artificial Intelligence (AI) is reshaping higher education and research by creating new possibilities for knowledge production, innovation, efficiency, and creativity (Gašević et al., 2022). In higher education, AI is increasingly being applied to teaching, learning, and research, with implications for how knowledge is generated, analyzed, and communicated (Ifenthaler & Yau, 2020; Crompton & Burke, 2023). These developments are particularly relevant to Business and Entrepreneurship Education, where learners and researchers are expected to develop analytical, problem-solving, innovative, and technology-related competencies. Business Education equips learners with knowledge, skills, and attitudes for effective participation in business and economic activities (Okoye et al., 2021), while Entrepreneurship Education develops competencies related to opportunity recognition, creativity, innovation, and venture development (Fayolle & Gailly, 2015). As these fields increasingly emphasize innovation and evidence-based decision-making, AI presents opportunities to support more efficient and innovative research practices. Applications such as natural language processing, machine learning, predictive modelling, and automated data analysis can expand researchers' capacity to process information and generate insights. However, the value of these

technologies depends on researchers' capacity to use them appropriately and on the availability of institutional infrastructure, technical expertise, and ethical guidance.

The growing use of AI in research has been associated with applications such as literature synthesis, predictive modelling, data analysis, and simulation, thereby expanding the scope and efficiency of contemporary research (Dwivedi et al., 2021; Kumar et al., 2022). A systematic review by Xia et al. (2022) identified multiple roles of AI across educational domains while also highlighting significant challenges associated with its integration. In business-related research, AI applications can support the analysis of complex data, exploration of consumer and market patterns, and simulation of business scenarios. At the same time, AI adoption presents concerns relating to accuracy, bias, academic integrity, data privacy, and responsible use. Ethical governance is therefore essential to ensure that the benefits of AI do not compromise the integrity of research processes (Floridi & Cowls, 2019). These concerns become more significant in contexts where access to appropriate infrastructure, digital resources, and specialized expertise is limited. In African higher education, infrastructural deficits, resource limitations, and capacity gaps have been identified as constraints to effective technology adoption (Alshurideh et al., 2021; Ifinedo & Usoro, 2022). Although AI is increasingly influencing research practices globally, evidence concerning how it is being used, the challenges encountered, and the strategies required for its effective integration into Business and Entrepreneurship Education research in Nigerian universities remains limited. This is particularly important in South-East Nigeria, where universities operate within a context of increasing interest in digital transformation alongside continuing institutional and infrastructural constraints.

Against this background, there is a need to move beyond general discussions of AI as a technological innovation and examine its practical role in contemporary research within Business and Entrepreneurship Education. Existing literature has established the potential of AI to transform research processes and identified opportunities and ethical challenges associated with its adoption, but insufficient attention has been given to the experiences and perspectives of Business Education lecturers and PhD students regarding the actual roles and applications of AI, the challenges limiting its use, and the strategies that could support effective institutional integration in South-East Nigerian universities. This study therefore investigated the role of AI in enhancing research methodologies in Business and Entrepreneurship Education across public universities in South-East Nigeria, focusing on its applications, challenges, and strategies for effective integration. By examining the perspectives of lecturers and Ph.D. students, the study contributes context-specific evidence on the opportunities and constraints surrounding AI-supported research and provides practical insights for institutional capacity building, researcher development, ethical governance, and the responsible integration of AI into university research practices.

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was propounded by Davis (1989) to explain the factors that influence individuals' acceptance and use of information technology. The model proposes that users' acceptance of a technology is primarily influenced by two central beliefs: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which an individual believes that using a particular technology will improve his or her performance, whereas perceived ease of use refers to the extent to which the individual believes that using the technology will require little effort. According to TAM, these beliefs influence users' attitudes and behavioural intentions toward technology and, ultimately, their actual use of the technology.

TAM is relevant to this tudy because the adoption of AI for research activities among Business Education lecturers and Ph.D. students may depend partly on whether they perceive AI tools as useful and sufficiently easy to use. For example, researchers who perceive AI as useful for literature exploration, data analysis, interpretation, predictive modelling, or other research

activities may be more willing to experiment with and integrate such technologies into their research practices. Similarly, inadequate technical skills or the perceived complexity of AI tools may discourage their use. TAM therefore provides a useful lens for understanding some of the factors underlying participants' experiences with AI and the challenges that may limit its adoption in university research.

However, TAM has an important limitation for the study. Its primary focus is on the individual user's acceptance and intention to use a technology, with particular emphasis on perceived usefulness and perceived ease of use. It provides less explanation of broader organizational and social processes through which a new technology becomes accepted, communicated, and integrated within an institution. The adoption of AI in university research is not determined solely by individual researchers' perceptions; it can also be influenced by institutional infrastructure, policies, available resources, professional networks, organizational support, and the characteristics of AI as an innovation. Therefore, while TAM helps explain individual acceptance of AI, it does not sufficiently account for the broader process through which AI spreads and becomes integrated into university research practices. This limitation necessitates a complementary theoretical perspective such as Diffusion of Innovations Theory.

Diffusion of Innovations Theory

The Diffusion of Innovations (DOI) Theory was propounded by Rogers (2003) and explains how an innovation is communicated through particular channels over time among members of a social system. The theory focuses on the processes through which new ideas, technologies, practices, or products are adopted by individuals and groups. Rogers identified five major attributes that influence the rate at which an innovation is adopted: relative advantage, compatibility, complexity, trialability, and observability. An innovation is more likely to be adopted when potential users perceive that it offers advantages over existing practices, is compatible with their needs and values, is not excessively complex, can be experimented with, and produces observable benefits.

DOI complements TAM in this study because AI adoption in university research represents not only an individual decision to use a technology but also an institutional process of introducing and integrating an emerging innovation into established research practices. The theory helps explain why some AI applications may gain acceptance while others encounter resistance. For instance, researchers may be more willing to adopt AI when they perceive clear advantages in literature review, data analysis, predictive modelling, or research efficiency. Conversely, complexity, inadequate infrastructure, limited opportunities for experimentation, insufficient training, and uncertainty about the outcomes of AI use may slow its diffusion. Institutional policies, professional networks, training programmes, and collaboration with technology providers may also facilitate the communication and diffusion of AI-related research practices.

