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<https://doi.org/10.1057/s41599-025-05598-x>

OPEN

Academic leadership attitudes toward employing artificial intelligence applications in developing administrative processes

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The growing interest in the use of artificial intelligence (AI) applications to enhance administrative tasks in educational settings has raised important questions about academic leaders' views on this emerging technology. This study aims to examine academic leadership's attitudes toward the use of AI in educational administrative processes within the Saudi context, in addition to exploring the challenges they face in implementing it. A quantitative research approach was used to collect data through a questionnaire, using a random sample ($n = 105$) of academic leaders from various educational institutions in the Kingdom of Saudi Arabia. The results indicated that trust in AI and its perceived benefits positively contributed to leadership readiness to adopt AI, whereas ethical considerations were the most important variable in academic leadership readiness to adopt AI. In addition, some challenges and barriers to academic leadership readiness to adopt AI were revealed, such as a lack of awareness and knowledge, lack of training, financial constraints, and resistance to change. Therefore, an approach that enhances the ethical considerations of AI and reduces the challenges and barriers facing AI implementation in education should be adopted. Given the findings of this study, several potential societal and managerial implications may emerge, such as ethical dilemmas in education and data-driven decision-making.

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Introduction

Artificial Intelligence (AI) is becoming increasingly influential, transforming both the professional and personal realms. AI represents a segment of computer science that aims to create intelligent systems capable of executing tasks that traditionally require human intelligence. AI utilizes its inherent properties and interconnections to achieve this goal by mimicking various cognitive processes (Darawshah et al., 2023).

As the importance of AI increases, its integration into education has become particularly relevant. The rise of generative AI such as ChatGPT signals a significant shift in how educational systems can utilize these technologies (Wang, 2023). Similarly, the Chinese government's New Generation AI Development Plan (2017) laid out a framework for the country's strategy to develop AI applications for various sectors, including education (State-Council, 2017). The growing deployment of technology in educational institutions has necessitated a fundamental shift in traditional leadership roles. This transformation emphasizes the need for educators and administrators to adapt to the educational landscape increasingly shaped by AI advancements (Zootzky and Pfeiffer, 2024). Using extensive data analysis, AI can identify patterns and trends that assist educators in making informed curriculum decisions and interventions. Furthermore, by alleviating teachers' administrative burdens, AI enables them to focus more on pedagogical engagement with their students. This ongoing technological evolution has the potential to address long-standing challenges within the education sector and provide innovative solutions (Togelius and Yannakakis, 2024). Application of AI is to redefine various educational systems and their infrastructure. Processes involving admission, counseling, library services, assessment, feedback, and tutoring have all been significantly altered by AI interventions (Aloqaily and Rawash, 2022), and the capabilities of AI systems to analyze extensive datasets and identify patterns empower educators to make well-informed decisions, thus improving the overall functionality of schools (Ge and Hu, 2020).

Moreover, fostering employee engagement and satisfaction in the workplace has become increasingly reliant on the synergistic blend of exemplary leadership skills and intelligent computer systems. When employees feel like integral members of a cohesive unit, inspired by their leaders and supported by technology, they show greater loyalty and happiness, leading to meaningful contributions that benefit the entire organization (Liu and Song, 2022). However, the perspectives on AI adoption among academic leaders can vary, with some advocating for its integration, while others express skepticism. By understanding these perspectives, educational organizations can develop comprehensive strategies to alleviate stakeholder concerns and highlight the benefits of AI (Lichtenthaler, 2020). Different industries exhibit varying approaches to AI utilization, influenced by legal frameworks, competitive landscapes, and leadership perspectives. Organizations can better navigate their AI journey by adhering to industry-specific guidelines, ensuring compliance, and aligning themselves with the leadership's vision (Vasiljeva et al., 2021).

AI's role in education represents a catalyst for efficiency, retention, and the creation of tailored curricula. By introducing AI, educational institutions can enhance administrative processes, optimize resource usage, and place greater emphasis on high-quality teaching. Furthermore, by customizing lessons according to individual student needs and learning styles, AI fosters more effective teaching methodologies, leading to notable advances in educational quality and effectiveness (Xie et al. 2022). Indeed, major advancements in AI, especially in neural networks, deep learning, and machine learning, have begun to reshape various sectors, introduce unexpected opportunities, and increase innovation potential across industries, such as healthcare, education,

finance, and manufacturing (Li et al., 2018). Individuals' attitudes toward technology significantly affect their deployment and success. The intersection between user perspectives and technological advancements can ultimately influence the outcomes of these implementations (Dwivedi et al., 2019). Furthermore, institutions must ensure that ethical standards are upheld to mitigate the potential misconduct associated with AI use (Young et al., 2019). Acknowledging the complementary roles of AI and human judgment can foster responsible decision making and maximize benefits while navigating ethical complexities (Chatterjee et al., 2023).

In the Saudi context, Vision 2030 launched numerous plans and initiatives aimed at improving the performance of education, healthcare, and other essential sectors (KSA, 2016), where enhancing skills and developing performance are the two main objectives. Therefore, information related to the flow of documents within the organization will serve as a supportive and influential element for Vision 2030 and its goals. It can be used to track the effectiveness of administrative departments and staff members (Huang et al., 2021). However, studies examining academic leaders' views on adopting AI technologies to enhance administrative processes in Saudi Arabia remain limited. While Musawa et al. (2024) investigated the readiness of students, faculty, and administrators to adopt AI in the Saudi educational context, Yufeia et al. (2020) measured the readiness of Saudi human resources departments to implement AI. Moreover, the growing interest in using AI applications to improve administrative tasks in educational institutions has raised important questions regarding academic leaders' views on this transformative technology. Therefore, this study seeks a comprehensive understanding of AI perception variables, ethical considerations, challenges in decision-making, and the overall integration of AI into administrative processes within educational institutions in Saudi Arabia. Accordingly, the main objectives of this study are as follows:

- To identify academic leaders' perceptions of the integration of AI applications in developing administrative processes in educational institutions.
- To explore the factors that influence academic leadership attitudes toward employing AI in educational administrative processes.
- To explore the challenges faced by academic leadership in AI implementation in an educational context.

