北京师范大学智慧学习研究院
Smart Learning Institute of Beijing Normal University

UNESCO CHAIR ON AI IN EDUCATION

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Pacesetting Global Educational Transformation Report

AI-Driven Innovations from 100 Selected Top Universities

June 2026

2024 • 2033
International Decade of Sciences for Sustainable Development

This work presents partial findings of the *Intelligent Social Education Science Experiment Project* endosed by IDSSD.

UNESCO Chair on Artificial Intelligence in Education (UNESCO AIED)

UNESCO has approved the establishment of UNESCO AIED at Beijing Normal University (BNU) in November 2022. The Chair will investigate the use of artificial intelligence in education as a driver and component of solutions and strategies to support the attainment of the Sustainable Development Goals (SDGs). It will facilitate collaboration between high-level, internationally-recognized researchers and teaching staff of BNU and other institutions in China, as well as elsewhere in Asia, Africa, Latin America, and other regions of the world.

Reshaping the Future of Educational Science based on Intelligent Social Experiment

Led by the UNESCO AIED at Beijing Normal University, the project has been officially announced and selected as one of the first set of endorsed projects under the United Nations' *International Decade of Sciences for Sustainable Development (2024-2033)*. In close collaboration with global partners, the project will bring together researchers, education practitioners, international organizations, schools, and private-sector actors to advance a shared agenda for educational transformation in the age of AI.

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Executive Summary

Artificial intelligence (AI) is accelerating the transformation of higher education worldwide. With nearly 269 million students enrolled in higher education globally, universities are exploring the potential of AI to strengthen institutional governance, enrich teaching and learning, advance scientific research, and deepen their engagement with society. Yet the benefits of this transformation are not being shared equally. While many world-class universities have rapidly expanded AI infrastructure, computing capacity, institutional strategies, and innovation ecosystems, many universities, particularly in resource-constrained contexts, continue to face significant barriers related to funding, digital infrastructure, human capacity, data access, and technological sovereignty. As a result, AI may deepen existing inequalities and give rise to new forms of digital, knowledge, and innovation divides across global higher education.

At the same time, higher education is facing a broader set of structural challenges. Advances in AI are reshaping the ways in which knowledge is generated, accessed, disseminated and applied, requiring universities to renew their roles not only as centres of knowledge production, but also as institutions for critical inquiry, ethical reflection, talent development, and social transformation. Demographic shifts, financial pressures, growing concerns about graduate employability, and rapidly evolving labour-market demands are further increasing the urgency of university transformation. AI therefore represents not only a technological innovation, but also a catalyst for rethinking the missions, structures, and responsibilities of universities in the twenty-first century.

Against this backdrop, there is a growing need to understand how universities are responding to the opportunities and challenges brought by AI. Although higher education is a vast and diverse sector, with more than 20,000 universities operating worldwide, only some institutions have accumulated systematic experience in institution-wide AI-Driven transformation. Their strategic choices, governance arrangements, and practical innovations provide valuable insights for universities working in different economic, social, cultural, and technological contexts. This report therefore seeks to identify emerging patterns of AI-Driven transformation in higher education and to explore how selected institutional experiences may inform broader efforts to build more inclusive, ethical, and future-oriented higher education systems.

The study adopts an embedded mixed-methods design and examines 100 representative universities worldwide. The sample was constructed to combine world-class universities with universities from under-represented regions, thereby balancing institutional excellence with geographical diversity. The quantitative strand draws upon five major global university ranking systems, including QS, Times Higher Education (THE), U.S. News, ARWU, and CWUR, and applies the Modified Risk Parity Model for Integrated University Ranking (MRPM-IUR) as a structured weighting and selection mechanism to identify 73 universities that perform consistently across multiple ranking systems. To address the limitations of ranking-based approaches and strengthen regional representation, a qualitative strand was developed using the Top-DRUM framework, which considers institutional prestige and visibility, institutional diversity, regional representativeness, unusual university size, and interregional mobility. Through this process, an additional 27 universities were selected from under-represented and resource-constrained regions, including Africa, Latin America, and Southeast Asia.

The final sample includes 100 universities from 30 countries across six continents, including 33 universities in North America, 22 in Asia, 21 in Europe, 10 in Africa, 8 in Latin America, and 6 in Oceania. Drawing upon publicly available sources, the study systematically analyses more than

1,400 AI-related initiatives implemented between 2020 and 2026. Building on the three core missions of universities - education, research, and social engagement - the report develops a ten-dimensional analytical framework comprising Digital Leadership and Faculty Transformation; Digital and Intelligent Infrastructure and AI Programmes; AI Literacy and Career Development; Reshaping Pedagogy and Curriculum Restructuring; AI for Science and Interdisciplinary Collaboration; Organisation Transformation and Resource Integration; Education Governance and Ethical Guidelines; Social Partnerships and Community Empowerment; Fund Mobilisation and Enterprise Incubation; and Cultural Inheritance and Sustainable Development. In addition, a Boston Consulting Group (BCG) matrix is employed as an interpretive framework to illustrate differentiated patterns of engagement degree and development momentum across universities.

The findings indicate that AI is no longer a peripheral technology within selected universities. Instead, illustrated by publicly documented initiatives, it is increasingly becoming a core institutional capability that shapes teaching and learning, research, organisational management, governance, and social engagement. Across regions, 100 selected top universities are moving beyond isolated pilot projects and fragmented experimentation towards more systematic, institutionalised, and university-wide transformation. AI-related initiatives have expanded rapidly since 2023, reflecting a shift from exploratory adoption towards strategic integration.

More fundamentally, the study suggests that AI is reshaping the traditional missions of the university. Teaching and talent development are evolving towards a new pact of learning and education characterised by learner-centred approaches, lifelong learning, competency development, and human-AI collaboration. Scientific research is increasingly moving towards human-AI teaming research and co-generative knowledge building, in which intelligent systems become active partners in scientific discovery and interdisciplinary innovation. Meanwhile, social service and cultural inheritance are expanding towards broader participation in intelligent society building, requiring universities to play more active roles in digital inclusion, AI governance, public service, cultural preservation, and sustainable development.

Although common trends are observed across the universities examined, regional pathways of AI-Driven transformation differ substantially. In North America, universities benefit from mature innovation ecosystems and strong university-industry collaboration, contributing to diverse and highly differentiated trajectories of institutional transformation. In Europe, universities emphasise ethical governance, public value, and regulatory coordination, leading to relatively convergent patterns of transformation. In Asia, AI-Driven transformation in universities is often shaped by national development strategies, large-scale infrastructure investment, and growing research capacity, supporting accelerated and system-level institutional change. In Oceania, universities pursue balanced and institution-wide transformation, supported by regional collaboration and shared public infrastructure. In Latin America, universities often draw on public funding, international partnerships, and regional cooperation to strengthen institutional capacity and advance AI innovation in resource-sensitive contexts. In Africa, universities demonstrate resilient and adaptive approaches that prioritise local relevance, institutional capacity-building, and inclusive development under conditions of limited resources.

Overall, the study identifies a common global trajectory. Universities are moving from technology adoption towards institutional transformation; from isolated innovation towards ecosystem development; and from efficiency-oriented applications towards human-centred and values-driven approaches. Human-centred development, ethical governance, inclusion, and sustainability are emerging as shared principles guiding AI-Driven transformation across universities worldwide.

This report is intended for policymakers, university leaders, educators, researchers, and industry stakeholders. It provides practical references for universities seeking to advance AI-enabled transformation and supports evidence-informed

decision-making in higher education. As the analysis relies primarily on publicly available information, the findings should be regarded as a dynamic snapshot of ongoing developments. Consequently, the report should be interpreted as a structured mapping of institutional strategies and initiatives rather than a direct evaluation of educational, research, or societal outcomes. Continued participation from universities worldwide and future updates to the evidence base will further strengthen understanding of AI-Driven transformation in global higher education.

Foreword

As the world enters the final years of the journey towards Sustainable Development Goal 4, the promise of inclusive and equitable quality education and lifelong learning opportunities for all remains both urgent and unfinished. Higher education has a vital role to play in this collective endeavour. It not only expands opportunities for advanced learning and research, but also contributes to social mobility, innovation, intercultural understanding and sustainable development. At the same time, digital and intelligent technologies are reshaping the conditions under which higher education systems operate. Artificial intelligence, in particular, is moving rapidly into classrooms, laboratories, libraries, campuses and systems of institutional governance. It is changing how knowledge is produced, accessed and shared, how teaching and learning are organised, how research is conducted, and how universities engage with society. These developments create new possibilities for strengthening education systems, but they also call for stronger evidence, more inclusive dialogue and coordinated action to ensure that technology serves human development and the common good.

Since UNESCO launched the Futures of Education initiative and advanced the idea of a new social contract for education, the global education community has increasingly recognised the need to rethink the relationships between education, knowledge, technology and society. The Transforming Education Summit and the World Higher Education Conference further called for systemic transformation towards more inclusive, equitable and sustainable education systems. Within this broader agenda, higher education has a particular responsibility. Universities are not only centres of teaching and research, but also public institutions that contribute to ethical reflection, cultural diversity, social transformation and the advancement of the common good.

