



# Artificial Intelligence As A Driver Of Digital Transformation In Higher Education: An Empirical Study Of Institutional Adoption Patterns

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## Abstract

The growing pace of Artificial Intelligence (AI) is transforming digital transformation pathways in institutions of higher learning and impacting academic provision, assessment mechanisms, research activities, and administrative activities. This empirical research examines the role of AI as an institutional digital transformation catalyst, specifically, at what stages of adoption it occurs, which areas of functional transformation are involved, strategic orientation, and enabling conditions. The structured questionnaire was used to gather data on 91 members of the faculty of institutions of higher learning and the data were analyzed using descriptive statistics and inferential statistics such as mean analysis, one-way ANOVA.

The results show that the most significant occurrence of AI-driven digital transformation is the use of AI in the teaching and assessment fields, but research processes and administrative processes are also undergoing a consistent introduction. Most institutions are in an emerging and developing level of transformation maturity which implied progressive but not yet mature strategic implementation. The most visible technologies that help to facilitate transformation are virtual assistants and predictive

modeling, and innovation becomes the main institutional goal that will determine the use of AI. Among the enablers that can hasten the speed of the digital transformation efforts, institutional support and student demand are listed.

Gender analysis does not show any statistically significant differences in the perceptions of AI-driven digital transformation, which can be regarded as shared institutional experiences of demographic groups. All in all, the paper concludes that AI is actively involved in digital transformation in higher education, but long-term strategic alignment, governance transparency, and organizational dedication are the keys to further maturity of transformation. The results will present practical information to policymakers and institutional administrators who will be able to enhance AI-based digital transformation and preserve the integrity of the academic process and its sustainability.

**Keywords:** Artificial Intelligence; Digital Transformation; Higher Education Institutions; AI Adoption Maturity; Institutional Strategy; Faculty Perceptions; Organizational Readiness;

## Introduction

Artificial Intelligence (AI) has become one of the most disruptive units that dictate the digital transformation of higher education institutions all over the globe. In addition to discrete technological implementation, AI is starting to become a source of digital change, affecting instructional design, assessment procedures, research practices, governance systems, and administrative effectiveness. In universities, AI-based systems like learning analytics systems, intelligent tutoring systems, plagiarism scanners, virtual assistants, and predictive analytics systems are being incorporated to complement decision-making, learning customization, and streamline processes within institutions. Nevertheless, the failure or success of AI-powered digital transformation is not necessarily an issue of the availability of technologies but of institutional preparation and readiness, strategic orientation, and engagement of stakeholders.

Faculty members are at the heart of the implementation of AI in academic ecosystems. Being main drivers of the instructional delivery process and curriculum design, their views on institutional support, available resources, professional development, and strategic direction transparency would greatly influence the depth and effectiveness of the digital transformation efforts. Although AI technologies possess potentials of innovation and modernization, there are still issues related to the governance arrangements, ethical principles, policy transparency, and the implementation of AI technologies into the existing pedagogical patterns. These issues emphasize the fact that digital transformation is an organizational and cultural phenomenon just as much as a technological phenomenon.

Though the academic interest in AI adoption into higher education has grown, a significant portion of the current research covers the aspects of technology acceptance, behavioral intention, or single areas of application. Minor empirical research has discussed AI as a combined force behind institutional digital transformation in functional areas and strategic aspects. In addition, the relative

lack of research has been devoted to the cognition of whether there is a differing perception of AI-enabled transformation among the demographic groups within the academic settings. To close this gap, the current research empirically examines the perceptions of faculty about AI-driven digital transformation in higher education institutions with a particular focus on the areas of transformation, the level of adoption maturity, and the strategic orientation, enabling conditions, and gender disparities in perception.

### Research Objectives

1. To analyze the levels of artificial intelligence input to digital transformation in the fundamental functional sectors of institutions of higher learning, such as teaching, assessment, research, and administration.
2. To examine patterns of institutional adoption of AI technologies to determine the levels of strategic integration and phases of digital transformation.
3. To assess the difference in the perception of AI-driven digital transformation between gender groups.
4. To establish the presence of major organizational facilitators, strategic priorities, and structural support systems that ensure AI-driven digital transformation in institutions of higher learning.