The theory is particularly relevant to the third and fourth research questions, which examine the challenges limiting AI adoption and the strategies for effective integration. The identified challenges can be understood partly in terms of the perceived complexity, compatibility, and availability of resources required to adopt AI, while proposed strategies such as training workshops, improved ICT infrastructure, institutional policies, and collaboration with EdTech firms can be interpreted as mechanisms that facilitate the diffusion and institutionalization of the innovation.

Statement of the Problem

In contemporary higher education, Artificial Intelligence (AI) ought to serve as a catalyst for more efficient, innovative, and evidence-driven research in Business and Entrepreneurship Education. Ideally, AI-driven tools such as machine learning, natural language processing, predictive analytics, and other intelligent applications should support researchers in literature exploration, data analysis, interpretation, modelling, and the generation of insights that can inform educational and business practices (Dwivedi et al., 2021). Effective integration of these technologies would

strengthen research capacity and enable researchers and students to develop competencies that are increasingly relevant in technology-driven academic and professional environments.

However, the potential of AI to support research in Business and Entrepreneurship Education does not necessarily correspond with its actual adoption in university settings in South-East Nigeria. Evidence from related studies indicates that inadequate digital infrastructure, limited AI-related skills, high costs of technological tools, and insufficient institutional support can constrain the effective adoption of emerging technologies in educational settings (Okolie et al., 2022; Onuorah & Amah, 2023). Consequently, there remains insufficient context-specific evidence on how Business Education lecturers and Ph.D. students in South-East Nigerian universities are using AI in their research activities, the particular applications they employ, the challenges they encounter, and the institutional or professional strategies that could facilitate effective integration. This creates a gap between the growing global potential of AI-supported research and the understanding of its practical application within Business and Entrepreneurship Education in the region.

If this gap remains inadequately addressed, universities in South-East Nigeria may face difficulties in building research capacity that responds effectively to emerging AI-driven developments in knowledge production. Continued limited or inappropriate use of AI could constrain researchers' ability to exploit emerging tools for efficient data processing, analysis, modelling, and knowledge generation, while inadequate attention to ethical and institutional considerations could create additional risks associated with responsible AI use. Addressing these concerns is therefore necessary to strengthen AI-supported research practices, enhance institutional capacity, and promote responsible and contextually appropriate integration of AI into Business and Entrepreneurship Education research in South-East Nigerian universities.

Research Questions

The following research questions guided the study:

1. What are the roles of Artificial Intelligence (AI) in supporting research methodologies among Business Education lecturers and Ph.D. students in universities in South-East Nigeria?
2. How is Artificial Intelligence (AI) applied in data collection, analysis, and interpretation for research activities in Business and Entrepreneurship Education in universities in South-East Nigeria?
3. What challenges hinder the adoption of Artificial Intelligence (AI) for innovative research in Business and Entrepreneurship Education in universities in South-East Nigeria?
4. What strategies can be employed to effectively integrate Artificial Intelligence (AI) into research practices in Business and Entrepreneurship Education in universities in South-East Nigeria?

Method

Research Design

This study adopted a qualitative research design. According to Tracy (2021), qualitative research design refers to a systematic plan that outlines how a researcher will collect, analyze, and interpret non-numerical data to understand concepts, opinions, or experiences. The design was considered appropriate for the present study because it sought to describe the experiences and perspectives of Business Education lecturers and PhD students concerning the roles, applications, challenges, and possible strategies associated with the use of Artificial Intelligence (AI) in research. The design enabled the researchers to obtain participants' views through semi-structured interviews and organize their responses into categories that corresponded with the research questions. The study therefore focused on describing participants' reported experiences rather than testing causal relationships or statistically generalizing the findings to all university researchers.

Population of the Study

The population comprised 505 participants, consisting of 148 Business Education lecturers and 357 PhD students across eight public universities in South-East Nigeria. The distribution was as follows: University of Nigeria, Nsukka (UNN) – 20 lecturers and 58 PhD students; Enugu State University of Science and Technology (ESUT), Agbani – 9 lecturers and 21 PhD students; Nnamdi Azikiwe University, Awka – 27 lecturers and 44 PhD students; Chukwuemeka Odumegwu Ojukwu University, Igbariam – 23 lecturers and 51 PhD students; Alex Ekwueme Federal University, Ndufu-Alike Ikwo, Abakaliki – 16 lecturers and 39 PhD students; Ebonyi State University, Abakaliki – 13 lecturers and 65 PhD students; Imo State University, Owerri – 19 lecturers and 46 PhD students; and Abia State University, Uturu – 21 lecturers and 33 PhD students. The eight universities constituted the study setting because they are public universities in South-East Nigeria with Business Education programmes. Lecturers and PhD students were included because both groups are directly involved in university-based teaching, learning, and research activities and could provide perspectives on the use of AI in research.

Sample and Sampling Technique

A purposive sampling technique was used to select 120 participants from the eight universities. The sample comprised 40 Business Education lecturers and 80 Ph.D. students, with five lecturers and 10 Ph.D. students selected from each university. The allocation of 15 participants per university was predetermined to ensure representation of both participant groups across all eight institutions. Participants were purposively approached based on their relevance to the study and willingness to participate. The researchers sought participants who were engaged in university teaching and postgraduate research activities and who could provide informed perspectives on the use or potential use of AI in research. Participation was voluntary and individuals were included after agreeing to participate in the interview.

The sample size was determined to provide broad representation across the eight universities and to permit comparison of perspectives between lecturers and PhD students. The study did not determine sample size through statistical sampling or claim statistical generalizability; rather, the predetermined allocation was intended to provide representation across institutions and participant categories. This approach is consistent with the descriptive purpose of the study, in which the emphasis was on obtaining varied perspectives from the identified research stakeholders.