The rapid development of AI is reshaping the core missions of higher education. Teaching and talent development are moving beyond one-way knowledge transmission towards learner-centred, lifelong and human-AI collaborative learning. Scientific research is increasingly being transformed by human-AI teaming, interdisciplinary inquiry and new forms of knowledge co-creation. Social engagement is also expanding, as universities are called upon to contribute to digital inclusion, responsible AI governance, public service, cultural preservation and sustainable development. In this sense, AI is becoming part of a renewed social contract for higher education.

At the same time, AI does not automatically lead to better education. Its educational value depends on clear purposes, sound pedagogy, ethical governance, institutional capacity and respect for human dignity and agency. Without these conditions, AI may deepen existing inequalities, create new divides in data, infrastructure and knowledge, weaken academic integrity, and reduce education to efficiency-oriented technological optimisation. The question facing universities is therefore not simply whether AI should be used, but how it can be developed and governed in ways that advance inclusion, quality, equity and the public good.

There is, however, still a lack of systematic evidence on how universities are responding to these challenges in practice. Many institutions are experimenting with AI strategies, platforms, curricula, governance mechanisms and partnerships, but these experiences remain fragmented. The global higher education community needs structured analysis, comparative evidence and practical references that can support context-sensitive transformation, especially for institutions operating under different social, cultural, economic and technological conditions.

It is against this background that the UNESCO Chair on Artificial Intelligence in Education at

Beijing Normal University launched the project *Reshaping the Future of Educational Science based on Intelligent Social Experiment*. Endorsed as one of the first set of endorsed projects under the United Nations *International Decade of Sciences for Sustainable Development*, the project seeks to explore how educational science can respond to the complexity and uncertainty of intelligent social transformation. Intelligent Social Experiment is understood as a research approach for studying education in real-world social contexts. It combines long-term observation, evidence collection, interdisciplinary analysis, cross-regional comparison and multi-stakeholder collaboration, with the aim of generating knowledge that can inform policy, practice and institutional innovation.

Within this project framework, the present report, *Pacesetting Global Educational Transformation Report: AI-Driven Innovations from 100 Selected Top Universities*, examines AI-driven innovation in higher education through the experiences of 100 selected universities worldwide. By analysing publicly available evidence on AI-related initiatives, the report identifies emerging patterns of transformation across teaching and learning, scientific research, governance, social engagement, cultural inheritance and sustainable development. It also proposes a ten-dimensional analytical framework to better understand how AI is reshaping university missions, structures and ecosystems.

The value of this report does not lie in prescribing a single model for all universities. Rather, it offers a structured mapping of institutional strategies and practices that may serve as references for diverse higher education contexts. It shows that universities are moving from isolated pilot projects to more systematic transformation, from technology adoption to ecosystem development, and from efficiency-driven applications to more human-centred and values-oriented approaches. It also reminds us that regional diversity matters. Different universities follow different pathways, shaped by their histories, resources, governance systems, partnerships and social responsibilities.

As Confucius reminds us, "*Select what is good and follow it.*" In this spirit of mutual learning, I hope this report will contribute to global dialogue on the future of higher education in the age of AI and support policymakers, university leaders, educators, researchers, industry partners and international organisations in advancing responsible and inclusive AI-enabled transformation. More importantly, it calls for collective action to ensure that AI serves learning, strengthens knowledge creation, protects human agency, supports cultural diversity and contributes to sustainable futures.

The future of higher education will not be determined by technology alone. It will depend on our shared capacity to align technological innovation with educational values, scientific responsibility and the common good. I invite universities and partners around the world to join this endeavour, learn from one another, adapt wisely to their own contexts, and work together towards a more inclusive, equitable, resilient and forward-looking higher education ecosystem for all.

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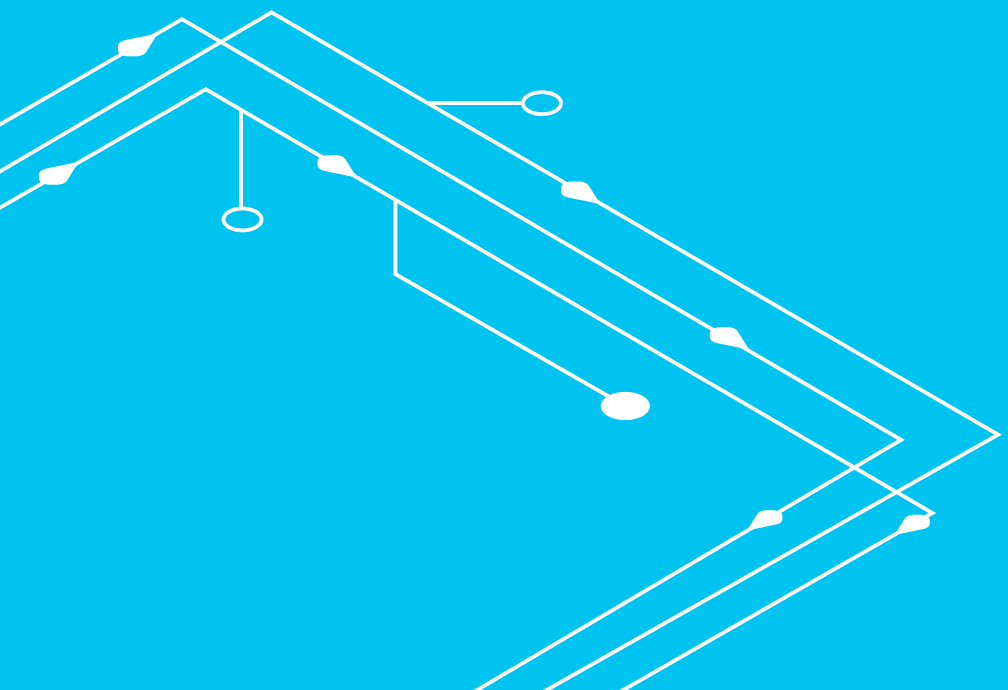
Part I

Framing AI-Driven Transformation in Higher Education



Chapter 1

Opportunities and Challenges on AI Transforming Higher Education

UNESCO IESALC (2026) argues that Artificial Intelligence (AI) is reshaping the fundamental functions and operational models of higher education institutions, indicating a system-wide transformation rather than a simple technological upgrade. Within just a few years, large language models, intelligent tutoring systems, and AI-enabled research tools have moved from experimental settings into the core domains of teaching, research, and institutional management. Faculty members increasingly use AI to support instructional design, classroom teaching, and learning assessment. Students are increasingly using AI for personalised learning, content creation, and data analysis. University leaders are increasingly adopting AI to enhance admissions processes, anticipate student needs, and improve operational efficiency (UNESCO, 2025). A large-scale opt-in survey suggests that AI has become widely used among faculty across a range of academic contexts, with reported usage rates of 86% among respondents in some studies. (Digital Education Council, 2025). However, most institutions have yet to establish comprehensive governance frameworks and ethical guidelines capable of ensuring its responsible, effective, and accountable use (World Bank, 2025; EDUCAUSE, 2025).

The rapid diffusion of AI has occurred at a time when higher education systems worldwide are facing a range of profound external pressures. On the one hand, intelligent technologies are transforming the ways in which knowledge is stored, produced, and disseminated, thereby challenging the traditional functions of universities as the primary knowledge hubs (International Association of Universities [IAU], 2024). On the other hand, demographic shifts have led to declining student enrolments in many regions, financial constraints have become increasingly acute, and public confidence in the value of higher education credentials has shown signs of weakening (MyCOS, 2026). At the same time, rapidly evolving labour markets are placing greater emphasis on AI literacy, critical thinking, and other human-centred competencies, challenging traditional approaches to talent development (World Economic Forum, 2025).

Against this backdrop, AI presents both significant opportunities and emerging risks. It has the potential to expand personalised learning, democratise access to knowledge, and accelerate scientific discovery. At the same time, it may widen the digital divide, undermine academic integrity, and automate certain forms of routine cognitive work (Wang et al., 2023).

Together, these forces call for the most fundamental transformation of all: a systemic rethinking of the university's core missions. UNESCO's *World Declaration on Higher Education for the Twenty-First Century* (1998) identified a broad range of higher education missions, including talent development, lifelong learning, knowledge creation, cultural inheritance, and the shaping of social values (UNESCO, 1998). Subsequently, the 2022 World Higher Education Conference in Barcelona, through *Beyond Limits: New Ways to Reinvent Higher Education*, articulated three fundamental responsibilities of higher education: knowledge production, holistic education, and social responsibility, emphasizing that these missions are deeply interconnected and cannot be treated in isolation (UNESCO, 2022). Similarly, *the Higher Education Law of the People's Republic of China* defines talent cultivation as the central task of higher education institutions while assigning them responsibilities in teaching, scientific research, social service, and the advancement of science, technology, and culture. Drawing upon these frameworks, the core missions of the university can be summarised as **teaching and talent development, knowledge production and scientific research**, and **social service and cultural inheritance**. As AI continues to evolve, a series of structural challenges have begun to emerge across all three missions.

In teaching and talent development, traditional models of knowledge transmission are being profoundly challenged. As generative AI becomes capable of generating answers, academic texts, and even software code within seconds, universities face urgent questions about how to sustain students' intrinsic motivation to learn and cultivate their critical thinking, creativity, and independent judgement. Currently, teachers are expected to transition from transmitters of knowledge to learning designers, yet institutional support for this transformation remains limited. Moreover, AI literacy and ethical reasoning have not yet been systematically embedded into mainstream curricula (UNESCO, 2024; EDUCAUSE, 2025). At the same time, many higher education systems have yet to establish clear standards for academic integrity in AI-enabled learning environments, while competency-based and process-oriented assessment approaches remain in an exploratory stage (World Bank, 2025).

