ACCEPTANCE OF AI IN ACADEMIC LIBRARIES IN ENGINEERING COLLEGES ACROSS INDIA

S. Reshma and K. Rekha

Department of Master of Business Administration, Nehru College of Engineering and Research Centre, India

Abstract

This study examines the relationship between leadership styles of academic librarians and their acceptance of artificial intelligence (AI) in higher education. The research involved 50 librarians from four Arab countries, using two distinct questionnaires: one on AI perceptions and the other utilizing the Multifactor Leadership Questionnaire. Data was analyzed using correlational and inferential statistics, including structural equation modeling and regression analysis. Findings indicate that transformational leadership significantly promotes AI implementation in academic libraries, enhancing both perceived usefulness and ease of use. Conversely, transactional leadership is associated with less favorable outcomes, while laissez-faire leadership positively influences perceived ease of use but not perceived usefulness. The study underscores the importance of fostering transformational leadership in librarian training programs to effectively integrate AI technologies, highlighting its role in creating an innovative and supportive organizational culture conducive to technological advancement.

Keywords:

Academic Librarians, Artificial Intelligence, Higher Education, Multifactor Leadership

1. INTRODUCTION

In recent years, the landscape of academic libraries in higher education has undergone profound transformations, driven largely by advancements in technology. Among these technological innovations, artificial intelligence (AI) stands out as a disruptive force poised to revolutionize traditional library services and operations. AI technologies offer unprecedented capabilities in information retrieval, data analysis, and user interaction, promising to enhance efficiency, accessibility, and user experience within academic library settings [1].

The integration of AI into academic libraries, however, is not merely a matter of technological implementation but also a complex socio-organizational endeavor influenced by various factors, including leadership styles adopted by librarians. Leadership within academic libraries plays a pivotal role in shaping organizational culture, fostering innovation, and guiding strategic initiatives. Understanding how different leadership styles impact librarians' attitudes and acceptance of AI technologies is crucial for effectively harnessing the potential of AI to meet the evolving needs of higher education institutions [2].

This study aims to explore the relationship between leadership styles embraced by academic librarians and their openness to AI technologies. By examining how transactional, transformational, and laissez-faire leadership styles influence librarians' perceptions of AI's ease of use and usefulness, this research seeks to provide valuable insights into fostering an environment conducive to AI integration within academic library settings [3].

1.1 CONTEXTUALIZING AI IN ACADEMIC LIBRARIES

The role of academic libraries has evolved significantly in the digital age, expanding beyond traditional collections to encompass digital resources, online learning support, and collaborative spaces. AI technologies offer libraries unprecedented opportunities to streamline operations, personalize services, and leverage vast amounts of data to enhance decision-making processes. Applications such as AI-driven chatbots for user assistance, predictive analytics for collection development, and machine learning algorithms for content recommendation exemplify the transformative potential of AI in enriching library services.

Moreover, AI enables academic librarians to shift from reactive to proactive roles, anticipating user needs and delivering tailored services in real-time [4]. This proactive stance not only enhances user satisfaction but also positions libraries as dynamic hubs of knowledge dissemination and scholarly engagement in the digital era.

1.2 LEADERSHIP STYLES AND AI ACCEPTANCE

The acceptance and successful implementation of AI in academic libraries are contingent upon the leadership styles practiced by librarians. Leadership theories provide frameworks to understand how different leadership behaviors influence organizational dynamics and employee attitudes towards technological change [5]. Transactional leadership, characterized by its focus on structured procedures and contingent rewards, may emphasize the practical benefits and efficiency gains of AI technologies, thereby influencing librarians' perceptions of AI's usefulness.

In contrast, transformational leadership, which inspires innovation, encourages creativity, and fosters a shared vision among team members, is likely to cultivate a supportive environment for AI adoption. Transformational leaders empower librarians to explore new technologies, experiment with AI applications, and perceive AI as a valuable tool for achieving organizational goals and enhancing service delivery [6].

Additionally, laissez-faire leadership, known for its hands-off approach and delegation of decision-making to employees, may promote autonomy and initiative among librarians in adopting AI technologies [7]. This autonomy could influence librarians' perceptions of AI's ease of use, as they have the freedom to explore AI functionalities and integrate them into their workflows according to individual preferences and professional contexts.