Instrument for Data Collection

Data were collected using a semi-structured interview guide developed around the four research questions and the objectives of the study. The guide contained seven open-ended questions covering four principal areas: (1) the roles of AI in research methodologies, (2) applications of AI in research activities, (3) challenges associated with AI adoption and (4) strategies for effective integration of AI into research practices. The semi-structured format provided sufficient consistency across participants while allowing the researchers to ask follow-up questions where clarification or elaboration was necessary. To reduce the possibility of directing participants toward predetermined responses, the interview questions were framed in open-ended and neutral language.

Interview Guide

1. Please describe your experience, if any, with the use of Artificial Intelligence in your research activities.
2. Which aspects of your research activities, if any, have you found Artificial Intelligence useful for? Please explain.
3. In what ways, if any, do you think Artificial Intelligence is changing research practices in Business and Entrepreneurship Education?

4. What challenges or limitations have you experienced or observed regarding the use of Artificial Intelligence in research?
5. How would you describe the level of institutional support available for the use of Artificial Intelligence in research at your university?
6. What concerns, if any, do you associate with the use of Artificial Intelligence in research?
7. What measures do you consider necessary for the effective integration of Artificial Intelligence into research practices in South-East Nigerian universities?

Data Collection Procedure

Data were collected through face-to-face and virtual semi-structured interviews conducted by the two researchers. Participants were contacted through personal contacts and WhatsApp, depending on their accessibility and willingness to participate. Interviews were conducted either physically or remotely through WhatsApp, Zoom, and Google Meet. Each interview lasted approximately 15–20 minutes. With participants' consent, the interviews were audio-recorded. The recorded interviews were subsequently transcribed using transcription software and reviewed by the researchers before analysis. The researchers maintained field and reflexive notes during the research process to document observations, assumptions and reflections arising during data collection and analysis. The use of both physical and virtual interviews enabled the researchers to accommodate participants' availability and geographical distribution across the eight universities while maintaining the same broad interview structure across participants.

Data Analysis

Data obtained from the semi-structured interviews were analyzed using qualitative content analysis. Content analysis provides a systematic approach for organizing textual data by identifying and grouping relevant categories within participants' responses (Elo & Kyngäs, 2008). The researchers first reviewed the interview transcripts to become familiar with the responses. Responses relevant to each research question were then identified and grouped according to similarities in meaning. The resulting categories corresponded to the major areas examined in the study, namely the roles of AI in research, applications of AI in research activities, challenges affecting AI adoption, and strategies for effective integration. The researchers compared the categorization of responses, discussed areas of difference, and reached agreement on the categories used for presentation.

Because participants could mention more than one role, application, challenge, or strategy, the frequencies represented mentions of identified categories rather than mutually exclusive participant counts. The frequency of each category was therefore calculated for the lecturer and PhD student groups and presented using grouped bar charts. Narrative explanations were then used to interpret the patterns shown in the charts and relate the findings to the research questions. This approach allowed the study to retain the qualitative character of participants' responses while providing a transparent descriptive comparison of the frequency with which particular issues were mentioned.

Trustworthiness of the Study

To enhance the trustworthiness of the findings, attention was given to **credibility, dependability, and conformability** throughout the research process. The two researchers were involved in reviewing and categorizing the interview responses, thereby providing an additional check on the interpretation and classification of the data. The researchers also engaged in peer discussion of the emerging categories and compared their interpretations before reaching agreement on the categories presented in the findings. Field and reflexive notes were maintained during the research process to enable the researchers to reflect on their observations, assumptions, and possible influences on data interpretation. These procedures strengthened the transparency of the analytical process and reduced reliance on a single researcher's interpretation. The study did not use participant member checking; consequently, the findings were based on the researchers' systematic analysis and comparison of the recorded interview responses.

This treatment of qualitative quality is consistent with the broader view that qualitative rigor involves credibility, reflexivity, transparency, ethics, and coherence rather than simply applying quantitative notions of reliability and generalizability (Tracy, 2010).

Researcher Positionality and Reflexivity

The researchers recognized that their backgrounds and relationships with some participants could influence the research process. In particular, one researcher had an academic relationship with one participant, while some participants were personally known to the researcher. At the same time, not all participants had prior personal relationships with the researcher. This created both insider and outsider positions during different stages of the research. To minimize the potential influence of these relationships on participants' responses and the interpretation of the data, participation was voluntary and the interview questions were presented in an open-ended manner. The researchers maintained reflexive notes throughout the research process and discussed emerging categories and interpretations with each other. This reflexive process was intended to make researchers' assumptions more visible and to reduce the possibility that individual expectations would determine the categorization of participants' responses.

Ethical Considerations

This study involved human participants; therefore, ethical issues relating to informed participation, confidentiality, privacy, and the handling of interview data were considered. Participants were informed about the purpose of the study and the nature of their participation before the interviews were conducted. Consent was obtained before interviews were audio-recorded. Participants were not required to provide information unrelated to the study, and their responses were treated confidentially in the reporting of the findings. The researchers did **not obtain formal institutional ethical approval or approval from an institutional review board before data collection**.