In scientific research and knowledge production, Microsoft Research proposed the concept of a "fifth paradigm" of scientific discovery (Bishop, 2022). However, the long-term implications and scientific validity of this framing remain under active debate, and many university research systems remain constrained by traditional disciplinary silos. Interdisciplinary collaboration mechanisms are often underdeveloped, data sharing barriers persist, and institutional support for integrating AI tools into disciplinary research remains insufficient (Yang et al., 2024). At the same time, issues such as algorithmic bias, data security risks, and the ambiguous ownership of AI-generated content continue to challenge the existing research ethics and academic governance (UNESCO, 2023; Stanford University, 2025).

In social service and cultural inheritance, the growing adoption of AI has exacerbated the technological inequalities in higher education. Access to high-quality AI educational resources and computing infrastructure remains unevenly distributed across regions and institutional levels, limiting the potential benefits of technological progress for disadvantaged communities and under-resourced institutions (World Bank, 2025). In addition, algorithm-driven recommendation systems may reinforce filter bubbles and promote cultural homogenisation, posing challenges to linguistic diversity and the preservation of local knowledge systems (UNESCO IESALC, 2025).

Faced with these systemic challenges brought by AI to higher education, a growing number of leading universities are moving beyond passive adaptation. Instead, they are proactively reconfiguring their institutional ecosystems around their core missions. A range of initiatives, including appointing Chief AI Officers, establishing institution-wide AI service platforms, implementing AI literacy programmes for all, forming AI ethics and governance committees, and creating interdisciplinary research centres for AI for Science, illustrate how institutions are navigating the opportunities and challenges of the intelligent era. These practices offer useful references for understanding how universities are advancing the intelligent transformation of teaching, research, and institutional governance.

Against this backdrop, two research questions guide this inquiry:

> ***How are world-class universities systematically addressing the structural challenges posed by AI?***
>
> ***What strategic choices, institutional arrangements, and practical innovations can be identified from these frontier practices, and how may they provide context-sensitive references for universities operating under different conditions?***

To answer these questions, this report examines selected universities with particular attention to their innovations and strategic initiatives across the missions of higher education. Rather than claiming universal transferability, the analysis aims to document frontier practices, identify emerging patterns, and generate practical references that may inform AI-Driven transformation in diverse higher education contexts.

Chapter 2

Selection of Typical Universities on AI-Driven Transformation

According to UNESCO, there are more than 20,000 higher education institutions worldwide, enrolling nearly 269 million students across countries and regions at different levels of development. To ensure that the findings of this study are relevant to a broad range of higher education institutions, the sample selection process followed the principles of broad coverage and institutional diversity. This study adopts an embedded mixed-methods design, in which qualitative analysis is incorporated into a quantitatively driven research framework to provide complementary evidence for addressing the research questions (Creswell & Clark, 2017).

In this study, global university rankings serve as the basis for selecting the quantitative sample. For the qualitative strand, institutions were selected based on factors such as region, institutional type, size, and student mobility patterns to ensure representativeness. By combining both strands, a final sample of 100 universities was identified to investigate and analyse AI-Driven transformation initiatives across global higher education.

2.1 Quantitative Strand

To ensure a rigorous and objective selection of globally leading higher education institutions, this study integrates five major international university ranking systems: the United Kingdom's QS World University Rankings (QS), the United Kingdom's Times Higher Education World University Rankings (THE), the United States' U.S. News Best Global Universities Rankings (U.S. News), China's Academic Ranking of World Universities (ARWU), and the United Arab Emirates' Center for World University Rankings (CWUR). A cross-validation approach is applied to mitigate the biases inherent in any single ranking, thereby enhancing the authority and comprehensiveness of the sample selection. The evaluation criteria and key characteristics of each ranking system are summarised as follows.

The QS World University Rankings (2026) are structured around five core dimensions: academic reputation, employer reputation, faculty-student profile, research performance, and internationalisation. Key indicators include academic peer review, graduate employability, faculty-student ratio, citation impact, and the proportion of international faculty and students. The ranking places emphasis on institutional reputation and the quality of talent development, particularly graduate employability and employer evaluations. As such, it offers a useful lens for understanding the alignment between institutional quality and labour-market demand.

The Times Higher Education World University Rankings (THE) (2026) are built around a balanced framework encompassing teaching, research, citations, international outlook, and industry collaboration. More than a dozen indicators systematically cover key dimensions of institutional performance, including the teaching environment, research volume and quality, academic impact, global engagement, and university-industry-research collaboration. The balanced weighting across these areas, combined with a comprehensive evaluative perspective, makes THE a reliable instrument for cross-institutional comparisons and for assessing overall institutional strength across diverse higher education contexts.

The U.S. News Best Global Universities Rankings (U.S. News) (2025-2026) are structured around an evaluation framework that emphasises global academic reputation, research scale, publication output, citation performance, and international collaboration. Key indicators include global academic peer assessment, total annual research output, the proportion of highly cited papers, and the share of internationally co-authored publications. As such, the ranking serves to reflect universities' standing in the global academic landscape, their research productivity, and their core scholarly competitiveness.

The Academic Ranking of World Universities (ARWU) (2025) is built on a fully quantitative and objectively verifiable methodology. It assesses universities across four dimensions: quality of education, quality of faculty, research output, and academic performance. Key indicators include the number of Nobel Prize and Fields Medal laureates affiliated with an institution, the count of highly cited researchers, the volume of publications in Nature and Science, the number of papers indexed in leading international journals, and overall citation impact. Owing to its stable evaluation criteria, transparent data, and fully quantitative scoring process, ARWU offers a high degree of objectivity, stability, and cross-institutional comparability.

The Center for World University Rankings (CWUR) (2025) assesses universities across five dimensions: quality of education, alumni achievement, faculty quality, research output, and publication influence. The ranking relies exclusively on publicly available and objective external data, thereby excluding self-reported institutional submissions and subjective self-assessments. By focusing on talent development outcomes, faculty strength, and the quality of academic output, CWUR offers a neutral and independent third-party evaluation - and is widely recognised within the international higher education community.

The raw data were first standardised and preprocessed. Interval data and missing data were addressed using midpoint substitution and within-case mean imputation, respectively. Subsequently, the original ranking scores from the five ranking systems were converted to a standardised 100-point scale (Schafer & Graham, 2002; Little & Rubin, 2019). On this basis, a **Modified Risk Parity Model for Integrated University Ranking (MRPM-IUR)** was applied to select the final quantitative sample.

The model is used primarily as a practical aggregation and sample-screening tool rather than as a performance evaluation model. It seeks to reduce the dominance of any single ranking by integrating information from five major global ranking systems. Rather than relying on a single ranking source, the approach aims to reduce reliance on any single ranking system. By combining multiple ranking systems with different evaluation criteria, the approach helps reduce reliance on any single ranking perspective and enhances the overall breadth and comparability of the sample. (Roncalli, 2013; Fabozzi et al., 2008).

At the implementation stage, a fifth-order covariance matrix (R) is constructed from the standardised scores of the five ranking systems to capture the correlation structure among them. Multiplying (R) by the weight vector (w) yields the covariance vector between each individual ranking and the integrated ranking, which serves to estimate the marginal effect of a change in any single ranking's weight on the overall evaluation result (Maillard et al., 2010). To assess the overall risk of the evaluation system, the total variance is calculated by multiplying the

transpose of the weight vector by the covariance vector, from which the system standard deviation (σ_p) is derived. Based on Euler's Homogeneous Function Theorem, the actual Risk Contribution (RC) of each ranking can then be determined (Tasche, 2002).

$$RC_i = w_i \times \frac{(Rw)_i}{\sigma_p}$$

Based on the principle of equal risk contribution, the model defines the Target Risk Contribution (TRC) and formulates a non-linear optimisation objective function that minimises the squared deviation from this target.

$$TRC_i = \frac{\sigma_p}{5}$$

By iteratively adjusting the weights assigned to each ranking system, the model minimises the sum of squared differences between the actual risk contributions and their target values. This process ultimately achieves a balanced state in which all five rankings contribute equally to the overall risk of the integrated evaluation.

$$\min_w \sum_{i=1}^{5} \left(RC_i - TRC_i\right)^2$$

The model is solved numerically using an iterative optimisation algorithm (Chaves et al., 2012; Roncalli, 2013; Choi & Chen, 2022). Starting from an initial weight vector, the algorithm follows the gradient direction of the objective function to guide the search path. Through multiple iterations and adjustments, it converges to the optimal weight vector that satisfies the specified constraints.

Based on a cross-ranking threshold rule, this study initially identified a quantitative sample of 73 higher education institutions. The selection criterion was defined as follows: each university was required to rank among the top 100 in at least four of the five major global university ranking systems. This threshold provides a transparent and replicable basis for identifying universities with consistently strong performance across multiple ranking systems. The complete list of selected institutions is provided in the appendix. The MRPM-IUR procedure was used as a supplementary aggregation and robustness check rather than as the sole selection rule.