### Research Significance

The present research helps the existing debate on digital transformation in higher education to rely on artificial intelligence as a strategic driver of change in institutions rather than a technological resource. The study offers an organized insight into the ways in which AI transforms the academic processes, governance practices, and institution strategy by empirically analyzing the adoption patterns and stages of transformations. Its findings can be very useful to policy makers, university administrators, and institutional planners intending to establish sustainable digital transformation models. Using the enablers and transformation gaps to outline the organization, the study contributes to evidenced-based decision making in terms of infrastructure investment, faculty development, and long-term AI strategy formulation. Moreover, the analysis of demographic changes will contribute to the inclusiveness of the digital transformation plan and make sure that the integration of AI is adjusted to the institutional objectives, academic principles, and fair representation of all stakeholder groups.

## Review of Literature

Artificial intelligence (AI) is now being established as a key facilitator of digital transformation (DT) in higher education that affects the way institutions redesign teaching-learning processes, assessment, research, and also administration decision-making. Instead of looking at AI as a discrete technology, recent literature views the adoption of AI as an institutionalization-level process of change that necessitates the alignment of strategy, governance, culture, infrastructure, and stakeholder preparedness. This systems perspective stresses the fact that AI-inspired DT is conditioned by reinforcing and balancing forces (e.g., loops of investment-capability growth and integrity versus policy and competitiveness "traps"), so the results of adoption are highly conditioned by institutional circumstances and leaders decisions.

An empirical literature analyzing the reasons behind the use of generative AI tools, as well as the long-term dynamics of their use, is growing. The longitudinal approach was added by Polyportis (2024) who analyzed the evolution of behavior regarding the use of ChatGPT in higher education and concluded that adoption is not static, but dynamic and that factors driving further use can change as users gain experience, have a sense of value and change expectations. The longitudinal framing, in particular, applies well to DT as it implies that the institutions need to expect that the adoption patterns are going to change and the institutions need to plan to provide continuous support rather than a one-time intervention.

Sharma and Singh (2024) used the Unified Theory of Acceptance and Use of Technology (UTAUT) to describe the use of AI in universities in the Indian context of higher education. Their empirical model-based methodology highlights that technology acceptance determinants (usually phrased in terms of performance expectations, effort expectations, social influence and facilitating conditions) determine adoption intentions and use behaviors, and can thus present a systematic perspective on the diagnostics of why certain institutions move more rapidly along the DT pathway, as compared to others. This evidence helps to pursue the thesis that AI-based DT needs not only tools but also facilitating conditions that minimize friction and enhance the sense of usefulness among the faculty and institutional units.

Outside personal acceptance, the institutional context and the governance factors have a potent effect on whether the AI adoption will foster long-term digital transformation. The importance of the institutional environment in value perceptions and adoption intentions was highlighted by Erdmann and Toro-Dupouy (2025), who also defined the necessary factors and value drivers that lead to the introduction of AI initiatives obtaining legitimacy and magnitude at universities. This literature confirms that institutional preparedness (policies, norms, leadership support, and resource structures) mediates the influence of stakeholders on their interpretation of the benefits and risks of AI, thus influencing the level of adoption and transformation processes.

On the organizational implementation level, Rowland et al. (2022) looked at the specific implementation of AI, namely within the digital transformation strategies, and demonstrated that despite having a high-level vision of digital transformation with the stakeholders, operational levels may be experiencing tensions of defining AI/DT, value realisation, and defining success metrics. This underscores a feasible DT dilemma: universities can implement AI technologies without agreement on strategic intent, governance procedures, and metrics that can be disaggregating to implementation and constraining to transformational influence.

These complexities have been responded to in framework-building studies that suggest systematic models of AI adoption as DT in higher education. Sararuch et al. (2025) contribute to the development of an AI adoption framework specific to digital transformation in institutions of higher learning, stating that AI-driven strategy, underlying technologies, and governance mechanisms that can transform experimentation into the ability to build capability on an organizational level are necessary. These frameworks generally emphasize gradual adoption, policy alignment, and capacity building so that AI efforts are not just isolated pilots that fail to become part of the institutional system.

In addition to the AI-oriented DT literature, there is a wider field of DT research in higher education that also highlights the e-learning adoption as the primary route upon which institutions establish digital capacity and pre-emption towards advanced technologies. To form a synthesis of evidence on e-learning adoption as a digital transformation, Shard, Kumar, and Koul (2024) suggested institutional DT tends to be cumulative, meaning developed through digital learning infrastructure and adoption to more complex analytics and AI-facilitating systems. This implies that the adoption trends of AI can be partially described by a pre-existing maturity of learning systems and institutional digitization in the field of DT.