Bar Chart 1. Legend: Roles of AI in Enhancing Research Methodologies

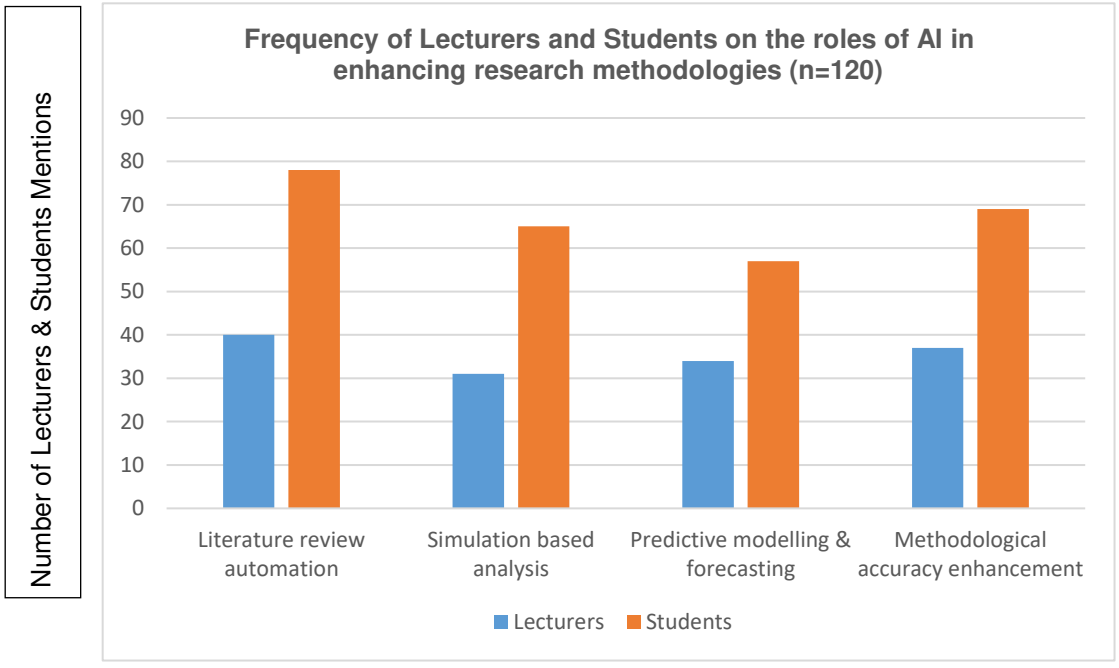
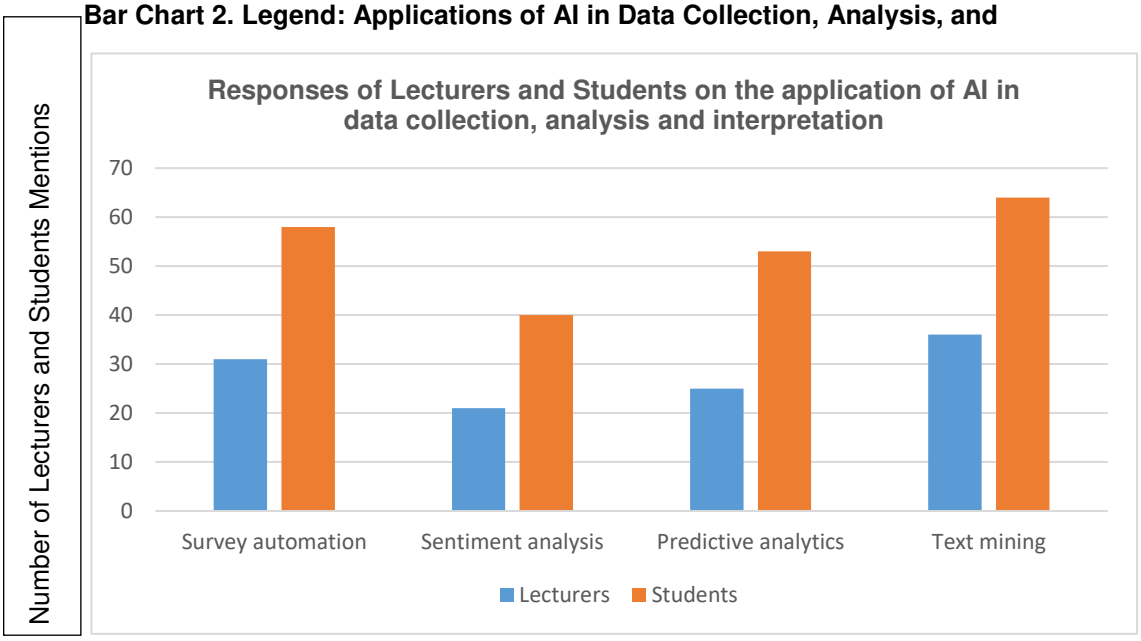


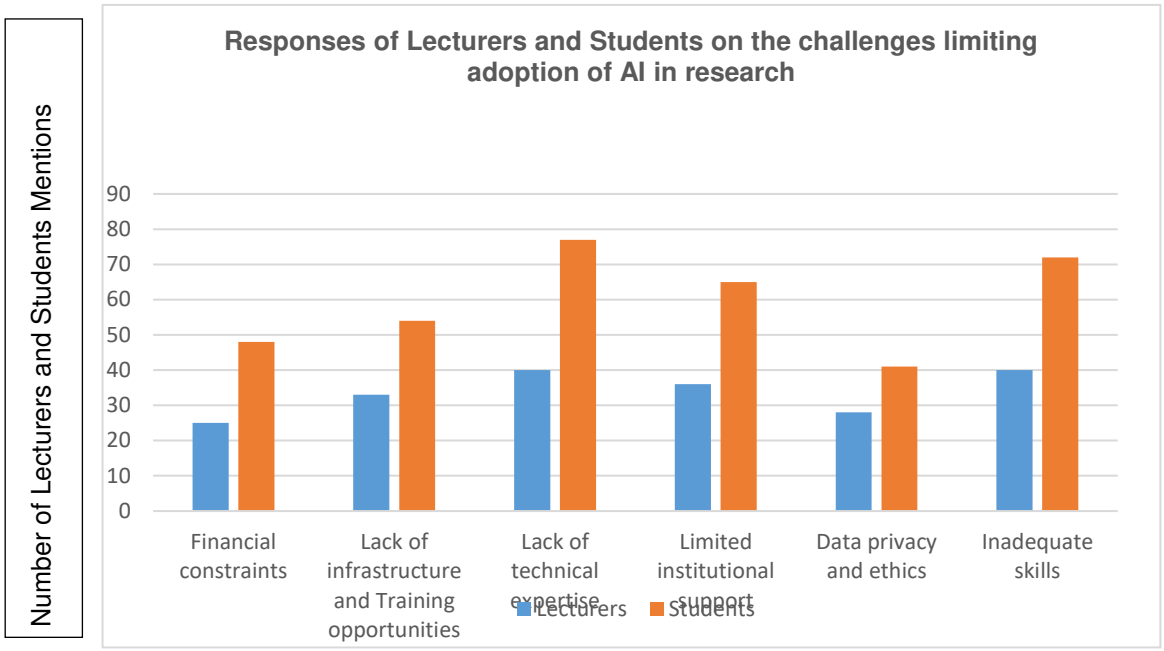
Figure 1 presents the roles of Artificial Intelligence (AI) in enhancing research methodologies as reported by Business Education lecturers and PhD students. Literature review support recorded the highest frequency of mentions among both groups, with 40 mentions from lecturers and 78 from PhD students. Methodological accuracy enhancement followed, with 38 lecturer mentions and 69 student mentions. Simulation-based analysis was mentioned by 31 lecturers and 65 students, while predictive modelling and forecasting recorded the lowest frequency, with 34 lecturer mentions and 57 student mentions. The pattern indicates that participants particularly associated AI with improving the efficiency of literature review, enhancing methodological accuracy, supporting simulation-based analysis, and facilitating predictive research activities.