This study is organized as follows. Next section provides a review of prior research and develops the study questions and hypotheses. "Methodology" describes the methods used for collecting data, constructing the sample, and analyzing the data. "Results" reports the results of the study. "Discussion" discusses the results, while "Conclusion, limitations, and recommendations" concludes the study.

Theoretical background, literature review, and development of research questions

AI applications in educational context. The term artificial intelligence (AI) was coined in 1956 by John McCarthy, who defined it as "*the science and engineering of constructing intelligent machines, especially intelligent computer programs*" (Almaraz-López et al., 2023). Russell and Norvig offered different definitions of "AI," which can be grouped into four categories: acting like humans, thinking like humans, thinking rationally, and acting rationally (Martinez, 2018). AI involves equipping machines with capabilities that mimic human intelligence, including understanding, reasoning, and problem-solving. Furthermore, AI

acquires external data, synthesizes its understanding, and applies this understanding to achieve specific goals and tasks (Enholm et al., 2022).

The use of AI in the field of education greatly affects both academic and administrative functions. AI applications are beneficial for classroom learning by aiding in grading and assessing students as well as managing courses, classrooms, and attendance. It also helps with admissions, budgeting, facility management, resource management, exam management, and record-keeping. Moreover, AI technology allows teachers to make notes during lectures, offer video lectures, and enhance student learning with virtual reality (Ahmad et al., 2022). In this context, multiple researchers recognize that AI tools, such as data analysis and machine learning, can improve decision-making by providing valuable information that helps academic administrators streamline processes and enhance resource distribution (Ge and Hu, 2020; Vasiljeva et al., 2021). Furthermore, AI affects teenagers' social adaptability, where a beneficial impact of AI in Education on teenagers' social adaptability has been reported, highlighting the importance of the social environment, personal factors, and learner-related factors on teenagers' social adaptability (Brock and Von Wangenheim, 2019; Xie et al., 2022). In supplementary research carried out by Ejjami (2024), it was discovered that previous studies have examined the strategic use of AI in different ways, including using predictive analytics to improve business strategies by visualizing key performance indicators and employing image recognition technology to identify consumer behavior trends. General applications of AI in education include, but are not limited to, automatic grading systems, teacher feedback, virtual teachers, and personalized learning (Huang et al. 2021; Musawa et al. 2024; Yufeia et al. 2020).

Factors influencing the adoption of AI in educational context.

Different opinions among academic professionals demonstrate the intricacy of attitudes towards AI; some are excited about its creative possibilities, while others are hesitant, stressing the importance of institutions tackling these differences to fully utilize AI's advantages (Lichtenthaler, 2020). In addition, private and public entities can benefit from utilizing AI to achieve specific results and streamline the progression from scientific research to practical use. Other potential factors that could lead to success include forming trust, setting up data categorization rules, and carrying out risk evaluations. Due to the interrelated nature of these factors, future studies should concentrate on determining the optimal way to interact to fully maximize the potential of AI in practical scenarios (Wolff et al., 2021). In addition, ethical issues surrounding AI-powered decision-making require in-depth discussion, emphasizing the importance of implementing guidelines that establish a responsible framework for the use of AI in educational settings (Young et al., 2019). Musawa et al. (2024) pointed out several factors affecting AI adoption in an educational context, such as performance expectancy, effort expectancy, perceived behavioral control, perceived ease of use, and perceived usefulness. Moreover, user trust is an important factor influencing users' choice to adopt new technologies, such as artificial intelligence, given its importance in addressing two fundamental challenges of digital tools: uncertainty and the risk of vulnerability (Ahmad and Khalid, 2017). Understanding the factors affecting attitudes, such as organizational culture, staff training, and the perceived effectiveness of AI in improving administrative efficiency, is crucial for bridging the pervasive knowledge-practice gap complicating this discourse (Aloqaily and Rawash, 2022; Scott et al., 2021). In the ever-changing educational environment, it is crucial to comprehend and acknowledge academic leaders'

views on AI usage and establish a setting that promotes innovation and teamwork so that AI can improve educational methods without impeding leadership capabilities.

Challenges facing the adoption of AI in educational context.

Although AI offers many advantages for education, there are challenges that must be addressed when integrating AI technologies. The primary limitation of AI-powered language learning tools is their lack of human involvement (Khanzode and Sarode, 2020). Effective management and protection of user information while complying with privacy laws is a significant challenge. Unequal access to technology and the Internet among students may affect their ability to utilize AI-based learning tools (Musawa et al., 2024). It is essential to consider the unique needs and resources of each user and to ensure that AI-based learning tools are available to all users (De la Vall and Araya, 2023). Educators are also tasked with acquiring new digital teaching skills to effectively integrate AI into the educational transformation. Furthermore, AI-based learning tool developers must have a comprehensive understanding of teaching methods to design products that align with teachers' teaching strategies (Huang et al., 2021). In terms of cost, adopting AI technologies could potentially be expensive, requiring a substantial initial financial commitment (Musawa et al., 2024).