Further empirical exploratory research also expands the knowledge about AI adoption drivers through the study of perceived risks, expectations, and social influences. Nagy et al. (2024) conducted a study on AI application in higher education and contributed to understanding the connection between risk perceptions and anticipated performance benefits as predictors of adoption intentions, which support the idea of trust, safeguards, and perceived value being the key factors in responsible adoption of AI tools. These findings are consistent with the DT literature that adoption is increased faster when institutions lessen the perceived risk (ethical, privacy, academic integrity) and show quantifiable benefit to the academic stakeholders.

More recent literature is also relating AI-driven digital transformation to more institutional objectives like inclusion and equitable education. Thakur et al. (2025) explored the interaction of digital transformation, the intention of the adoption of AI and inclusive education, indicating that in case of the design of DT strategies with the focus on accessibility, support systems, and diversity of stakeholders, it is possible to affect not only the tendency to adopt technologies but also the results of inclusion. This broadens the lens of adopting to one of impact, which is the rationale that AI-guided

DT must be measured according to educational equity outcomes, as well as efficiency and innovation indicators.

AIs can be used to digitize not only classrooms but also the service ecosystems of universities, such as libraries and academic support. Okunlaya et al. (2022) came up with a conceptual framework of AI-based innovation in library services as an element of university digital transformation, demonstrating that the adoption of AI can transform the service delivery and value creation enterprise-wide. This, combined with the systems perspective of Katsamakos et al. (2024), supports a whole-institution vision of DT, where AI influences interrelated subsystems and has to be controlled as a collection of changes instead of a single technology implementation.

## **Research Gap**

Even with increasing literature on the use of artificial intelligence in higher education, especially those that are based on the technology acceptance model, behavioral intentions, and generative AI usage studies, a very small amount of empirical evidence exists regarding how AI can be an organized factor in institutional digital transformation. Available literature tends to look at one-on-one adoption variables or single implementation settings, yet lacks in-depth investigation of institutional adoption likeliness patterns in center domains of operation like teaching, assessment, research, and administration within an integrated change framework. Moreover, the coverage of mapping AI integration stages, the evaluation of strategic alignment with academic objectives, and the possibility of the consistency in perceptions of transformation caused by AI among demographic groups has received inadequate attention. Therefore, there is a definite gap in research to offer an integrated, institution-level empirical evaluation of AI as a driver of digital transformation in higher education, which the current study is aimed at filling.

## **Research Methodology**

The research design adopted in the study was descriptive and analytical in nature to investigate the issue of artificial intelligence as a source of digital transformation in the institutions of higher learning. The primary data were gathered with the help of a structured questionnaire which was given to 91 faculty members of different institutions of higher learning. The tool was aimed at assessing the faculty opinion on AI-enabled digital transformation in the most critical functional areas, according to which teaching, assessment, research, and administration are noted. It also preached perceptions about institutional adoption phases, strategic alignment with academic goals, and key facilitating factors in favor of digital transformation.

Frequency, percentage, mean, and standard deviation were visually described as descriptive statistical tools to summarize patterns of AI adoption and digital transformation in the institutions. One-way ANOVA was used to perform inferential analysis to determine if there were significant differences in the perception of AI-driven digital transformation among members of gender groups. Proper statistical operations were taken to achieve reliability, consistency and validity of the results.

## Data Analysis

**Table 1: Frequency and Percentage Analysis of Institutional AI-Driven Digital Transformation Profile**

<b>Dimension of Digital Transformation</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
<b>Primary Domain of AI-Driven Transformation</b>	Administration	20	22.0
	Teaching	27	29.7
	Research	21	23.1
	Assessment	23	25.3
<b>Stage of AI-Enabled Digital Transformation</b>	Emerging	25	27.5
	Developing	29	31.9
	Established	22	24.2
	Advanced	15	16.5
<b>Dominant AI Technologies Supporting Transformation</b>	Learning Analytics	16	17.6
	Plagiarism Detection	16	17.6
	Virtual Assistants	33	36.3
	Predictive Modeling	26	28.6
<b>Strategic Orientation of AI Adoption</b>	Efficiency	19	20.9
	Innovation	35	38.5
	Competitiveness	18	19.8
	Standardization	19	20.9
<b>Key Enablers of Digital Transformation</b>	Institutional Support	30	33.0
	Faculty Readiness	15	16.5
	Student Demand	27	29.7
	Regulatory Policies	19	20.9