Bar Chart 2. Legend: Applications of AI in Data Collection, Analysis, and



Interpretation

Figure 2 presents the reported applications of Artificial Intelligence (AI) in data collection, analysis, and interpretation. Text mining recorded the highest frequency of mentions, with 36 lecturers and 64 PhD students identifying it as an application of AI in research. Survey automation followed, with 31 lecturer mentions and 58 student mentions. Predictive analytics was mentioned by 25 lecturers and 53 students, while sentiment analysis recorded 21 lecturer mentions and 40 student mentions. The findings indicate that participants associated AI with a range of research activities, particularly the processing of large volumes of textual and survey data, identification of patterns, and extraction of insights from research information.



Legend: Challenges Limiting Adoption of AI in Research

Figure 3 presents the challenges reported by Business Education lecturers and PhD students regarding the adoption of Artificial Intelligence (AI) in research. Lack of technical expertise recorded the highest frequency of mentions, with 40 lecturer mentions and 77 student mentions. This was followed by inadequate skills, with 40 lecturer mentions and 72 student mentions, indicating concerns about the ability of researchers to effectively apply AI tools in research activities. Limited institutional support was also frequently mentioned, with 36 lecturer mentions and 65 student mentions, while lack of infrastructure and training opportunities accounted for 33 lecturer mentions and 54 student mentions. Data privacy and ethical concerns were mentioned by 28 lecturers and 41 students, whereas financial constraints recorded 25 lecturer mentions and 48 student mentions. The pattern of responses indicates that participants perceived technical capacity, researcher skills, institutional support, infrastructure and training, ethical considerations, and financial limitations as important barriers to effective AI adoption in research.

Bar Chart 4. Legend: Strategies for Effective Integration of AI in Research

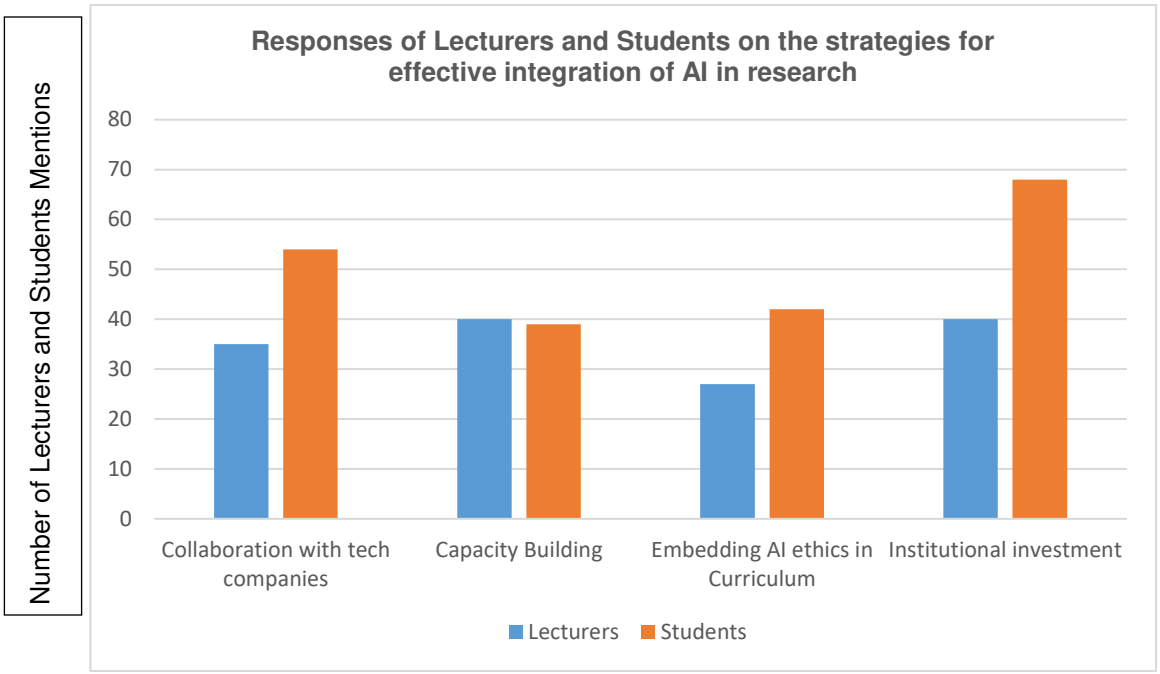


Figure 4 illustrates the strategies identified by Business Education lecturers and PhD students for the effective integration of Artificial Intelligence (AI) into business and entrepreneurship education research. Capacity building through professional development and AI training recorded the highest frequency of mentions, with 40 lecturer mentions and 39 student mentions. Institutional investment in AI infrastructure and resources was mentioned by 40 lecturers and 68 students, indicating strong recognition of the need for adequate institutional resources to support AI adoption. Collaboration with technology companies and industry partners was mentioned by 35 lecturers and 52 students as a means of strengthening the connection between academic research and industry practice. In addition, embedding AI ethics and responsible use into university curricula was mentioned by 27 lecturers and 42 students. The responses indicates that effective AI integration requires more than technical training and infrastructure; it also requires institutional support, collaboration with relevant industry partners, and attention to ethical and responsible use of AI in research.