Furthermore, Pedro et al. (2019) discussed the challenges and policy considerations that should be included in global and local considerations regarding the opportunities and risks of implementing AI in education. These challenges include a comprehensive public policy on AI for sustainable development, ensuring inclusion and equity in AI in education, preparing teachers for AI-powered education and preparing AI to understand education, developing quality and inclusive data systems, making research on AI in education significant, and addressing concerns related to ethics and transparency in data collection, use, and dissemination. Additionally, resistance to technological progress is a common barrier to adopting AI in educational settings, which arises from multiple factors, such as anxiety over job loss, skepticism about AI systems, ethical issues, and cultural obstacles (Ivchik, 2024). Adopting AI technology requires significant investment in infrastructure, software, and training, making it difficult for many organizations to implement. This technology also requires significant computing power and storage space, which can be extremely expensive (Sayari 2025). However, there may be a lack of understanding of the technical requirements for implementing the AI technology. Therefore, integrating AI into accounting requires a certain level of technical knowledge and understanding of technology (Bai, 2024).

Research questions and conceptual framework. Many studies have explored technology adoption, with recent attention specifically focused on AI adoption within domains (FakhrHosseini et al., 2024; Mariani et al., 2023; Ofosu-Ampong, 2024). Recognizing the factors that facilitate AI adoption across diverse contexts is important to both researchers and AI users. This knowledge can serve as a valuable guide for decision-makers seeking to introduce AI into their institutions and increase adoption rates among users (Radhakrishnan and Chattopadhyay, 2020). The current study is based on three theories applied to understand the adoption of AI in an educational context. First, the Technology Acceptance Model (TAM) as introduced by Davis (1989) was employed to model user acceptance of information systems. It comprises of three central factors: trust in technology, perceived benefits, and ethical considerations. Second, theory of Planned Behavior (TPB) explains the technology adoption and readiness of users for this adoption (Mital et al., 2018). This

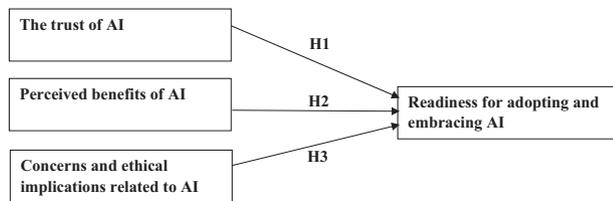


Fig. 1 The proposed conceptual framework.

theory highlights that users' attitudes shape their behavioral intentions and the actual behaviors that follow (Huang 2023). Third, the Diffusion of Innovation theory (DOI) is used to identify the challenges facing the adoption of AI technology through academic leadership attitudes. DOI is developed by Rogers (2003). It is a concept that describes how new technologies and various developments diffuse across societies and cultures, from their creation to widespread acceptance, with diffusion occurring through a five-stage decision-making process: awareness, interest, evaluation, experimentation, and adoption (Dearing and Cox, 2018). In this case, at any time during the decision-making process, an individual may decide not to adopt a new technology, often because of a particular obstacle (Rogers, 2003).

The conceptual framework for this study, based on the TAM, TPB, and DOI, is presented in Fig. 1. This study proposes that readiness to adopt AI by academic leadership is determined by factors such as trust in AI, perceived benefits of AI, and ethical concerns about AI. In addition, the impact of demographic variables on academic leadership readiness in adopting AI will be examined. Accordingly, this study was guided by the following research question:

1. How does "Trust of AI" influence academic leadership readiness for AI adoption?
2. How does "Perceived benefits of AI" affect academic leadership readiness for AI adoption?
3. How does "Concerns and ethical implications related to AI" impact academic leadership readiness for AI adoption?
4. What are the key challenges in the AI-driven decision-making processes in educational administration?

Based on these research questions, the hypotheses of this study were derived as follows:

H1: Trust in AI positively impacts academic leadership readiness to adopt and embrace AI.

H2: The perceived benefits of AI positively impact academic leadership's readiness to adopt and embrace AI.

H3: Concerns and ethical implications related to AI positively impact academic leadership's readiness to adopt and embrace AI.

Methodology

Research design. In this study, the researchers used a quantitative approach to gather numerical data on academic leaders' attitudes towards the integration of AI in developing administrative processes.

Participants. This study focuses on the leaders of Saudi educational institutions. It randomly selected a representative sample ($n = 105$) of academic leaders, including deans, department heads, and administrators, from diverse educational institutions in Saudi Arabia. The researchers distributed the finalized questionnaire electronically to a selected sample of academic leaders.

Instrument development. This study used a quantitative approach to explore the perception of Saudi academic leaders regarding the adoption of AI and the factors influencing this

perception. To investigate these objectives, a questionnaire was adopted from the literature (Ahmad and Khalid, 2017; De la Vall and Araya, 2023; Khanzode and Sarode, 2020; Musawa et al., 2024; Pedro et al., 2019; Wolff et al., 2021) with minor amendments to fit the context of academic leaders and the Saudi context. Indeed, the questionnaire in the literature was mainly based on TAM, TPB, and DOI, revealing the factors that affect academic leadership readiness to adopt AI in administrative processes, as well as exploring the key challenges that may hinder this adoption.

It consists of two parts. The first concerns the demographic features of the participants, such as gender, academic rank, and professional experience. The second part measured the participants' attitudes toward AI use in educational administrative processes, as well as the challenges facing them in adopting AI. The included factors (as independent variables) are "The trust of AI", "Perceived benefits of AI", and "Ethical considerations related to AI". "Readiness for adopting and embracing AI" represents the dependent variable. Each of these variables (independent and dependent) consists of five items. We also listed items for the most challenges the leaders perceived when adopting AI in the administrative process. These variables were measured using a five-point Likert-type scale, with anchors ranging from 1 = "strongly disagree" to 5 = "strongly agree".

Data analysis. Statistical Package for the Social Sciences software (SPSS) was used for this study. Descriptive statistics included mean, standard deviation, frequency, and percentage. In addition, quantitative regression analysis was used to predict the relationships between the independent and dependent variables.