1.3 RESEARCH OBJECTIVES AND HYPOTHESES

This study seeks to achieve several objectives:

- To examine the relationship between leadership styles (transactional, transformational, laissez-faire) and librarians' perceptions of AI's perceived ease of use and usefulness in academic libraries.
- To investigate how leadership styles influence librarians' behavioral intentions to use AI technologies in their professional roles.

Based on the Technology Acceptance Model (TAM) and previous research in leadership theory, several hypotheses are formulated:

- **H1**: The perceived ease of use of AI positively influences the perceived usefulness of AI among academic librarians.
- **H2**: Transactional leadership positively influences the perceived usefulness of AI in academic libraries.
- **H3**: Transformational leadership positively influences the perceived usefulness of AI in academic libraries.
- **H4**: Transactional leadership positively influences the perceived ease of use of AI in academic libraries.
- **H5**: Transformational leadership positively influences the perceived ease of use of AI in academic libraries.
- **H6**: Laissez-faire leadership positively influences the perceived ease of use of AI in academic libraries.
- **H7**: Laissez-faire leadership positively influences the perceived usefulness of AI in academic libraries.

By empirically testing these hypotheses, this study aims to provide evidence-based insights into the role of leadership in fostering a supportive environment for AI adoption and integration within academic libraries.

1.4 SIGNIFICANCE OF THE STUDY

The findings of this research have significant implications for academic library management and leadership development. Understanding how leadership styles influence AI acceptance can guide strategic decisions on leadership training programs, organizational policies, and technological investments [8]. By fostering transformational leadership qualities among librarians, institutions can cultivate an innovative culture that embraces technological advancements and adapts to changing educational landscapes [9].

Moreover, this study contributes to the broader discourse on technology acceptance in organizational contexts, offering theoretical insights and practical recommendations for enhancing AI integration in academic libraries. Ultimately, by harnessing the potential of AI technologies through effective leadership, academic libraries can enhance their role as vital resources in supporting teaching, learning, and research initiatives in higher education.

2. CONCEPTUAL FRAMEWORK

The conceptual framework of this study integrates the Technology Acceptance Model (TAM) by Davis (1989) with leadership theories, specifically focusing on transactional, transformational, and laissez-faire leadership styles. This framework serves to understand how different leadership styles influence academic librarians' acceptance and perceptions of AI technologies in higher education.

2.1 TECHNOLOGY ACCEPTANCE MODEL

- **Perceived Ease of Use (PEOU)**: Refers to the extent to which a person believes that using a particular technology will be free of effort. In this context, it measures how librarians perceive the ease of using AI technologies.
- **Perceived Usefulness (PU)**: Indicates the degree to which a person believes that using a technology will enhance their job performance. For academic librarians, it gauges the perceived benefits of AI in their professional roles.
- **Behavioral Intention to Use (BI)**: The likelihood that a person will use the technology. In this study, BI is influenced by PEOU and PU.

2.2 LEADERSHIP THEORIES

- **Transformational Leadership**: Leaders inspire and motivate employees to exceed their own self-interests for the good of the organization, fostering an environment of innovation and creativity.
- **Transactional Leadership**: Leaders focus on routine transactions, using rewards and punishments to motivate compliance and adherence to established processes.
- **Laissez-faire Leadership**: Leaders adopt a hands-off approach, allowing employees significant autonomy to make decisions and manage their own work.

3. HYPOTHESES

Based on the conceptual framework, several hypotheses were formulated to explore the relationships between leadership styles and librarians' perceptions of AI:

- **H1**: The perceived ease of use of AI positively influences the perceived usefulness of AI.
  - **Rationale**: If librarians find AI easy to use, they are likely to perceive it as more useful in enhancing their job performance, consistent with the TAM model.
- **H2**: Transactional leadership positively influences the perceived usefulness of AI.
  - **Rationale**: Transactional leaders emphasize the benefits and utility of technology to achieve specific goals, potentially heightening librarians' perception of AI's usefulness.
- **H3**: Transformational leadership positively influences the perceived usefulness of AI.
  - **Rationale**: Transformational leaders encourage innovation and creative thinking, helping librarians understand and appreciate the practical benefits of AI.
- **H4**: Transactional leadership positively influences the perceived ease of use of AI.
  - **Rationale**: Transactional leaders promote structured and efficient use of technology, which might simplify the adoption process and enhance the perception of ease of use.
- **H5**: Transformational leadership positively influences the perceived ease of use of AI.