Discussion of Findings

The findings indicate that Artificial Intelligence (AI) is perceived by both lecturers and PhD students as having several roles in supporting research methodologies in Business and Entrepreneurship Education. Among the identified roles, **literature review support recorded the highest frequency of mentions**, followed by methodological accuracy enhancement, simulation-based analysis, and predictive modelling and forecasting. This pattern suggests that participants are more familiar with AI applications that directly assist researchers with information-intensive and relatively accessible tasks than with applications requiring more advanced computational and statistical competencies. The prominence of literature review support is understandable because reviewing scholarly literature involves searching, screening, organizing, summarizing, and synthesizing large volumes of information, tasks for which contemporary AI tools can provide considerable assistance. Thus, participants' emphasis on literature review support may reflect the immediate usefulness and accessibility of AI in an aspect of research that is common to virtually every academic investigation. The comparatively lower recognition of predictive modelling and

forecasting is particularly noteworthy. Predictive modelling is increasingly important in data-driven business research, yet it recorded fewer mentions than the other identified roles in the present study. One possible explanation is that effective predictive modelling requires greater familiarity with statistical techniques, data preparation, computational tools, and interpretation of model outputs. Consequently, researchers may recognize the general usefulness of AI without possessing the technical competence required to exploit its more sophisticated analytical capabilities. This interpretation is important because it suggests that awareness of AI does not necessarily translate into equal familiarity with all of its research applications. Rather, the level of engagement may depend partly on the complexity of the application and the competencies available to the researcher.

Another notable pattern is the generally higher frequency of mentions among PhD students than lecturers across the identified roles. Although the present study did not directly investigate the reasons for this difference, the pattern may indicate greater experimentation with emerging digital technologies among researchers who are actively engaged in contemporary postgraduate research. It may also reflect differences in research demands, exposure to newer digital tools, or willingness to experiment with unfamiliar technologies. From an institutional perspective, this difference is significant because PhD students represent an important emerging research workforce. If their experimentation with AI is not accompanied by appropriate methodological and ethical guidance, increased use may occur without a corresponding improvement in research quality. Conversely, structured support could convert this experimentation into more competent and responsible research practice. Generally, the above findings aligns with Dwivedi et al. (2021), who noted that AI has transformed knowledge discovery by automating systematic reviews and improving accuracy. Also, these results correspond with Alshurideh et al. (2021), who emphasized the value of AI in enabling researchers to interpret complex datasets and communicate results more effectively. The findings suggest that both lecturers and students in South-East universities are increasingly aware of AI's methodological potential, although adoption levels remain limited compared to global trends.

The finding therefore has an important implication for universities. AI integration should not be understood simply as making AI tools available to researchers. Universities need to develop researchers' capacity to determine **when an AI application is appropriate, how it should be used, and how its outputs should be critically evaluated**. This is particularly important for more technically demanding applications such as predictive modelling and simulation. The finding extends the discussion of AI adoption beyond access to technology and toward the development of research competencies necessary for meaningful use.

The findings further show that participants identified several applications of AI in data collection, analysis, and interpretation, with **text mining receiving the highest frequency of mentions**, followed by survey automation, predictive analytics, and sentiment analysis. The prominence of text mining is particularly relevant to Business and Entrepreneurship Education because researchers frequently deal with textual information generated through interviews, online content, customer feedback, business reports, and other documentary sources. AI-supported text analysis can potentially assist researchers in organizing and examining large volumes of textual information that would otherwise require considerable time and manual effort. The relatively high recognition of survey automation also indicates participants' awareness of AI's potential to streamline data collection processes. However, automation should not be interpreted as eliminating the need for researcher judgment. Decisions concerning sampling, question design, data quality, informed participation, and interpretation remain fundamentally human responsibilities. The finding therefore points to a complementary relationship between AI and the researcher rather than a replacement of the researcher. AI may reduce the burden associated with some research tasks, but methodological decisions still require disciplinary knowledge and

critical judgment. Predictive analytics and sentiment analysis received fewer mentions than text mining and survey automation. This may again reflect differences in technical accessibility. Predictive analytics requires researchers to understand the underlying data, analytical assumptions, and interpretation of predictive outputs, while sentiment analysis requires familiarity with how AI systems classify and interpret language. The lower frequency of these applications should therefore not necessarily be interpreted as evidence that they are less useful. Rather, it may indicate that their effective application requires a level of technical competence that is not yet widespread among the participants.

The findings are consistent with Kumar et al. (2022), who discussed the growing relevance of AI in business and entrepreneurship research, particularly for extracting consumer insights and supporting the simulation of business scenarios. However, the present findings contribute an important contextual dimension by showing that, among the participants in South-East Nigerian universities, more accessible applications such as text mining and survey automation appear to receive greater recognition than more technically demanding applications. This suggests that the progression from basic to advanced AI-supported research may depend on the development of researchers' technical capabilities and the availability of institutional support.