Ethical considerations. The researchers obtained informed consent from all participants, clearly explained the purpose of the study, and ensured confidentiality. In addition, they obtained ethical approval from relevant institutional review boards to ensure that the research adhered to ethical guidelines.

Results

The results were organized to reflect the validity and reliability of the research instrument, demographic characteristics of participants, and perceptions regarding several dimensions of AI in administrative processes.

Findings related to the validity of the instrument

Face validity. The validity of the developed questionnaire was initially evaluated using face validity. A panel of experts meticulously assessed the questionnaire items for their clarity, relevance, and coherence. Their feedback led to several minor revisions that not only refined the language but also improved the instrument's overall robustness by ensuring that the items effectively captured the intended constructs. These revisions contributed to a more comprehensive approach to measuring academic leaders' attitudes toward AI integration, enabling the instrument to yield meaningful data that reflected participants' genuine perspectives.

Internal consistency. The internal consistency of the questionnaire was assessed using Pearson's correlation coefficient, which allowed for a comprehensive measurement of how well the individual items correlated with their respective constructs. The findings presented in Table 1 reveal strong positive correlations across various dimensions of the questionnaire, indicating that the items consistently reflect the underlying constructs they aim to measure. For example, the correlation between trust in AI and perceived benefits yielded a notable correlation coefficient of

Table 1 Internal correlation between phrases and axis.

The trust of AI		Perceived benefits of AI		Concerns and ethical implications related to AI		Readiness for adopting and embracing AI		Challenges at using AI	
N	Correlation coefficient	N	Correlation coefficient	N	Correlation coefficient	N	Correlation coefficient	N	Correlation coefficient
1	0.690**	6	0.764**	11	0.739**	16	0.712**	21	0.674**
2	0.596**	7	0.623**	12	0.741**	17	0.709**	22	0.660**
3	0.515**	6	0.845**	13	0.644**	18	0.584**	23	0.588**
4	0.602**	9	0.769**	14	0.678**	19	0.632**	24	0.771**
5	0.714**	10	0.590**	15	0.752**	20	0.706**	25	0.699**

**Correlation is significant at the 0.01 level (2-tailed).

Table 2 Cronbach's Alpha coefficients.

Axis	N of Items	Cronbach's Alpha
The trust of AI	5	0.845
Perceived Benefits of AI	5	0.829
Concerns and ethical implications related to artificial intelligence	5	0.882
Readiness for adopting and embracing artificial intelligence	5	0.809
Challenges when using artificial intelligence	5	0.814
Total	25	0.897

0.690, suggesting a significant relationship in which greater trust is associated with a higher acknowledgment of perceived benefits provided by AI systems. This correlation emphasizes the importance of fostering trust among academic leaders to enhance the potential acceptance and utilization of AI in administrative contexts.

Findings related to the reliability of the instrument. The reliability of the questionnaire was measured using Cronbach's alpha coefficient, as shown in Table 2. Each dimension of the questionnaire displayed high reliability, with the overall coefficients reflecting Cronbach's alpha scores exceeding the acceptable threshold of 0.700. The total reliability coefficient of 0.897 affirms that the instrument is stable across multiple administrations and can be used to produce consistent results regarding academic leaders' attitudes toward AI integration. This high level of reliability reassures stakeholders that the findings of this study are grounded in a solid methodological framework, thus bolstering the credibility of the data collected.

Findings related to the participants' demographic data. Table 3 summarizes the demographic characteristics of the participants, showing a diverse representation in terms of gender, academic rank, and professional experience. Specifically, 54% of the participants were male and 41% were female, suggesting a relatively balanced gender representation in leadership roles within educational institutions. Regarding academic rank, 41% held titles as Associate Professors, while both Assistant Professors and Professors accounted for 29.5% each, indicating diversity in leadership perspectives across different levels of the academic hierarchy. Notably, a substantial portion of leaders (52.4%) had over 10 years of academic experience, suggesting a wealth of experience that informs their attitudes toward AI integration. This demographic variety enhances the generalizability of the research, allowing for a nuanced understanding of perceptions of AI across various academic contexts.

Findings related to the perceptions of AI in administrative processes. The exploration of perceptions surrounding AI integration in administrative processes highlights five key areas: Trust

Table 3 The demographic data of the participants.

		Frequency	Percent
Gender	Male	62	59.0
	Female	43	41.0
Academic rank	Professor	31	29.5
	Associate Professor	43	41.0
	Assistant Professor	31	29.5
Professional experience	Less than 5 years	12	11.4
	from 5 to 10 years	38	36.2
	10 years and over	55	52.4
	Total	105	100%

in AI, Perceived Benefits of AI, and Readiness for AI Adoption, Concerns and Ethical Implications, and Challenges in Using AI.

The trust of AI. As shown in Table 4, the average score reflecting academic leaders' trust in AI was 3.78, indicating a generally positive perception. The highest-ranked item was the belief that AI improves managerial efficiency (mean = 4.18), reinforcing the notion that academic leaders recognize AI's potential to enhance institutional performance. However, reliance on AI systems for administrative tasks was comparatively lower (mean = 3.47), suggesting some hesitation among leaders regarding their complete dependence on technology. This dichotomy underscores a pivotal area for future research and development to build mechanisms that enhance leaders' trust and reliance on AI.

Perceived benefits of AI. The findings in Table 5 illustrate that academic leaders perceived AI as highly beneficial for enhancing administrative operations, with an average score of 4.18. The highest-ranked benefit was identified as the ability of AI applications to streamline administrative work processes (mean = 4.28), highlighting the consensus on role of AI in improving operational efficiency and productivity. This widespread recognition of benefits serves as a strong foundation for advocating further integration of AI within institutional frameworks.