In Table 1, the overall picture of artificial intelligence as the driver of digital transformation in the higher education institution is provided. The results show that teaching (29.7) is the major area of AI-based transformation, the assessment (25.3), research (23.1), and administration (22.0) take the next ranks. Such a distribution indicates that the digital transformation efforts are highly rooted in the fundamental academic operations, where instructional and evaluation roles are slightly more prone to transformation. Nevertheless, the comparatively equal percentages across the domains indicate that the adoption of AI is not limited to the specific functioning area but is slowly seeping into various functions of institutions.

About the stage of AI-driven digital transformation, most institutions are seen to be at the developing (31.9%) or emerging (27.5%) stage. This shows that AI-based change is in process but is at its initial phases and not at the institutional maturity levels. A smaller percentage of institutions is defined as established (24.2%) or advanced (16.5%), which indicates that the overall strategic integration and systemic change remain an ongoing process in most higher education settings.

As far as the most popular AI technologies that can help to transform, the use of virtual assistants (36.3) is reported predominantly. Their popularity indicates the increased use of AI-based communication systems, academic support, and administration mechanisms. It is followed by predictive modeling (28.6) and is an indication that there is a growing trend towards data-driven decision-making processes. Moderately but steadily integrated learning analytics and plagiarism detection tools (17.6% each) are used to promote quality assurance and academic integrity in digital ecosystems.

When it comes to strategic orientation, innovation (38.5) turns out to be the main institutional driver of AI-based digital changes. This reflects the idea that institutions also view AI not only as a device that facilitates operational efficiency but also as an agent of modernization and competitive positioning. However, efficiency (20.9%), standardization (20.9%), and competitiveness (19.8%) also positively affect the adoption of AI, and this aspect may indicate a multi-dimensional strategic reason.

The analysis determines the institutional support (33.0%) as the greatest enabler of the digital transformation and then student demand (29.7%). This highlights the fact that organizational commitment, leadership support, and resource distribution are the key to further development of AI integration. The role of faculty readiness and regulatory policies though significant, is seen as secondary supporting mechanism.

As the aim of investigating whether the perceptions of AI as a factor that has triggered digital transformation vary by gender groups, the following hypotheses were developed;

**H<sub>01</sub>: Gender has no significant impact on the perceptions of faculty about AI-driven digital transformation.**

**H<sub>A1</sub>: “Gender has a significant impact on the perceptions of faculty about AI-driven digital transformation”.**

**Table 2: Mean table for faculty for AI-Driven Digital Transformation**

Gender	“My institution actively promotes AI-enabled digital transformation in teaching and administration.”	Adequate resources are available for AI-enabled transformation.	Faculty are encouraged to experiment with AI-based digital practices.	My institution has a clear digital transformation roadmap incorporating AI.	AI initiatives align with the institution’s long-term academic strategy.
Male	2.77	2.49	2.51	2.55	2.47
Female	2.69	2.69	2.38	2.54	2.69
Prefer not to say	2.75	2.42	2.25	2.17	2.25
<b>Total Mean</b>	<b>2.75</b>	<b>2.54</b>	<b>2.44</b>	<b>2.49</b>	<b>2.51</b>

Table 2 provides the average score of faculty perception in AI-facilitated digital transformation by gender groups. The average scores are between 2.44 and 2.75, which reveal a rather neutral to moderately positive attitude toward institutional support of AI, sufficiency of resources, support of experimentation, strategic focus, and compliance with academic goals.

Male faculty is characterized by slightly higher values of mean values in institutional promotion of AI-enabled change and encouragement of experimentation, but female faculty are characterized by relatively greater perceptions of resource availability and connection of AI initiatives to academic strategy. Those respondents who did not want to reveal their gender have comparatively poor perceptions especially as far as there was a clear transformation roadmap.

Nonetheless, the general proximity of means scores between gender categories shows that the perception of AI-based digital transformation in institutions is rather consistent generally. The descriptive results indicate that the degree of demographic difference in the perception of

transformation is not large. The close proximity of mean scores across gender categories suggests that faculty perceptions of AI utilization and integration are largely similar, with only minor variations observed across specific aspects. The results indicate that, regardless of gender, faculty members share comparable views on institutional support, strategic direction, and alignment of AI with academic objectives. These descriptive findings provide a preliminary indication that gender-based differences in perceptions may be limited, which is further examined through inferential analysis in subsequent sections to test the stated hypotheses.