The findings revealed that **lack of technical expertise and inadequate skills were the most frequently identified challenges**, followed by limited institutional support and inadequate infrastructure and training opportunities. Financial constraints recorded comparatively fewer mentions, while data privacy and ethical concerns were also identified by participants. This pattern is important because it suggests that the principal challenge may not simply be whether researchers can obtain AI tools, but whether they possess the knowledge and institutional support required to use those tools appropriately. The prominence of technical expertise and inadequate skills has particular significance for AI-supported research. AI applications vary considerably in complexity, and meaningful use requires researchers to understand not only how to operate a tool but also how to evaluate the accuracy, relevance, limitations, and potential biases of its outputs. A researcher who can generate an AI-assisted analysis but cannot critically evaluate that analysis may introduce new methodological problems rather than improve research quality. The finding therefore suggests that AI literacy should be treated as part of contemporary research competence rather than as an optional technological skill. Limited institutional support and infrastructure further reinforce this interpretation. Individual researchers may be willing to experiment with AI, but sustained integration is difficult when universities do not provide adequate digital infrastructure, training opportunities, technical assistance, and institutional guidance. Ifinedo and Usoro (2022) similarly drew attention to infrastructural and resource-related constraints affecting technology adoption in African university contexts. The present finding extends this concern by showing that participants perceived **human capacity and institutional support** as particularly important alongside technological resources.

An interesting finding is that **financial constraints were not the most frequently mentioned barrier**, despite the cost of some AI tools and digital technologies. This may indicate that participants perceive skills and institutional capacity as more immediate obstacles than the cost of individual tools. In other words, even where researchers can access free or relatively affordable AI applications, they may still be unable to use them effectively without appropriate knowledge and guidance. This finding challenges a purely resource-based explanation of AI adoption and suggests that universities should not assume that providing access to AI platforms alone will result in meaningful integration. Ethical concerns, including data privacy, academic integrity, plagiarism, and algorithmic bias, also emerged from the responses. These concerns are particularly significant in research because AI systems can process sensitive information and generate outputs whose accuracy or provenance may not always be immediately apparent. Floridi and Cowls (2019) emphasized the importance of ethical principles in the development and

use of AI. In the context of the present study, this means that AI adoption should occur alongside clear guidance on responsible use, protection of research data, academic integrity, transparency, and critical evaluation of AI-generated outputs. Thus, ethical governance should be regarded as an integral component of AI integration rather than an issue to be addressed after adoption has already occurred.

The findings identified four major strategies for strengthening AI integration in Business and Entrepreneurship Education research: **capacity building, institutional investment, collaboration with technology companies and industry partners, and embedding AI ethics and responsible use into university curricula**. The identification of these strategies is particularly significant because they correspond closely with the challenges reported by participants. The findings therefore suggest that participants do not view AI integration as a matter of technology alone but as an institutional process requiring investment in people, infrastructure, partnerships, and responsible practices. Capacity building through professional development and AI training was mentioned by **40 lecturers and 39 PhD students**. This finding directly responds to the major challenge of inadequate technical expertise and skills. Training should therefore extend beyond basic awareness of AI tools to include practical research applications, critical evaluation of AI outputs, data protection, ethical use, prompt formulation where appropriate, and understanding of the limitations of AI-generated information. Such training would enable researchers to progress from experimental use of AI toward more systematic and methodologically appropriate application.

Institutional investment was also strongly supported, with **40 lecturer mentions and 68 student mentions**. This finding indicates that participants recognize that individual willingness cannot substitute for institutional capacity. Universities need to provide reliable digital infrastructure, access to appropriate research technologies, technical support, and institutional policies that guide AI use. The particularly high number of student mentions may suggest that PhD students experience infrastructure and resource limitations directly in the course of their research activities. Institutional investment may therefore be especially important for ensuring that enthusiasm for AI among emerging researchers is not constrained by inadequate research environments. Collaboration with technology companies and industry partners was identified by **35 lecturers and 52 PhD students**. Such collaboration could expose researchers to current AI technologies and practical applications while creating opportunities for knowledge exchange between universities and industry. For Business and Entrepreneurship Education in particular, industry collaboration may help researchers understand how AI is being applied to contemporary business problems and consequently encourage research that is more responsive to real-world needs. However, such partnerships should be accompanied by clear arrangements concerning data ownership, research independence, privacy, and ethical responsibilities. The final strategy, embedding AI ethics and responsible use into university curricula, received **27 lecturer mentions and 42 student mentions**. Although this was the least frequently mentioned strategy among the four categories, its importance should not be judged solely by frequency. Ethical competence is fundamental to sustainable AI integration because researchers need to understand the implications of using AI for scholarly work. Incorporating responsible AI principles into research training and relevant curricula can help researchers recognize issues surrounding academic integrity, privacy, bias, transparency, and appropriate attribution.

Theoretical Implications

The findings have implications for understanding AI integration as a process of technology adoption rather than simply technological availability. The differences observed in the types of AI applications recognized by lecturers and PhD students, together with the prominence of technical expertise, institutional support, and infrastructure as challenges, suggest that successful integration depends on more than awareness of AI's potential. Researchers must perceive AI as

useful, possess the competence to use it, and operate within an institutional environment that facilitates responsible use.

This interpretation provides a basis for applying the theoretical framework adopted in this study. In particular, the findings suggest that **perceived usefulness, perceived ease of use, individual competence, and facilitating institutional conditions** can influence the extent to which researchers move from awareness and experimentation toward meaningful AI-supported research. The relatively greater experimentation reported among Ph.D. students, for example, may indicate willingness to engage with emerging technologies, while the lower recognition of more technically demanding applications points to the importance of competence and ease of use. Similarly, the prominence of institutional support and infrastructure demonstrates that individual willingness alone may be insufficient for sustained adoption. The findings also imply that AI integration should be viewed as an institutional change process. Training, infrastructure, policies, ethical guidance, and collaboration can create conditions that make AI-supported research easier to adopt and sustain. The theoretical framework therefore helps explain why the availability of AI tools by itself is unlikely to produce the desired transformation in research practices.