2.2 Qualitative Strand

The higher education institutions selected through the quantitative strand are concentrated in traditional higher education strongholds, including Europe, North America, Australia, and East Asia. However, high-quality institutions in Latin America, Africa, Southeast Asia and other non-core regions may remain underrepresented due to a systemic visibility bias embedded in global ranking systems (Hazelkorn, 2015; Marginson, 2007). To address this limitation, the study introduces a qualitative strand as a complementary component, focusing on how universities in these non-core geographies pursue AI-driven institutional transformation.

For the qualitative strand, sample selection follows a purposive sampling strategy and adopts a dual-track complementary logic that combines subjective and objective criteria - specifically the Top-DRUM framework. The detailed selection criteria are as follows.

Top Institutional Prestige and International Visibility

The qualitative strand adopts institutional prestige and international visibility as the primary entry criterion. Each selected institution must be ranked within the global top 1,000 in at least one of the five major international university rankings. This threshold helps exclude institutions with limited visibility or insufficient data coverage, thereby ensuring that all selected universities possess mature governance structures and a recognised level of international academic standing.

To identify high-quality cases, the study draws on authoritative sources published over the past three years by UNESCO and the World Bank, as well as the network of UNESCO Chairs, as key reference points for institutional identification. Particular attention is given to universities that have demonstrated substantive progress in AI-driven educational transformation - including those that have introduced formal AI governance policies or implemented intelligent teaching and learning infrastructure at scale. This approach helps to ensure the authority, representativeness, and transferability.

Institutional Diversity

This criterion moves beyond the conventional preference of global ranking systems for research-intensive institutions and supports the construction of a multi-type sample that reflects a broader range of institutional missions and functions. The sample includes research universities that serve as key nodes in regional knowledge systems, as well as comprehensive universities, open universities, and digital or virtual universities. By incorporating institutions with diverse profiles and organisational forms, the approach enables a systematic analysis of differentiated AI-driven transformation pathways across the higher education landscape, thereby providing a comprehensive empirical basis for understanding the full picture of global AI-driven change.

Regional Representative

This criterion explicitly addresses the systematic underrepresentation of universities from the Global South in conventional ranking-based samples, thereby helping to mitigate the geographical bias embedded in mainstream ranking systems. By selecting institutions from Africa, Latin America, and Southeast Asia, the study operationalises the principles of digital inclusion and regional equity, while significantly enhancing the geographical coverage and representativeness of the overall sample.

Unusual University Size

The qualitative sample incorporates substantial variation in institutional scale, creating a complementary structure that brings together mega-universities and smaller institutions. On the one hand, the sample includes mega-universities that enrol large numbers of learners - often hundreds of thousands or more - and that play a central role in expanding access to higher education and advancing digitally enabled inclusion. These institutions offer valuable insights into governance models and digital transformation strategies under conditions of mass provision.

On the other hand, the sample also includes smaller institutions with more focused missions and leaner organisational structures. This variation in institutional scale allows the study to examine how AI-driven transformation strategies, decision-making logics, and governance pathways differ across universities with distinct resource endowments and organisational capacities, thereby strengthening the inclusiveness of the overall sample.

Interregional Mobility

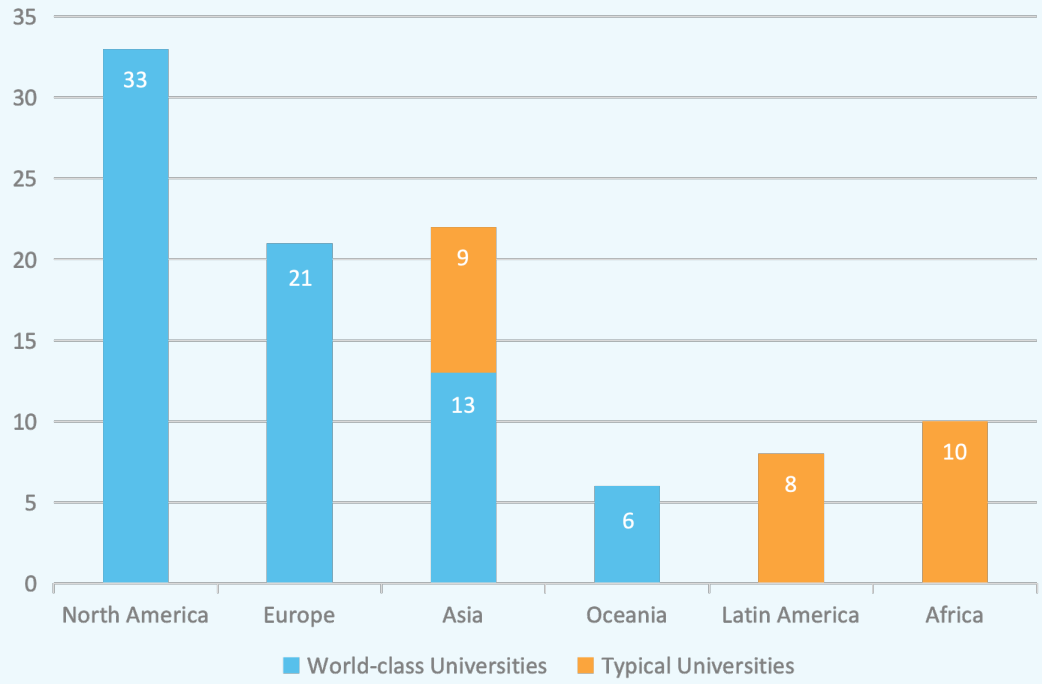
This dimension moves beyond the conventional, static reliance on international student ratios as the primary indicator of internationalisation. Instead, it focuses on how universities, enabled by digital technologies, are engaging in a broader range of cross-border practices. These include establishing transnational virtual campuses, implementing credit recognition mechanisms, developing joint programmes, building regional intelligent education networks, and fostering cross-border research collaboration and capacity-building projects.

By examining these institutional initiatives, the study analyses how intelligent technologies are reshaping the modalities, boundaries, and very meaning of cross-regional connectivity in higher education. It further seeks to assess the level of embeddedness, collaborative capacity, and development potential of universities from different regions within emerging global knowledge networks.

Through the Top-DRUM framework, a total of 27 universities were selected for the qualitative strand. Together with the 73 universities identified through the quantitative selection process, these form an integrated sample of 100 higher education institutions for this study.

The 100 universities are distributed across 30 countries and six continents, with 33 institutions located in North America, 21 in Europe, 22 in Asia, 10 in Africa, 8 in Latin America, and 6 in Oceania (Figure 2.1). This distribution balances institutional excellence with geographical diversity, thereby providing a solid empirical basis for the subsequent case analysis. The full list of the 100 selected institutions is provided in the Appendix.

Figure 2.1 Distribution of Selected Top Universities in Different Regions



Note: 73 universities are identified through the quantitative selection process, while 27 universities are selected for the qualitative strand.

Chapter 3

Analytical Framework of AI-Driven Transformation in Higher Education

3.1 The New Missions of Higher Education Institutions in the AI Era

The mission of universities constitutes the fundamental value foundation and logical starting point for the development of higher education. The ongoing revolution in intelligent technologies, together with shifting global dynamics, is reshaping the higher education. Universities continue to uphold values such as academic freedom, knowledge creation, social responsibility, open collaboration, and the pursuit of the public good. Yet these values must be reinterpreted and enacted in new ways in the age of AI (IAU, 2024). It is guided by an explicit anchoring principle that distinguishes between technological augmentation and substitution of human epistemic agency. In this report, transformation is understood not only as the expansion of AI-enabled capabilities, but also as the extent to which human judgement, critical thinking, and epistemic responsibility remain meaningfully anchored in institutional practice.

In recent years, international organisations such as UNESCO, the OECD, and the IAU have published a series of reports that have contributed to a broad consensus on the future direction of higher education in the age of AI. This consensus suggests that education systems should shift from a knowledge-delivery orientation towards the development of learning capabilities; research systems should move from individual scholarship towards human-AI collaborative knowledge production; and the social responsibilities of universities should expand to encompass the advancement of digital civilisation, participation in AI governance, and the innovative preservation and transmission of cultural heritage (UNESCO, 2021; UNESCO, 2026; OECD, 2026; IAU, 2024).

Against this backdrop, the traditional threefold mission of universities - talent development, scientific research, and social service and cultural inheritance - is undergoing a profound transformation.

Talent Development: Evolving from Unidirectional Knowledge Transmission to a New Pact of Learning and Education Empowered by AI

UNESCO's *Reimagining Our Futures Together: A New Social Contract for Education* (2021) was the first to systematically introduce the concept of a new social contract for education. This new educational compact constitutes a novel framework and collaborative system that restructures the triadic relationships between humans and knowledge, humans and technology, and humans and society.

From the perspective of universities, AI is becoming an integral learning and collaborative partner, fundamentally reshaping the relationship between educators and learners. Rather than being defined by the traditional dynamic of "teaching and being taught", this relationship is evolving into a learning community characterised by joint inquiry and shared exploration. At the same time, the objectives of talent cultivation are shifting away from the mastery of fixed textbook knowledge towards the development of core competencies that will equip future learners (UNESCO, 2024).

Instructional models will leverage AI to deliver personalised, adaptive teaching that accommodates the diverse needs and learning paces of students from different backgrounds (OECD, 2026). Furthermore, the educational mission of universities is no longer confined to the campus. Increasingly, they are forging partnerships with enterprises, communities, and non-profit organisations to bridge education and industry. Through lifelong learning systems, they enable continuous capacity-building

across the human lifespan, adapting to the dynamically changing, AI-driven labor market (WEF, 2025).