Table 4 The trust of AI.

No	Item	Mean	Standard deviation	Rank
1	I trust that using AI enhances the institution's performance.	4.16	1.084	2
2	I rely on artificial intelligence systems in performing administrative tasks.	3.47	1.093	5
3	I believe that using artificial intelligence improves managerial efficiency.	4.18	0.998	1
4	I depend on artificial intelligence systems to enhance the execution of administrative processes.	3.49	1.210	4
5	I have confidence that utilizing artificial intelligence aids in addressing managerial challenges.	3.60	1.106	3
General mean		3.78	1.10	

Table 5 Perceived benefits of AI.

No	Item	Mean	Standard deviation	Rank
6	Applications of artificial intelligence streamline administrative work processes.	4.28	0.872	1
7	Using artificial intelligence applications saves administrative costs.	4.25	0.938	2
8	Using artificial intelligence improves the decision-making process.	4.06	1.045	5
9	Artificial intelligence applications contribute to better resource investment within educational institutions.	4.16	0.900	3
10	Artificial intelligence applications help achieve greater productivity and effectiveness.	4.16	0.962	4
General mean		4.18	0.94	

Table 6 Concerns and ethical implications related to AI.

No	Item	Mean	Standard deviation	Rank
11	Academic leaders' express concerns about the ethical implications of using artificial intelligence.	3.73	1.040	2
12	Academic leaders are concerned about potential biases in artificial intelligence algorithms.	3.49	1.066	5
13	There are fears among academic leaders that using artificial intelligence poses security risks that threaten the privacy of workers.	3.65	1.143	4
14	There are concerns that using artificial intelligence applications in administrative tasks may lead to employee layoffs.	3.67	1.190	3
25	Academic leaders are concerned about the lack of transparency in how artificial intelligence algorithms make decisions.	3.75	1.081	1
General mean		3.66	1.10	

Table 7 Readiness for adopting and embracing AI.

No	Item	Mean	Standard deviation	Rank
16	I am ready to integrate artificial intelligence into our administrative processes.	3.70	1.046	4
16	I will be prepared to invest in implementing artificial intelligence technologies.	3.98	0.971	3
18	Our institution should explore AI applications in management for implementation.	4.10	0.940	1
19	The positive outcomes associated with using artificial intelligence incline me towards its utilization.	4.10	1.018	2
20	I feel hesitant about integrating artificial intelligence into our administrative processes	3.62	1.311	5
General mean		3.90	1.06	

Concerns and ethical implications related to AI. The average score for the ethical implications of AI is 3.66, as shown in Table 6. Leaders expressed significant concerns about transparency in AI algorithms (mean = 3.75) and the potential biases embedded within AI systems (mean = 3.49). This reflects critical awareness of the ethical issues associated with AI use. The need for transparent and fair AI systems is paramount, as leaders balance the benefits of technology with ethical considerations regarding decision-making processes.

Readiness for adopting and embracing AI. Table 7 shows an average readiness score of 3.90 among academic leaders to integrate AI. The item indicating a willingness to explore AI applications ranked highest (mean = 4.10), suggesting openness to innovation. Conversely, hesitance was evident when the participants expressed the least readiness to integrate AI into administrative procedures. This suggests a cautious approach towards widespread adoption and indicates the need for targeted

professional development and training initiatives to better prepare leaders and staff for integration.

Findings related to challenges at using AI. Table 8 reveals that the identified challenges to implementing AI yielded an average score of 4.12, indicating the recognition of significant obstacles. The most pronounced hurdle was the lack of awareness and training regarding AI among academic staff (mean = 4.32), underscoring a critical need for investment in educational efforts to support AI integration. Other challenges included financial constraints (mean = 3.99) and resistance to change (mean = 4.12), highlighting the systemic barriers that need to be addressed to facilitate effective AI adoption. This insight emphasizes the importance of developing comprehensive training and resource allocation strategies to alleviate perceived challenges.

Hypotheses testing. To test our hypotheses (H1, H2, and H3), a simple linear regression was conducted, while we used multiple

Table 8 Challenges at using AI.

No	Item	Mean	Standard Deviation	Rank
21	Financial challenges pose a barrier to deploying artificial intelligence applications in enhancing administrative processes.	3.99	1.014	5
22	Underinvestment in infrastructure presents a hurdle to implementing artificial intelligence in advancing administrative operations.	4.05	0.913	4
23	Resistance to change and acceptance of artificial intelligence pose obstacles to deploying AI applications in improving administrative processes.	4.12	0.917	3
24	A shortage of qualified human resources is a barrier to deploying artificial intelligence applications in advancing administrative operations.	4.14	0.985	2
25	Lack of awareness and training in artificial intelligence presents a hurdle to deploying AI applications in improving administrative processes.	4.32	0.882	1

Table 9 Results for simple regression analysis for the impact of trust of AI on the adopting and embracing AI.

Model	R	R ²	F	Sig.	B	Beta	T	Sig.
(Constant)	0.184 ^a	0.034	3.608	0.060 ^b	3.012	-	8.612	0.000
The trust of AI					0.171	0.184	1.899	0.060

^aDependent Variable: The academic leadership readiness for adopting and embracing AI.
^bPredictors: (Constant), The trust of AI.

regression to combine the effects of these factors. To determine the relationship between AI trust and academic leadership readiness for adopting and embracing AI, in the simple linear regression, trust in AI was considered as an independent variable, and academic leadership readiness for adopting and embracing AI as a dependent variable.