Practical Implications

The findings have several practical implications for universities in South-East Nigeria. First, university management should prioritize **continuous AI-related professional development** for lecturers and PhD students, with training differentiated according to research needs and levels of technical competence. Second, universities should strengthen digital infrastructure and provide researchers with appropriate technical support rather than expecting individual researchers to independently acquire the capacity to use advanced AI applications. Third, universities should develop clear institutional guidelines for responsible AI use in research. Such guidelines should address academic integrity, data privacy, transparency, attribution, verification of AI-generated information, and the appropriate boundaries of AI assistance. Fourth, universities should strengthen relationships with relevant technology companies and industry organizations to provide access to expertise, practical applications, and emerging technologies. These measures would help move AI use from isolated experimentation toward more systematic and responsible integration into research practice.

Limitations and Directions for Future Research

First, participants were purposively selected, with five lecturers and ten PhD students from each participating university. Consequently, the frequencies reported in the study should not be interpreted as statistically representative estimates of all lecturers and postgraduate students in South-East Nigerian universities. Second, the study relied on participants' reported experiences and perceptions rather than direct observation of their use of AI tools. Third, the interviews were relatively brief, which may have limited the depth of responses that could be obtained from individual participants. Finally, the researchers' existing relationships with some participants may have influenced the interaction or responses, although the use of a second researcher to review coding and peer discussion of categories provided additional checks on interpretation. Future studies could address these limitations by adopting mixed-methods approaches that combine qualitative interviews with quantitative measures of AI adoption and competence. Future research could also examine differences between lecturers and postgraduate students more systematically, investigate specific AI applications such as predictive analytics and text mining in greater depth, and evaluate the effectiveness of AI training programmes and institutional interventions. Comparative studies across Nigerian geopolitical regions could further establish whether the challenges and strategies identified in South-East Nigeria are similarly experienced elsewhere.

Conclusion

This study contributes to the literature on Artificial Intelligence (AI) and research innovation by showing that the value of AI in Business and Entrepreneurship Education is not determined by access or perceived usefulness alone, but by researchers' competencies and the institutional conditions supporting its use. The findings further reveal a distinction between relatively accessible applications, such as literature review support, text mining, and survey automation, and more technically demanding applications, such as predictive modelling, predictive analytics, and simulation-based analysis. This suggests that AI integration in research is a capability-dependent and institutionally mediated process, providing a more nuanced understanding of AI-supported research within universities in South-East Nigeria. Theoretically, the findings extend the study's framework by indicating that perceived usefulness and ease of use need to operate alongside researcher competence and facilitating institutional conditions for AI adoption to progress from awareness and experimentation to meaningful and responsible research practice. Practically, universities should therefore move beyond providing access to AI tools and prioritize continuous AI training, digital infrastructure, technical support, institutional guidelines, ethical governance, and collaboration with technology companies and industry partners. These measures can enable researchers to use advanced AI applications while critically evaluating their outputs, protecting research data, and maintaining academic integrity.

The findings should, however, be interpreted within the study's context. Because the study focused on participants in Business and Entrepreneurship Education in universities in South-East Nigeria, its findings may not be directly generalizable to other disciplines or regions. Moreover, the study examined perceived AI applications, challenges, and strategies rather than directly measuring the effect of AI use on the quality or effectiveness of research outputs. Future research should therefore examine whether AI competence predicts research quality, investigate how researchers' AI capabilities develop over time, and compare AI adoption across disciplines, regions, and levels of research experience. Research should also examine how institutional policies, infrastructure, ethical governance, and industry collaboration interact with researcher competence to shape sustained AI adoption. The central implication is that the future of AI-supported research will depend less on access to AI itself than on the capacity of researchers and universities to use it critically, competently, and responsibly. For Business and Entrepreneurship Education in South-East Nigeria, developing this combined human, institutional, and ethical capacity is essential for converting AI's technological potential into meaningful research innovation.

Recommendations

Based on the findings of the study, the following four recommendations are proposed:

1. Universities should prioritize targeted AI research capacity building for lecturers and PhD students. This recommendation is directly supported by the finding that lack of technical expertise and inadequate skills were the most prominent barriers to AI adoption. Rather than relying on general awareness programmes, universities should organize periodic, needs-based workshops and research-methods training that progress from accessible applications such as literature searching and text analysis to more technically demanding applications such as predictive modelling and analytics. Training should also emphasize verification and critical evaluation of AI-generated outputs so that increased use translates into improved research practice.
2. Institutional support for AI-enabled research should be strengthened through phased and resource-conscious investment. Given that limited institutional support and inadequate infrastructure were major challenges, universities should prioritize improvements that offer broad research value, including reliable internet connectivity, access to shared digital research facilities, technical assistance, and institutionally negotiated access to appropriate AI resources where affordable. A phased approach is preferable to expensive

blanket subscriptions: universities can begin with essential, widely usable resources and expand provision according to demonstrated research needs, usage, and available funding. This approach recognizes the resource constraints identified in the study while creating a sustainable pathway toward more advanced AI-supported research.

3. Universities should establish clear and practical frameworks for responsible AI use in research. The emergence of data privacy, academic integrity, plagiarism, bias, and transparency concerns indicates that AI adoption should be accompanied by governance rather than treated solely as a technological initiative. Research committees, postgraduate schools, and relevant academic units should develop context-specific guidance covering disclosure of AI assistance, verification of AI-generated information, protection of research data, attribution, and appropriate human oversight. Short guidance documents and research-oriented ethics sessions may provide a more feasible starting point than complex regulatory structures, with the framework reviewed periodically as AI capabilities and research practices evolve.
4. Universities should develop collaborative, problem-oriented AI research initiatives with technology and industry partners. This recommendation responds to the substantial support for collaboration with technology companies and industry partners and to the need to expand researchers' exposure to more advanced AI applications. Rather than establishing costly new structures in every institution, existing research centres, entrepreneurship centres, innovation hubs, and postgraduate research groups can serve as platforms for joint projects addressing locally relevant business and entrepreneurial problems. Such collaborations can provide access to practical expertise, datasets where ethically permissible, and real-world research problems while enabling lecturers and PhD students to progress from basic experimentation toward more sophisticated and contextually relevant applications of AI.

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