Consequently, the mission of teaching and talent development is no longer confined to the transmission of existing knowledge. Rather, it is evolving towards the creation of a learner-centered lifelong learning ecosystem, enabled by human-AI collaboration and the participation of multiple stakeholders. Through this new educational pact, universities can continuously support individual growth and capability development. They therefore need to rethink the emerging pact of learning and education and use it as a guiding framework for advancing reforms in teaching and talent development.

Scientific Research: From Individual Knowledge Creation to Human-AI Teaming Research and Co-Generative Knowledge Building

Universities, as centres of knowledge production, bear the critical responsibility of exploring the unknown and advancing scientific and technological progress. Traditional research systems have been predicated on human-led knowledge discovery and theoretical innovation, typically organised around individual scholars or small research teams and conducted within the confines of single disciplines. Core research activities, including literature review, data collection, and experimental design, have largely relied on manual effort, which has inherently constrained the scope and pace of innovation. With the emergence of large language models, intelligent agents, and other AI-driven tools in the research domain, the process of knowledge discovery is increasingly shifting towards a paradigm of human-AI collaborative innovation.

Licklider's seminal theory of Man-Computer Symbiosis (1960) was among the first to envision computers as collaborative partners that extend human cognition, rather than merely serving as computational tools. This foundational idea provided the philosophical basis for the paradigm of human-machine co-creation. Building on this vision, the *Human-AI Teaming Report* published by the US National Academies of Sciences, Engineering, and Medicine (2022) translated this concept into an operational framework, defining human-AI collaboration as a model in which humans and AI systems share cognitive resources, divide complex research tasks, and complement one another throughout the research process - from problem formulation and experimental design to data analysis. This report formally established the modern theoretical framework for human-AI collaboration in scientific research.

Subsequent contributions - including Nature Research Intelligence's *AI for Science (2023-2025)*, Stanford HAI's *The AI Index Report 2025*, and the IAU's publication *IAU Horizons: Universities and the Interplay of Human Intelligence and Generative AI* - have progressively refined the theoretical framework, collectively affirming that global scientific research has entered a new era of human-AI collaborative knowledge production.

Leveraging AI's capabilities in data analytics, literature mining, and intelligent reasoning, universities are increasingly able to conduct interdisciplinary research and global collaborative innovation more efficiently, thereby advancing open science and knowledge sharing. At the same time, the widespread adoption of generative AI has posed significant challenges concerning academic integrity, research quality, and public trust in scientific knowledge. Consequently, the scientific research and knowledge production mission of universities extends beyond the creation of knowledge itself. It increasingly encompasses the cultivation of an open and collaborative human-AI knowledge ecosystem, within which intelligent agents, researchers, and scholarly communities engage in co-innovation and the co-construction of knowledge.

Social Service: From Singular Social Contribution to Community Engagement and Cultural Inheritance toward an Intelligent Society

During the industrial and information eras, universities primarily served national and societal development through talent cultivation, the transfer and commercialisation of scientific and technological achievements, and cultural dissemination. With AI

increasingly functioning as a critical infrastructure that shapes economic systems, social governance, and cultural communication, the scope of their social responsibilities is undergoing a significant expansion.

International organisations have provided policy guidance for universities in fulfilling their social responsibilities. The UNESCO IESALC's *Higher Education Global Trends Report* (2026) highlights that universities can advance the achievement of SDG 4 by developing open knowledge repositories and public-interest research initiatives that help build a global knowledge-sharing network. The ITU's *AI for Good Impact Report* (2024) further notes that, through AI-enabled accessible learning resources and freely accessible online courses, universities can extend high-quality educational provision to underserved communities, remote regions, and refugee populations, thereby helping to dismantle barriers created by geography and economic inequality.

In the realm of cultural heritage, AI has also demonstrated unique advantages. UNESCO's *Beyond Limits: New Ways to Reinvent Higher Education* (2022) and *Transforming Higher Education: Global Collaboration on Visioning and Action* (2026) *(hereinafter "Transforming Higher Education")* both emphasise that universities should serve as key nodes within an open knowledge ecosystem, leveraging digital technologies to promote the preservation of cultural heritage, intercultural dialogue, and the governance of global public issues. Digital archiving has enabled the transmission of minority languages, intangible cultural heritage, and ancient manuscripts, while AI-powered short-form videos have significantly expanded the reach of cultural dissemination. Moreover, cross-regional humanities exchanges are increasingly being facilitated by AI.

Consequently, universities can no longer be viewed merely as providers of education or engines of technological innovation in the age of AI. Rather, they are emerging as pivotal institutions in shaping the future of intelligent societies and advancing the global public good. As societies confront increasingly complex challenges related to algorithmic ethics, digital divide, data governance, and the societal implications of AI, universities are called upon to exercise intellectual leadership, provide evidence-based policy advice, and contribute to the development of responsible and human-centerd approaches to technological transformation.

Beyond their educational and research functions, universities also carry a broader civic and cultural mission. They play a vital role in safeguarding cultural heritage, nurturing humanistic values, fostering intercultural understanding, and strengthening social cohesion in an increasingly digital and interconnected world. Through active engagement in AI governance, the promotion of social innovation, the advancement of digital inclusion, and the digital preservation and dissemination of cultural knowledge, universities contribute to building more equitable, inclusive, and sustainable societies.

Ultimately, the enduring value of universities in the AI era lies not only in its capacity to generate knowledge and innovation, but also in its ability to ensure that technological progress remains aligned with human dignity, cultural diversity, social justice, and the collective well-being of humanity. In this sense, they serve as essential stewards of shared human values and key actors in shaping a sustainable future for all.

Increasingly, these missions are evolving into three new imperatives: New Pact of Learning and Education Empowered by AI, Human-AI Teaming Research and Co-generative Knowledge Building, and Community Engagement and Cultural Inheritance toward an Intelligent Society.

Building upon the three emerging missions of institutions in the age of AI, a range of international reports have further outlined practical pathways for digital transformation in higher education. For instance, The Digital Education Council's *Ten-Dimension AI Readiness Framework* (2025) proposes a capability framework for organisational transformation in the AI era, covering strategic alignment, institutional governance, stakeholder engagement, operational readiness, AI literacy and ethics, inclusion and equity, faculty development,

teaching and curriculum transformation, and research and innovation. The OECD's *Policies for the Digital Transformation of School Education: Proposed Analytical Framework and Methodology* (2025) puts forward an eight-dimensional analytical framework for digital transformation in education. The framework emphasises coordinated policy action across strategic planning, governance mechanisms, curriculum and assessment reform, digital infrastructure, capacity-building, human resource development, and monitoring and evaluation to advance high-quality educational development.

Furthermore, international reports from UNESCO, the IAU, the WEF, and other organisations have provided in-depth analyses of strategic pathways for universities navigating AI-driven structural transformation, focusing on areas such as AI literacy enhancement, curriculum redesign, the acceleration of research and innovation, and collaborative social governance.

Drawing on the foregoing theoretical and empirical insights, this study develops an AI-driven transformation framework for universities. In line with the three emerging missions of universities in the AI era, the framework deconstructs systemic transformation pathways across multiple dimensions. It thereby provides a theoretical basis and analytical framework for digital transformation and practical innovation in higher education in the age of AI.

3.2 New Pact of Learning and Education Empowered by AI

The implementation of a new pact for learning and education fundamentally depends on multi-stakeholder collaboration to equip learners with future-oriented competencies. The World Economic Forum's *Education 4.0* (2025) highlights that enhancing AI literacy for all and aligning education with dynamic labor markets are essential for enabling lifelong capability development. In this process, education administrators need to strengthen their digital leadership, while teachers must refine their competencies in human-AI collaborative teaching (Huang Ronghuai, 2024).

Personalised learning models and intelligent tutoring systems (ITS) enabled by AI serve as the primary vehicles for implementing this new pact, and are continuously reshaping classroom teaching and curriculum design (UNESCO IESALC, 2026). At the same time, intelligent infrastructure provides the technological foundation for its implementation. Accordingly, multiple stakeholders can work together across four dimensions - organisational support, technological infrastructure, talent development, and pedagogical innovation - to advance the effective implementation of the new pact for learning and education.

Based on a keyword analysis of reports published over the past two years by authoritative organisations such as UNESCO, the OECD, the World Bank, and EDUCAUSE, the four dimensions can be summarised as follows: Digital Leadership and Faculty Transformation; Digital and Intelligent Infrastructure and AI Programmes; AI Literacy and Career Development; Reshaping Pedagogy and Curriculum Restructuring.

Digital Leadership and Faculty Transformation

Digital leadership and faculty transformation are mutually reinforcing and serve as the strategic enablers and core human capital foundations for leading universities to advance AI-driven transformation. UNESCO (2023) emphasises that their development extends beyond the mere adoption of technological tools, encompassing systemic change across pedagogical models, organisational culture, governance mechanisms, and teacher professional development. Educational leaders are expected to provide strategic direction through vision-setting, institutional support, and organisational enabling, thereby enabling teachers to update their digital skills, integrate intelligent technologies, and innovate pedagogical approaches. This, in turn, supports the continuous renewal of teaching philosophies, professional roles, and instructional methods, ultimately contributing to enhanced educational quality and the comprehensive digital transformation of universities.