Table 9 presents the results of the analysis. As shown in Table 9, an *R*-value of 0.184 indicates a weak positive correlation between AI trust and academic leadership readiness for adopting and embracing AI. An *R*² value of 0.034 indicates that only about 3.4% of the variance in academic leadership readiness for adopting and embracing AI can be attributed to trust in AI, meaning that the influence of trust in AI is minimal. The *F* value is 3.608, and the *p* value is 0.060, which is slightly above the typical significance level of 0.05. This indicates that the model is not statistically significant at the 0.05 level, although it is close to this level. Therefore, the model was not highly significant. Several values were considered for the regression coefficient of trust in AI. The unstandardized coefficient (*B* = 0.171) indicates a positive relationship between trust in AI and academic leadership readiness to adopt and embrace AI. The higher the trust in AI, the higher is the leadership readiness. There were also *t* and *p* values of 1.899 and 0.060, respectively. Since the *p* value is slightly above the typical significance level, the relationship is not statistically significant at the level of 0.05. This suggests a trend toward significance, but does not provide strong enough evidence to confidently confirm the positive effect of trust in AI. A constant *B* value of 3.012 represents the baseline level of leadership readiness when trust is zero. While the results indicate a positive relationship between trust in AI and academic leadership's readiness to adopt and embrace AI, the small statistical significance suggests that further research with larger samples is needed to confirm this relationship.

To test the relationship between the perceived benefits of AI and academic leadership readiness for adopting and embracing AI, a simple linear regression was used, in which the perceived benefits of AI were considered as an independent variable and academic leadership readiness for adopting and embracing AI as a dependent variable. Table 10 presents the results of the analysis.

The results in Table 10 demonstrate the relationship between the perceived benefits of AI and academic leadership readiness to

adopt and embrace AI. The significance of the model can be inferred from the *F*-value of 4.320 and *p* value of 0.040. As the *p* value is less than the typical significance level of 0.05, this indicates that the regression model is statistically significant, meaning that a significant portion of the variance in academic leadership readiness for adopting and embracing AI is due to the perceived benefits of AI. The strength of the relationship can be inferred from the *R*² value of 0.040, meaning that ~4% of the variance in academic leadership readiness to adopt and embrace AI can be attributed to the perceived benefits of AI. While this indicates a statistically significant relationship between the perceived benefits of AI and academic leadership readiness for adopting and embracing AI, the effect size was relatively small. Regarding the regression coefficients, the *B* coefficient and *t* value were 0.200 and 2.078, respectively. Therefore, the perceived benefits of AI were statistically significant. For every unit increase in perceived benefits, academic leadership readiness for adopting and embracing AI increased by ~0.200 units, holding other factors constant. A constant coefficient *B* of 2.823 represents the baseline level of leadership readiness when perceived benefits are zero. Thus, the results indicate a statistically significant positive relationship between the perceived benefits of AI and the academic leadership readiness for adopting and embracing AI. Therefore, the greater the perceived benefits of AI, the greater the readiness of academic leadership for adopting and embracing AI.

To determine the relationship between concerns and ethical implications related to AI and academic leadership readiness for adopting and embracing AI, in the simple linear regression, the concerns and ethical implications related to AI were considered as independent variable and academic leadership readiness to adopt and embrace AI as a dependent variable. Table 11 shows the simple regression analysis for the impact of concerns and ethical implications related to AI on academic leadership readiness for adopting and embracing AI.

It can be noted from Table 11 the relationship between the concerns and ethical implications related to AI and the academic leadership readiness for adopting and embracing AI. Where Sig. value of 0.000 indicates a statistically significant positive relationship between ethical considerations related to AI and academic leadership readiness for adopting and embracing AI.

Table 10 Results for simple regression analysis for the impact of the Perceived benefits of AI on adopting and embracing AI.

Model	R	R ²	F	Sig.	B	Beta	T	Sig.
(Constant)	0.201 ^a	0.040	4.320	0.040 ^b	2.823	-	6.886	0.000
The Perceived benefits of AI					0.200	0.201	2.078	0.040

^aDependent Variable: The academic leadership readiness for adopting and embracing AI.
^bPredictors: (Constant), Perceived benefits of AI.

Table 11 Results for simple regression for the impact of concerns and ethical implications related to AI on adopting and embracing AI.

Model	R	R ²	F	Sig.	B	Beta	T	Sig.
(Constant)	0.341 ^a	0.116	13.565	0.000 ^b	2.243	-	5.722	0.000
Concerns and ethical implications related to AI					0.362	0.341	3.683	0.000

^aDependent Variable: The academic leadership readiness for adopting and embracing AI.
^bPredictors: (Constant), The ethical considerations of related to AI.

Table 12 Results for the multiple regression analysis for the impact of the combined effect of all factors on the adopting and embracing AI.

Model	R	R ²	F	Sig.	B	Beta	T	Sig.
(Constant)	0.351 ^a	0.123	4.739	0.004 ^b	2.381	-	5.621	0.000
The trust of AI					-0.040-	-0.043-	-0.313-	0.755
Perceived benefits of AI					-0.098-	-0.098-	-0.648-	0.519
Concerns and ethical implications related to AI					0.470	0.442	3.022	0.003

^aDependent Variable: The academic leadership readiness for adopting and embracing AI.
^bPredictors: (Constant), The trust of AI, perceived benefits of AI, and ethical considerations of related to AI.

An R^2 value of 0.116 indicates that ~11.6% of the variance in academic leadership readiness to adopt and embrace AI can be attributed to ethical considerations related to AI. Regarding the effect size, the unstandardized coefficient B of 0.362 indicates that, for every unit increase in ethical considerations, there is an increase in leadership readiness of ~0.362 units, holding other factors constant. A standardized beta coefficient of 0.341 confirmed a moderate positive effect. A constant B of 2.243 represents the baseline level of leadership readiness when the ethical considerations related to AI are zero. An F -value of 13.565 and p value of 0.000 indicate that the model is statistically significant, confirming the importance of concerns and ethical implications related to AI in predicting leadership readiness.