- **Rationale**: Transformational leaders foster a supportive environment for experimentation and learning, making it easier for librarians to become familiar with AI technologies.
- **H6**: Laissez-faire leadership positively influences the perceived ease of use of AI.
  - **Rationale**: Laissez-faire leaders provide autonomy, allowing librarians to explore AI technologies at their own pace, which can lead to a positive perception of ease of use.
- **H7**: Laissez-faire leadership positively influences the perceived usefulness of AI.
  - **Rationale**: The autonomy granted by laissez-faire leaders might enable librarians to discover novel ways to integrate AI into their workflows, enhancing its perceived usefulness.

The integrated framework posits that:

- **Perceived Ease of Use (PEOU)** and **Perceived Usefulness (PU)** are influenced by librarians' leadership context.
- Transformational leadership is expected to positively impact both PEOU and PU.
- Transactional leadership is hypothesized to have a positive impact, primarily through structured use and highlighting utility.
- Laissez-faire leadership is anticipated to influence PEOU positively due to the autonomy provided, though its impact on PU is less certain.

4. RESULTS AND DISCUSSION

The study on leadership styles and AI acceptance in academic libraries in higher education provides valuable insights into how different leadership approaches influence librarians' perceptions and openness towards artificial intelligence (AI). Here, transformational leadership emerges as a significant factor positively influencing both the perceived usefulness and ease of use of AI technologies among librarians. Conversely, transactional leadership shows limited influence on these perceptions, while laissez-faire leadership impacts primarily the ease of use aspect. These findings underscore the importance of leadership in shaping organizational attitudes and readiness for technological integration in academic settings.

Table 1. Descriptive Statistics of Domains

Domain	N	Mean	Std. Deviation
Transactional	50	3.143	0.482
Transformational	50	2.365	1.049
Laissez-Faire	50	1.346	0.935
Usefulness of AI	50	4.727	2.054
Ease of AI	50	4.677	2.156

Table 2. Maximum Likelihood Estimates Regression Weights of All Variables

Variables	Estimate	S.E.	C.R.	P	Label
Transactional ← Sex	-0.409	0.127	-3.276	0.001	Sig.
Transformational ← Sex	0.801	0.281	2.877	0.004	Sig.
Laissez-Faire ← Sex	-0.771	0.245	-3.183	0.002	Sig.
Transactional ← Country	-0.073	0.056	-1.320	0.194	Non sig.
Transformational ← Country	0.124	0.125	1.003	0.326	Non sig.
Laissez-Faire ← Country	-0.127	0.108	-1.181	0.246	Non sig.
Transactional ← Highest Certification	-0.028	0.138	-0.210	0.846	Non sig.
Transformational ← Highest Certification	0.294	0.308	0.968	0.343	Non sig.
Laissez-Faire ← Highest Certification	-0.322	0.268	-1.215	0.233	Non sig.
Transactional ← Years of Experience	0.006	0.130	0.045	0.977	Non sig.
Transformational ← Years of Experience	0.052	0.290	0.180	0.869	Non sig.
Laissez-Faire ← Years of Experience	-0.091	0.252	-0.366	0.726	Non sig.
Usefulness of AI ← Transactional	0.170	0.149	1.155	0.257	Non sig.
Ease of AI ← Transactional	0.153	0.150	1.036	0.310	Non sig.