Digital leadership is broadly defined as the strategic capability of institutional leaders to leverage digital

technologies, data, and communication systems to enable organisational transformation and improve coordination and decision-making. As a new leadership model grounded in technology, it reshapes organisational operating models and overall effectiveness through digital environments, emphasising the deep integration of technological application, institutional strategy, and governance systems (Avolio et al., 2000; Van Wart et al., 2019; OECD, 2020). In the context of AI, teacher transformation is reflected in a structural reconfiguration of academic roles: teachers gradually shift from traditional knowledge transmitters to learning facilitators in intelligent environments, proactively integrating digital technologies into classroom teaching to enhance educational quality and student engagement (UNESCO, 2023; Redecker, 2017).

This dimension focuses on how universities can leverage AI to empower leaders, administrators, and teachers, thereby fostering innovation in organisational governance, the transformation of faculty roles, and the enhancement of professional competencies.

Digital and Intelligent Infrastructure and AI Programmes

The development of an AI-empowered education ecosystem relies fundamentally on digital infrastructure and technological platforms. UNESCO IESALC (2026) highlights that the integration of digital transformation and AI is reshaping teaching, research, and governance models in higher education, while disparities in infrastructure have emerged as a significant factor affecting educational equity and the implementation of AI.

Intelligent infrastructure is conceptualised as a socio-technical system that integrates computational resources, data platforms, the Internet of Things, and automated control modules, enabling real-time connectivity, environmental sensing, and adaptive coordination. Existing research indicates that intelligent infrastructure is evolving from static hardware architectures towards dynamic and interoperable digital ecosystems capable of efficient data exchange, system optimisation, and intelligent resource allocation (Bibri et al., 2023; Bhardwaj et al., 2024).

Emerging technologies such as cloud computing and digital twins further strengthen its capacity to provide systemic intelligence. At the same time, AI is moving from a phase of isolated algorithmic innovation towards a new stage driven by system-wide integration and application-oriented deployment. As data volumes and computational capacity continue to grow, AI is becoming deeply embedded in the infrastructure and organisational systems of universities, providing robust support for intelligent decision-making, predictive analytics, and autonomous operations (Russell & Norvig, 2021; Xu et al., 2024).

This dimension focuses on the practical pathways through which universities can establish an integrated intelligent infrastructure to support core activities in teaching, research, and governance. In terms of its composition, the hardware layer includes computing platforms, campus clouds, and ubiquitous networks; the software layer centres on educational large language models and intelligent learning management systems. The overall system encompasses data centres, cloud computing platforms, high-performance computing facilities, intelligent networks, data governance frameworks, and AI applications and innovation initiatives.

AI Literacy and Career Development

In the AI era, the objectives of talent development in higher education are shifting from a primary focus on knowledge acquisition towards the cultivation of comprehensive competencies. UNESCO's *AI Competency Framework for Students* (2024) identifies AI literacy, digital citizenship, ethical judgement, and critical thinking as core competencies for future learners. The World Bank's *AI Revolution in Higher Education* (2025) further notes that the greatest challenge posed by AI is not the technology itself, but rather the structural mismatch between workforce capabilities and evolving labour market demands. This implies that talent development in higher education must continuously adapt in response to industrial development and societal needs.

AI literacy has been increasingly recognised as a foundational competence, referring to individuals' ability to understand, evaluate, and appropriately use AI systems in both professional and everyday contexts. Recent policy and research indicate that AI literacy extends beyond technical proficiency to encompass critical thinking, ethical reasoning, and human-AI collaboration (UNESCO, 2023; Long & Magerko, 2020). As AI becomes embedded across industries, AI literacy is increasingly becoming a core component of digital competence frameworks and lifelong learning strategies.At the same time, the AI wave is reshaping career development: traditional career pathways based on fixed skills are gradually being replaced by novel development models characterised by dynamic upskilling, interdisciplinary competencies, and human-AI collaboration.

This dimension focuses on how universities can systematically cultivate AI literacy. It moves beyond a narrow model of training in specific software operations to build a multi-dimensional framework that integrates ethical literacy, technical competence, practical application, and lifelong development, thereby proactively responding to the rapidly evolving demands of the labour market.

Reshaping Pedagogy and Curriculum Restructuring

The restructuring of curriculum systems and pedagogical models represents the most direct manifestation of AI-driven educational transformation. UNESCO's *Guidance for Generative AI in Education and Research* (2023) notes that generative AI has broken the traditional model of standardised instruction, making the restructuring of curricula and teaching systems a central component of the digital transformation of universities.

AI enables adaptive learning, personalised instruction, and real-time feedback, driving the classroom towards a hybrid human-AI learning model, with teachers transforming into learning designers and facilitators. The *2025 EDUCAUSE Horizon Report: Teaching and Learning Edition* also identifies adaptive learning and formative assessment as key directions for pedagogical transformation in the AI era. In the curriculum domain, AI promotes interdisciplinary integration and the modular reorganisation of knowledge, with computational thinking, data literacy, and AI application skills no longer confined to specialised technical courses but becoming core competencies across all disciplines.

This dimension focuses on how the institution reconstructs its pathways for teaching and curriculum around a learner-centred philosophy. At the pedagogical level, the emphasis is on personalised adaptation, adaptive learning, and competency-based assessment. At the curriculum level, AI is integrated into overall curriculum development, with a focus on cultivating the "soft skills" demanded by the labor market, including innovation and critical thinking.

3.3 Human-AI Teaming Research and Co-generative Knowledge Building

Human-AI Teaming Research and Co-generative Knowledge Building are not limited to individual researchers working alongside intelligent systems. Rather, they entail a comprehensive and systemic transformation encompassing research communities, organisational structures, and governance systems. The UNESCO IESALC *Higher Education Global Trends Report* (2026) highlights that AI is profoundly reshaping research organisation models, research collaboration patterns, and knowledge governance mechanisms in higher education, calling for governments and universities to update their research legislation and ethical review frameworks accordingly. The *IAU Horizons: Universities and the Interplay of Human Intelligence and Generative AI* (2024) further argues that, in response to the restructuring of knowledge production driven by AI, the comprehensive institutional and organisational transformation is indispensable. This includes establishing academic integrity systems, breaking down disciplinary and organisational silos, and addressing the risks associated with the commodification of knowledge.

Based on the consensus reached by international organisations on the transformation of research in the intelligent era, this study identifies three

interrelated core dimensions of Human-AI Teaming Research and Co-generative Knowledge Building: AI for Science and Interdisciplinary Collaboration; Organisation Transformation and Resource Integration; and Education Governance and Ethical Guidelines. Together, these dimensions constitute the core framework for the transformation of knowledge production in universities in the intelligent era, covering the technological, organisational, and institutional dimensions.

AI for Science and Interdisciplinary Collaboration

AI for Science is characterised by the intelligentisation, automation, and coordination of the scientific discovery process through AI. The Nature Research Intelligence publication *AI for Science (2023-2025)* notes that global scientific innovation is progressively moving beyond the limitations of single disciplines and entering a new phase of interdisciplinary and collaborative breakthroughs. The Stanford *AI Index Report* (2025) further confirms that high-impact research outcomes are increasingly concentrated in interdisciplinary fields such as life sciences, medicine, materials science, and climate science, demonstrating that the deep integration of "AI + disciplines" has become a mainstream trend in scientific research.

Leveraging technological advantages such as hypothesis generation, automated experimentation, large-scale data mining, and intelligent simulation, AI has comprehensively restructured research processes across all fields. It has driven scientific research models towards data-intensive and computation-driven paradigms, thereby expanding the cognitive boundaries of human research and accelerating knowledge production. At the same time, large language models and scientific foundation models are further promoting interdisciplinary knowledge integration and significantly lowering the barriers to entry for cutting-edge scientific research.

This dimension focuses on how universities can leverage AI for science to break down traditional disciplinary silos and integrate research resources across engineering, natural sciences, humanities, and social sciences. By leveraging technologies such as AI simulation and big data analytics, they can address complex frontier challenges that a single discipline cannot overcome, thereby enabling cross-disciplinary knowledge co-creation. In this process, AI serves a dual function as both a research tool and a collaborative bridge. It enhances research efficiency, accelerates scientific discovery and knowledge innovation, while also bringing together interdisciplinary research efforts, facilitating researchers to collaboratively address complex scientific and social challenges, and helping universities build a new research system characterised by human-AI collaboration and multi-domain integration.

Organisation Transformation and Resource Integration

AI-driven research and knowledge production increasingly rely on cross-departmental collaboration, data sharing, and the coordination of computational resources. McKinsey's *The State of AI in 2025: Agents, Innovation, and Transformation* notes that the most profound impact of AI often occurs at the organisational level rather than the technological level alone; only through organisational restructuring and resource integration can technological advantages be fully translated into innovation capacity. Similarly, *THE: Advancing Universities Towards an AI Future* (2025) highlights that the main challenge for universities in advancing AI-driven research is not a shortage of AI tools, but rather a lack of organisational mechanisms and resource integration capabilities aligned with development needs.

The organisational transformation in the AI era represents a fundamental reshaping of organisational structures, governance systems, and operational processes, aimed at enhancing agility, innovation, and strategic responsiveness (Reis et al., 2023; Mühlburger & Krumay, 2024). Resource integration is a core component of organisational transformation, referring to the coordinated allocation of heterogeneous resources such as human capital, digital technologies, data assets, and

knowledge systems (Hsiao, 2024).