In this analysis, we employed multiple regression to report the combined effect of all factors on academic leadership readiness to adopt and embrace AI. In this regression, the three factors were considered as independent variables, and academic leadership readiness to adopt and embrace AI as a dependent variable. Table 12 shows the results of the multiple regression analysis. The multiple regression model indicated a statistically significant effect, with F and p values of 4.739 and 0.004, respectively, indicating that a significant portion of the variance in leadership readiness was attributable to the combined influence of these variables ($R^2 = 0.123$).

Regarding the results for concerns and ethical implications related to AI, B , p , and beta values of 0.470, 0.003, and 0.442, respectively, indicate that ethical considerations have a significant positive effect on leadership readiness, highlighting the importance of ethical considerations in shaping leadership attitudes toward AI adoption. Regarding both trust in AI and perceived benefits, B and p values of -0.040 and 0.755 for trust in AI and -0.098 and 0.519 for perceived benefits indicate that these two

variables do not exhibit any statistically significant individual effects on leadership readiness in this model, as p values are above the typical significance level of 0.05. Thus, the results indicate that the combined effect of trust, perceived benefits, concerns, and ethical implications related to AI is statistically significant. Concerns and ethical implications related to AI are considered more important; therefore, addressing ethical considerations related to AI is crucial for enhancing leadership readiness for adopting AI. The results also indicate a limited effect of trust and perceived benefits due to the negative, non-statistically significant coefficients. Therefore, these variables did not independently affect leadership readiness to a statistically significant degree. Thus, in this model, concerns and ethical implications related to AI are considered more important than trust or perceived benefits.

Discussion

Relationship between “trust of AI” and academic leadership readiness for adopting and embracing AI. The results regarding trust in AI showed an average trust score of 3.78, indicating that the impact of trust in the use of AI on academic leadership readiness for adopting AI is positive. This was confirmed by Ahmad et al. (2022), who confirmed a positive correlation between trust in AI and end-users’ intention to adopt AI services. Ahmad and Khalid (2017) confirmed that user trust is an important factor influencing their choice to adopt new technologies such as AI.

The difference between AI’s contribution to managerial efficiency (mean = 4.18) and relatively low trust in the use of AI applications (mean = 3.47) indicates that administrative professionals are concerned about AI technologies. This is

consistent with the findings of Wang (2023), who stated that academic and administrative professionals emphasize the effectiveness of AI and its ability to increase the efficiency and accuracy of leaders' decision-making processes, but they are concerned about overreliance on it, as its misuse could have serious repercussions.

The average readiness score was 3.90, and the average willingness to explore AI applications was 4.10. This indicates a desire to keep up with innovations in AI; however, there are concerns about its use in administrative tasks. This also aligns with the study by Ge and Hu (2020), who emphasized the importance of keeping up with AI innovations in the educational environment and developing teaching methods in colleges and universities, and the study by Holmes, who emphasized the importance of AI in academia, but there is some doubt about academic leaders' attitudes toward its use.

On the other hand, an R -value of 0.184 indicates a weak positive association between trust in AI and leadership readiness for adopting AI. Given that the p value of 0.060 is greater than the typical significance level of 0.05, this suggests the need for further research in this area. In this context, it can be argued that further studies using larger samples are needed to examine the extent of trust in AI among academics.

Relationship between “perceived benefits of AI” and academic leadership readiness for adopting and embracing AI. It can be observed that there is a generally positive impact of the benefits of AI among academics, with the average score for perceived benefits being 4.18, a high value, particularly for simplifying administrative processes (4.28). This is consistent with Ahmad et al. (2022), who found that AI has the potential to enhance efficiency in the academic field and reduce administrative tasks for teachers, allowing them to invest more in teaching and guiding students. In addition, the average perceived willingness to explore AI was 4.10, which confirmed a positive attitude toward AI. This is consistent with the study by Chatterjee et al. (2023), who considered the willingness to use AI essential for the successful implementation of the technology in educational settings.

The regression coefficients, represented by the F , p , and R^2 values of 4.320, 0.040, and 0.040, respectively, indicate that the relationship between the benefits of AI and leadership readiness is significant. However, these coefficients are considered modest; therefore, in addition to perceived benefits, other factors influence leadership readiness. Therefore, these results confirm the importance of perceived benefits of AI in leadership readiness for adopting and embracing AI.

Relationship between “Concerns and ethical implications related to AI” and academic leadership readiness for adopting and embracing AI. The results reveal a significant relationship between the ethical considerations related to AI and academic leadership readiness for adopting and embracing AI, with the mean score for ethical implications being 3.66, and the mean scores for concerns about transparency and bias being 3.75 and 3.49, respectively. This is consistent with the research by Osasona et al. (2024), who stated that the integration of AI into decision-making raises numerous ethical concerns about transparency, accountability, and bias, especially when these decisions affect individuals or societal groups. Sain et al. (2024) also emphasized that transparency and privacy are important factors influencing the use of AI. The regression coefficients p and R^2 of 0.000 and 0.116, respectively, indicate a significant positive relationship between AI-related ethical considerations and academic leadership readiness to adopt and embrace AI. This underscores the

importance of ethics in promoting the use of AI, as improving ethics and ethical safeguards enhances institutional effectiveness and the use of AI in educational settings (Sain et al., 2024; Young et al., 2019). While the regression coefficients were relatively modest, other factors, in addition to ethics, influenced leadership readiness. Overall, improving ethics is important to promote the use of AI.