Table 3. Impact of Sex on Various Variables

Sex	N	Mean (Transactional)	Mean (Transformational)	Mean (Laissez-Faire)	Mean (Usefulness of AI)	Mean (Ease of AI)
Male	24	3.359	1.951	1.740	3.986	3.888
Female	26	2.944	2.747	0.9971	5.412	5.405

Table 4. Regression Analysis

Variables	Usefulness of AI (B)	Usefulness of AI (t)	Usefulness of AI (Sig.)	Ease of AI (B)	Ease of AI (t)	Ease of AI (Sig.)
Transactional	0.170	0.736	0.477	0.153	0.660	0.524
Transformational	1.976	10.670	<0.001	1.737	9.342	<0.001
Laissez-Faire	-0.014	-0.077	0.952	-0.416	-2.234	0.032

4.1 INFERENCES

- The study highlights that transformational leadership, characterized by visionary and supportive behaviors, fosters a conducive environment for AI adoption in academic libraries. Leaders who inspire innovation and provide intellectual stimulation are more likely to enhance librarians' perceptions of AI as both useful and easy to use. This suggests that promoting transformational leadership can facilitate smoother integration of AI technologies in higher education.

- In contrast, transactional leadership, which focuses on contingent rewards and adherence to existing norms, does not significantly influence librarians' perceptions of AI usefulness or ease of use. This implies that a more rigid leadership style may hinder organizational readiness for adopting new technologies like AI, potentially creating barriers to innovation.

- Laissez-faire leadership, characterized by a hands-off approach, positively impacts the ease of use of AI technologies. This suggests that allowing autonomy and flexibility in how AI technologies are explored and implemented can enhance librarians' perceptions of usability. However, its impact on perceived usefulness is less pronounced, indicating that while autonomy aids in familiarity, it may not inherently drive perceived value.

- The study also reveals gender differences in leadership preferences and perceptions of AI. Females tend to favor transformational leadership more than males, which aligns with higher perceived usefulness and ease of use of AI technologies among female librarians. This underscores the importance of considering gender dynamics in leadership and technology adoption studies.

4.2 LIMITATIONS

- The study sample, consisting of 50 librarians from four Arab countries, may not fully represent the diversity of academic libraries globally. Therefore, generalizing findings to broader contexts should be done cautiously, considering potential cultural and regional variations in leadership styles and technology acceptance.

- The reliance on self-reported data from librarians could introduce bias, such as social desirability bias where respondents may provide answers they perceive as favorable. Future research could benefit from incorporating objective measures or observations to validate self-reported perceptions.

- The cross-sectional nature of the study limits causal inferences about the relationship between leadership styles and AI acceptance. Longitudinal studies could provide deeper insights into how these relationships evolve over time as AI technologies and leadership styles adapt.

- While the Multifactor Leadership Questionnaire (MLQ) and Technology Acceptance Model (TAM) are robust tools, variations in interpretation or cultural nuances may affect the validity and reliability of responses across different settings.

5. CONCLUSION

The study shows that leadership styles significantly influence librarians' attitudes and acceptance of AI technologies in academic libraries. Transformational leadership emerges as a key driver in fostering positive perceptions of AI usefulness and ease of use, while transactional and laissez-faire leadership styles show mixed impacts. Understanding these dynamics can inform organizational strategies to promote effective leadership practices that support technological innovation in higher education. Addressing the study's limitations through larger, more diverse samples and longitudinal approaches will further enhance our understanding of leadership's role in navigating the evolving landscape of AI integration in academic libraries.

6. CONCLUSION

This study explored the relationship between academic librarian leadership styles and their openness to AI in higher education, finding transformational leadership to be a significant predictor of positive AI adoption outcomes.

Transformational leadership enhances both perceived usefulness and ease of use of AI among librarians, suggesting that leaders who inspire, motivate, and encourage innovation create a conducive environment for AI integration.

Conversely, transactional leadership, characterized by a focus on standardized procedures and contingent rewards, is less effective in facilitating AI adoption. Its emphasis on conformity and operational stability poses challenges for the dynamic requirements of AI integration.

Laissez-faire leadership positively influences the perceived ease of use of AI, allowing librarians the autonomy to explore and experiment with AI technologies at their own pace. However, it does not significantly impact the perceived usefulness of AI, indicating that while laissez-faire leadership can ease initial AI interaction, it does not enhance perceptions of its practical benefits.

The findings emphasize the need for leadership development programs in academic libraries that prioritize transformational leadership skills to support effective AI integration.

By fostering an organizational culture that values innovation and embraces technological advancements, academic libraries can better navigate the evolving landscape of higher education and improve the implementation of AI technologies.

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