At present, effective resource integration increasingly relies on digital platforms, intelligent analytics systems, and data-driven decision-making models to achieve real-time coordination and dynamic optimisation of various resources (Reis et al., 2023; Stroumpoulis et al., 2024). At the same time, organisational transformation is gradually being embedded within open collaborative ecosystems, extending beyond institutional boundaries and fostering a multi-stakeholder development pattern across industries, academia, and government (Bharadwaj et al., 2023).

This dimension focuses on two main directions. The first is how universities can break down disciplinary silos, establish streamlined collaborative research organisations, coordinate various research resources, and meet the development needs of human-AI collaborative research. The second is how, in response to the development requirements of the intelligent era, they can systematically optimise governance, processes, culture, and resource allocation systems. Through the comprehensive integration of internal and external resources, universities can fully enhance their overall competitiveness and long-term development capacity.

Education Governance and Ethical Guidelines

Algorithmic bias, data security risks, limited model transparency, intellectual property attribution, and academic integrity concerns arising from generative AI have become widely recognised issues for universities worldwide. UNESCO's *Guidance for Generative AI in Education and Research* (2023) emphasises that the multiple risks associated with generative AI - including intellectual property disputes, academic misconduct, and algorithmic bias - highlight the importance of sound research governance systems and the need to establish a solid foundation for the healthy development of research. The European Union's *Artificial Intelligence Act* (2024) further emphasises that universities must establish comprehensive, end-to-end AI oversight and review mechanisms to ensure the standardised governance of AI applications.

Educational governance in the intelligent era refers to the system of institutional arrangements, regulatory mechanisms, and decision-making structures that govern the research, deployment, and application assessment of AI technologies. Recent research indicates that the deep integration of AI and education is not merely a matter of technological embedding and tool upgrading, but rather depends on robust governance frameworks to ensure the transparency, fairness, and accountability in algorithmic decision-making (UNESCO, 2023; OECD, 2023).

This dimension focuses on the practical pathways for AI research governance and ethical development in universities. On the one hand, it emphasises the establishment of full-cycle AI regulatory mechanisms covering the entire research process, from project approval and experiment implementation to research output and publication. On the other hand, it examines how universities can implement ethical norms adapted to the AI era to ensure the fair, compliant, and responsible application of educational resources and intelligent technologies.

3.4 Community Engagement and Cultural Inheritance toward an Intelligent Society

Community Engagement and Human Culture Inheritance toward an Intelligent Society are fundamentally concerned with leveraging AI and other intelligent technologies to empower inclusive public services, facilitate cultural dissemination and innovation, and ultimately serve the goals of sustainable social development. In this process, universities must balance the application of technological tools with cultural agency. The ITU's *AI for Good Impact Report* (2024) emphasises that AI should serve the public interest by enhancing access to education, healthcare, and public services to promote social development. Similarly, UNESCO's *Transforming Higher Education* underscores that higher education should play a pivotal role in advancing social inclusion, cultural diversity, global cooperation, and sustainable development.

These international reports indicate that AI is reshaping the social mission of universities. This transformation is reflected not only in the expansion of service scope, but also in a shift in the logic of value creation. The implementation of this mission requires stable and diversified funding and resource support. Accordingly, this study decomposes "Community Engagement and Cultural Inheritance toward an Intelligent Society" into three interrelated dimensions: Social Partnerships and Community Empowerment, Fund Mobilisation and Enterprise Incubation, and Cultural Inheritance and Sustainable Development. These correspond respectively to the transformation of the university mission in three directions: social inclusion, social innovation, and humanistic values.

Social Partnerships and Community Empowerment

In the intelligent era, the core objective of social service in universities is to extend the benefits of AI technologies to all social groups, thereby promoting educational equity and social inclusion. UNICEF (2024) notes that the iterative advancement of AI may exacerbate the digital divide, exposing vulnerable groups to new forms of digital exclusion. The OECD's *Digital Education Outlook 2026* emphasises that achieving AI-driven educational equity requires coordinated efforts across multiple dimensions, including strengthened infrastructure, multilingual support, and the cultivation of digital literacy among disadvantaged populations.

In the digital transformation, social partnerships refer to a collaborative system involving universities, industry, government, and communities. Their core value lies in addressing complex societal challenges and enhancing collective innovation momentum. Within this framework, community empowerment is a key dimension of social partnerships, aimed at enabling local communities and disadvantaged groups to actively participate in, co-construct, and share the benefits of AI-driven development. High-quality community empowerment requires not only ensuring access to technology and resources, but also relies on multiple forms of support, including digital literacy for all, participatory governance, and trust-based systems between universities and communities (OECD, 2023).

This dimension focuses on the implementation pathways and enabling mechanisms for inclusive social services in universities in the intelligent era. On the one hand, it examines how universities, leveraging their own AI expertise, technologies, and curriculum resources, can provide free digital literacy training and inclusive intelligent education services to local communities, remote regions, vulnerable groups, and learners in primary and secondary education. On the other hand, it analyses how universities can establish multi-stakeholder collaborative mechanisms involving government, enterprises, social organisations, and local communities to achieve resource sharing, shared responsibility, and joint capacity building, thereby activating community participation in educational governance and empowering high-quality and sustainable development of regional education.

Fund Mobilisation and Enterprise Incubation

Universities have become key engines of regional innovation and economic transformation, a role that requires the strategic mobilisation and integration of funding from multiple sources, including government allocations, corporate investment, philanthropic donations, and proceeds from technology transfer. The World Economic Forum's *Education 4.0* (2025) highlights that universities are increasingly serving as critical platforms connecting governments, industry, and social organisations. UNESCO's *Transforming Higher Education* further emphasises that universities should strengthen their capacity for collaborative innovation with industry, social organisations, and local communities in the new era, comprehensively enhancing their capacity for cross-sector collaborative innovation.

University-based incubators, as key vehicles of the intelligent innovation ecosystem, can effectively connect academia, industry, and investors to accelerate the commercialisation and iterative application of cutting-edge intelligent technologies. Through on-campus innovation incubation platforms, universities can facilitate the market-

oriented and industrial transformation of research outcomes in the field of AI, using the innovation revenue generated to support campus digital transformation, AI talent development, and inclusive social services.

This dimension focuses on the innovative pathways for funding mobilisation and project incubation in universities in the intelligent era. On the one hand, it examines how universities can move beyond the traditional model of sole reliance on government funding, engaging with market enterprises, social capital, and philanthropic foundations to diversify their funding sources. On the other hand, it analyses how universities can, through the commercialisation of research outcomes, create a sustainable cycle of "research innovation - outcome commercialisation - resource reinvestment".

Cultural Inheritance and Sustainable Development

Culture is recognised as a crosscutting driver of social resilience and global sustainable development, providing foundational support within the sustainable development system (UNESCO, 2023). The rapid advancement of AI also brings potential risks such as cultural homogenisation and the weakening of civilisational diversity. Universities should play a leading role in leveraging intelligent technologies to protect diverse forms of civilisation and support the achievement of the Sustainable Development Goals.

Cultural inheritance in higher education refers to the processes through which knowledge, values, traditions, and cultural heritage are preserved, interpreted, and transmitted across generations within academic and social systems. Intelligent tools such as digital museums, heritage digitisation systems, and generative AI models are increasingly used to reconstruct, visualise, and disseminate cultural content, significantly enhancing accessibility and engagement with cultural heritage (UNESCO, 2023; European Commission, 2022).

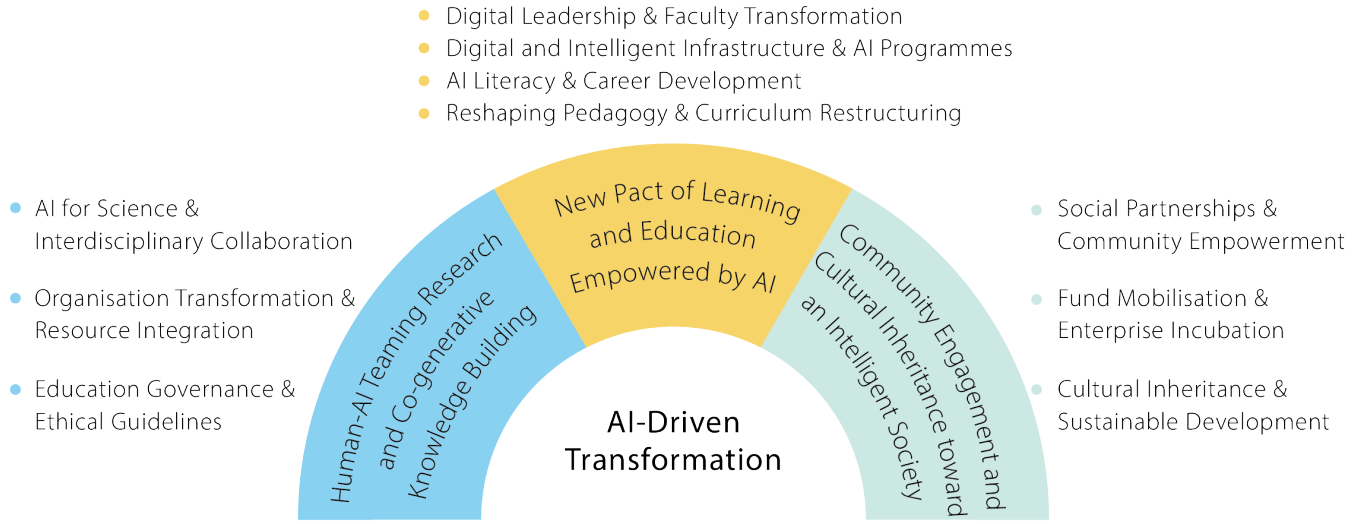
Meanwhile, sustainable development in higher education refers to the integration of environmental, social, and economic sustainability principles into institutional strategies, research agendas, and teaching practices (UNESCO, 2024). The convergence of cultural inheritance and sustainable development is increasingly evident in digitally transformed environments, where AI technologies support both cultural heritage preservation and sustainability-oriented decision-making (Vecco & Caiazza, 2024; UNESCO, 2024).