**Table 3: ANOVA Results for Gender Differences in AI-Driven Digital Transformation Perceptions**

<b>Dimension of AI-Driven Digital Transformation</b>	<b>Source</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
<b>Institution actively promotes AI-enabled digital transformation in teaching and administration</b>	Between Groups	0.115	2	0.058	0.052	0.949
	Within Groups	97.071	88	1.103		
	Total	97.187	90			
<b>Adequate institutional resources support AI-driven digital transformation initiatives</b>	Between Groups	0.915	2	0.457	0.421	0.658
	Within Groups	95.7	88	1.088		
	Total	96.615	90			

<b>Faculty are encouraged to innovate through AI-enabled digital practices</b>	Between Groups	0.768	2	0.384	0.32	0.727
	Within Groups	105.649	88	1.201		
	Total	106.418	90			
<b>The institution has a clearly defined AI-integrated digital transformation roadmap</b>	Between Groups	1.487	2	0.743	0.568	0.569
	Within Groups	115.26	88	1.31		
	Total	116.747	90			
<b>AI initiatives are strategically aligned with long-term academic transformation goals</b>	Between Groups	1.751	2	0.876	0.734	0.483
	Within Groups	104.996	88	1.193		
	Total	106.747	90			

Table 3 shows the ANOVA findings that investigate the differences in the perceptions of AI-mediated digital transformation between gender groups among the faculty. The significance (Sig.) values of all five dimensions of the transformation such as promotion of AI-enabled transformation, availability of institutional resources, encouragement of digital innovation, clarity of transformation roadmap, and strategic alignment with academic goals are above the level of 0.05.

The F-values are consistently low which also suggests that there is not much difference between male, female as well as undisclosed gender groups. Such results prove that the attitudes towards the AI-generated digital transformation are statistically homogeneous among gender groups.

On this basis, the null hypothesis (H01) will be accepted and the alternative hypothesis (HA1) rejected. The findings indicate that gender is not a major factor that can influence the perceptions of the faculty in regard to the institutional process of digital transformation, guided by artificial intelligence. Faculty members seem to have like experiences and conception of AI integration, institutional support systems, and institutional strategic direction in their respective institutions of higher learning.

## Conclusion

The research comes to a conclusion that artificial intelligence is operating as a substantial driver of digital transformation in organizations of higher learning. The most apparent area of change is in fundamental academic spheres especially teaching and assessment, which suggests that instructional systems will lead change related to AI. But most of the institutions fall at the emerging or developing phases of digital transformation maturity meaning that they are at the stage of adoption but not the entire strategic integration has been realised.

The results also indicate that innovation is the key strategic force that will dictate the AI-based transformation initiatives. Faculty perceptions show that there is an average confidence level in the institutional support structures and alignment with academic goals but lacks clear digital transformation roadmaps which the institution needs to work on. Notably, the concept of gender does not play an important role in perceiving the digital transformation based on AI development, which indicates a similar institutional experience among demographic groups.

In general, the paper highlights that long-term leadership adherence, systemic change plan, and ongoing faculty involvement can improve AI-facilitated digital change in higher education. Those institutions who go beyond the adoption of isolated AI tools to have a cohesive strategy will have a better chance of long-term academic modernization and organizational improvement.

## Suggestions

1. Institutions of higher learning ought to develop comprehensive strategies of digital transformation, including AI, in line with the long-term academic and organizational goals.
2. Regular AI-enabled transformation preparation programs that are structured around capacity-building and continuous professional development should be adopted so as to improve faculty preparedness to AI-enabled transformation.
3. Within institutions, mechanisms and support systems such as good governance and responsibility in experimentation and innovation, and cross-functional integration of AI need to be reinforced.
4. To ensure transition between rudimentary and advanced levels of AI maturity, there should be clear digital transformation road maps with specific milestones that can be measured.

## Limitations

1. The research was based on perceived faculty, and this could cause a response bias and interpretation bias.
2. The quantity of respondents (n=91) was small and this might limit the extrapolation of results to a wider institutional setting.
3. The design is cross-sectional in nature that records the perceptions of the people at a particular moment and does not present the dynamics of transformation over a long period of time.

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