Relationship between “The combined effect of independent variables and academic leadership readiness for adopting and embracing AI. The results show that the combined effect of three variables (trust in AI, perceived benefits of AI, and ethical considerations related to AI) influences academic leadership readiness for adopting and embracing AI. This finding is consistent with those of other studies (Aloqaily and Rawash, 2022; Scott et al., 2021). The results confirm the significant positive effect of ethical considerations on leadership readiness to use AI, underscoring the importance of significantly improving ethical aspects. This is consistent with previous research (Sain et al., 2024; Young et al., 2019), confirming that ethical aspects are an important and fundamental factor in the use of AI. Conversely, the results confirm that trust in AI and the perceived benefits of AI alone do not have a statistically significant effect when tested independently.

The relatively modest R^2 value of 0.123 also indicates that in addition to the combined effect of these factors on leadership readiness, other factors also influence leadership readiness for adopting and embracing AI. In general, it can be said that it is necessary to pay attention to ethical considerations to enhance the use of AI.

Key challenges facing academic leadership for AI implementation. The results showed that the main challenges facing the use of AI in academia include a lack of awareness and training among staff, financial constraints, and resistance to change. The high average scores for these challenges (4.32, 3.99, and 4.12, respectively) indicate their significant impact on the use of AI. This is consistent with other studies, such as that of Alshadoodee et al. (2022), who confirmed that the lack of AI knowledge among individuals in academia hinders the use of AI. Therefore, it is essential to enhance AI knowledge to build an effective educational system. Kitsios and Kamariotou (2021) confirmed that the application of AI technology faces challenges in practical applications and a lack of experience in the strategic use of AI. Therefore, it is important to develop training programs in the educational field and invest in them to promote the use of AI (Ivchik, 2024; Osman et al., 2024).

On the other hand, the regression coefficients reveal that moral concern influences leadership readiness to adopt and embrace AI. Ethical considerations were the most statistically significant variables among the studied variables, as evidenced by their coefficients ($R^2 = 0.116$ and $p < 0.001$). This is consistent with the findings of Yilmaz et al. (2025), who stated that ethical considerations are important for the use of AI to improve administrative tasks and pose significant obstacles to full implementation. This indicates that it is important to work on the ethical aspects of better AI use. However, trust in AI and perceived benefits had a limited and insignificant impact on leadership readiness for adopting and embracing AI.

Conclusion, limitations, and recommendations

Conclusion. This research was conducted to study academic leadership readiness for adopting and embracing AI, where three aspects influencing the readiness of academic leadership were considered: trust in AI, perceived benefits of AI, and ethical considerations of AI use. It was found that trust in AI and its

perceived benefits contribute positively to leadership readiness, but their independent impact is limited. However, the ethical considerations variable was the most important variable in academic leadership readiness to adopt AI. The results emphasized the importance of addressing concerns related to ethical issues, transparency, and bias in the use of AI in educational settings and academia. There are also some challenges and barriers to academic leadership readiness for adopting AI, such as lack of awareness and knowledge of AI, lack of training, financial constraints, and resistance to change. However, these barriers need to be addressed and managed. Overall, the results indicate that an approach that enhances ethical considerations and reduces challenges and barriers should be adopted to utilize AI in education. Therefore, further research using larger samples is needed to facilitate the effective and efficient use of AI in academia.

Limitations. This study had several limitations, such as the sample size (105 participants), which may not adequately reflect the diversity of opinions across contexts and regions. The geographical scope of this study also raises concerns about cultural influences on AI acceptance. Furthermore, relying on self-reported data introduces potential bias as participants may provide socially desirable responses rather than their actual opinions.

Social implications. Given the findings of this study, several potential societal implications may emerge, including changes in the power dynamics within education, issues of equity and access, changes in administrative roles, ethical dilemmas in education, cultural shifts within educational institutions, impacts on student experiences, long-term societal consequences for the workforce, and resistance to change.

Managerial implications. This study focuses on how academic leaders view AI as a means of enhancing efficiency, decision-making, and administrative functions in universities and educational systems. Therefore, the managerial implications of this study may include the integration of AI to improve operational efficiency, change management and leadership, tailored AI solutions, data-driven decision-making, improved collaboration and communication, and its impact on organizational culture.

Recommendations. Future studies should use a larger, more representative sample to gain broader insights into participants' attitudes toward the use of AI in management processes. Furthermore, longitudinal studies are needed to track changes in attitudes toward the use of AI in education.

Directions for future studies. Future research could incorporate longitudinal studies to monitor attitude shifts, expand sample diversity, examine implementation outcomes, and explore the influence of organizational culture on AI integration.

Data availability

The authors attached the raw data supporting the finding in the supplementary material.

Received: 4 December 2024; Accepted: 22 July 2025;

Published online: 16 August 2025

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Author contributions

Arrooqi: Conceptualization, Writing—original draft, Methodology, Data curation, Formal analysis. Alruqi: Conceptualization, Writing-review and editing, Methodology, project co-supervisor.

Competing interests

The authors declare no competing interests.

Ethics approval

Since this study used individuals to respond the study's instrument, the author made sure that the study was conducted in accordance to the ethical standards of the Helsinki Declaration. Thus, the Local Committee of Research Ethics at Shaqra University (HAPO-01-R-128) reviewed and evaluated this study on Sunday, June 02, 2024, in accordance with "the rules of research ethics on living organisms" and its executive regulations issued by King Abdulaziz City for Science and Technology (KACST) in 1443 AH. The committee approved the compliance of this study with the ethical standards as per the committee decision number ERC_SU_F_202400016.

Informed consent

Verbal informed consent was obtained from all participants because of the need for flexibility. The consent process, including the purpose of the study, voluntary participation, and confidentiality measures, was clearly explained to the participants. The participants were also informed that they could withdraw from the study at any time without any consequences. The protocol for this verbal informed consent was face-to-face or an office phone call and took place within the period from 15 June 2024 to 20 July 2024.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-025-05598-x>.

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