This dimension focuses on the practical pathways for cultural inheritance and sustainable development in universities in the intelligent era. On the one hand, it examines how universities can leverage AI and digital technologies to systematically preserve endangered languages, intangible cultural heritage, folk customs, and other marginalised cultural resources, thereby revitalising the transmission of diverse civilisational achievements. On the other hand, it analyses how universities, in the process of intelligent transformation, can uphold a humanistic orientation, avoid technological determinism, and achieve the co-existence of technological innovation, humanistic transmission, and ecological sustainability.

3.5 Research on Measures for the Transformation of AI in Higher Education Institutions

Based on the above analysis, this study develops a ten-dimensional analytical framework for AI-driven transformation in higher education, grounded in the three core missions of universities in the AI era. These ten dimensions include: Digital Leadership and Faculty Transformation; Digital and Intelligent Infrastructure and AI Programmes; AI Literacy and Career Development; Reshaping Pedagogy and Curriculum Restructuring; AI for Science and Interdisciplinary Collaboration; Organisation Transformation and Resource Integration; Education Governance and Ethical Guidelines; Social Partnerships and Community Empowerment; Fund Mobilisation and Enterprise Incubation; Cultural Inheritance and Sustainable Development (Figure 3.1).

Figure 3.1 Framework of AI-Driven Transformation at University Level



Methodology for Investigating AI-Driven transformation in Sample Universities

Guided by the ten-dimensional analytical framework, this study conducted a systematic review of AI-driven transformation practices at the 100 sampled universities. Data were collected from three main types of sources: university communications, including news items, official announcements, policy documents, and annual reports; national AI education strategies and supporting policy texts issued by governments and education authorities; and global AI education development reports published by internationally recognised organisations and higher education platforms.

The review focused on the period 2020-2026, capturing AI related initiatives that were formally implemented and continuously advanced during this timeframe. Search keywords included core terms such as "AI strategy," "AI positions," "AI platforms," "AI infrastructure," "AI talent development," "AI literacy," "AI for science," "intelligent learning systems," "AI assistants," "AI curriculum development," "AI governance," and "AI ethics."

This study followed the methodological conventions of internationally authoritative reports and established four inclusion principles to ensure the scientific validity, authenticity, and rigour of the data.

Principle of Multi-Source Cross-Validation

To ensure the integrity and reliability of the evidence base, AI-related practices obtained through non-official channels were subject to systematic cross-validation using at least two independent sources, such as strategic policy documents, annual reports, media publications, and peer-reviewed academic literature. This triangulation approach reduces the likelihood of source-specific bias and misinformation, thereby enhancing the accuracy, credibility, and robustness of the findings.

Principle of Timeliness and Continuity

To ensure the contemporary relevance of the analysis, only projects formally initiated or demonstrably active between January 2020 and June 2026 were considered. For initiatives spanning multiple implementation cycles, inclusion was contingent upon the availability of evidence demonstrating either substantive interim outcomes within the specified timeframe or continued routine operation. Projects that had been effectively terminated or ceased meaningful activity were excluded. This approach safeguards the currency of the evidence base and enhances the practical and policy relevance of the findings.

Principle of Traceability and Empirical Grounding

To maintain methodological rigour, only practices characterised by clearly documented activities,

identifiable responsible entities, defined implementation stages, or quantifiable outcomes were retained. General strategic aspirations, policy rhetoric, and statements of intent lacking evidence of concrete implementation were excluded. By requiring verifiable and traceable empirical support for every entry, this principle enhances the transparency, reliability, and evidential robustness of the research findings.

Principle of Multi-Stakeholder Representation

To capture the institutional breadth and governance dimensions of AI-related initiatives, priority was given to official information released by university governance bodies, academic units, administrative offices, and faculty and student organisations. This ensures that the documented practices reflect institution-wide arrangements and collective action, rather than isolated efforts confined to a single department or unit.

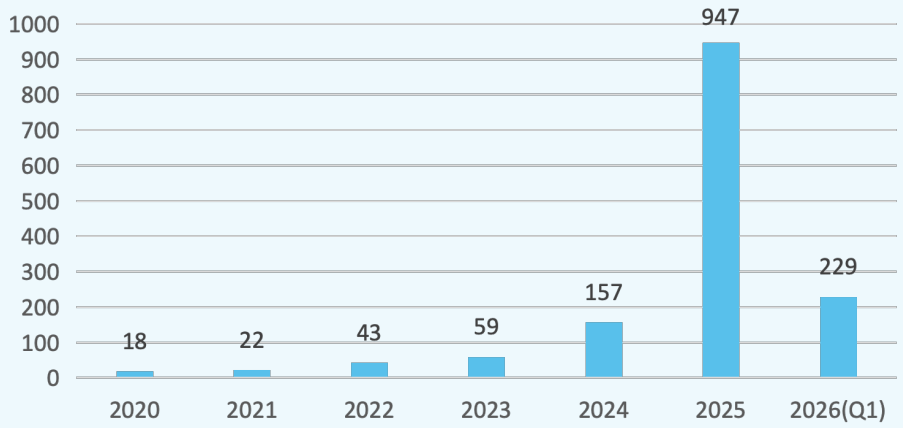
Preliminary Analysis of AI-Driven Educational Transformation in the Sample Universities

Following a process of systematic manual retrieval and cross-source verification, this study compiled over 1,400 validated and discrete AI-driven transformation initiatives. All initiatives were classified into ten analytical dimensions using a structured coding framework developed for this study. Coding was conducted by multiple researchers, with iterative discussion and consensus-based resolution applied to ambiguous cases to improve consistency. A structured database was established for each sampled higher education institution, recording the initiative content, analytical dimension, year, and description. While formal inter-coder reliability statistics (e.g., Cohen's kappa) were not computed due to the exploratory and large-scale nature of the dataset, coding consistency was ensured through iterative calibration sessions and cross-validation across coders. This process resulted in a structured and systematically reviewed empirical dataset.

Observed Growth Patterns of Selected AI-Related Measures

The number of documented AI-related initiatives identified in the sampled universities increased substantially between 2020 and 2026, reflecting a growing institutional emphasis on AI-related transformation. The period from 2020 to 2022 was largely exploratory, with an average of 28 identified initiatives per year. From 2023 onward, the number of initiatives increased markedly, reaching 59 in 2023 and surpassing 100 in 2024 with 157 identified initiatives. This pattern suggests a growing institutional response to the opportunities and challenges associated with AI. In 2025, the number of documented initiatives identified in the sample rose sharply to 947 (Figure 3.2). While the annual counts reflect the initiatives captured through the study's data collection process, the results nevertheless indicate that many universities were expanding AI-related activities across multiple domains. Overall, the findings suggest a shift from isolated pilot projects towards more coordinated and institution-wide approaches to AI adoption, spanning governance, teaching and learning, research, and administrative functions.

Figure 3.2 Trend of AI-Related Measures



Scenario Distribution of AI-Related Measures

AI practices in leading universities worldwide have formed a development pattern centered on "capacity building - knowledge creation - organisational support." Among these, AI literacy and career development (223 cases) and scientific intelligence and interdisciplinary collaboration (211 cases) show the highest levels of coverage, constituting the two most concentrated domains of university AI strategies. This indicates that universities widely regard the development of AI competencies among staff and students, the transformation of research paradigms, and the advancement of interdisciplinary knowledge innovation as priority tasks in responding to the AI era. In parallel, organisational transformation and resource integration (183 cases), together with educational governance and ethical regulation (157 cases), also account for a relatively high proportion. This reflects the extent to which universities are supporting large-scale AI implementation through organisational restructuring, resource coordination, and institutional development.

The second tier primarily includes restructuring of teaching and curriculum (133 cases), funding mobilisation and project incubation (131 cases), social support and community empowerment (130 cases), as well as intelligent infrastructure and AI development (124 cases). These initiatives indicate that universities have begun to deeply embed AI into talent cultivation, innovation and entrepreneurship ecosystems, and social service frameworks, while leveraging infrastructure development and diversified resource investment to extend AI capabilities beyond the campus into broader societal contexts.

By contrast, digital leadership and faculty transformation (112 cases), and cultural inheritance and sustainable development (71 cases), exhibit relatively lower levels of coverage. The cultural inheritance, in particular, accounts for only a small proportion of all initiatives, indicating that current university AI practices remain primarily driven by educational reform, research innovation, and organisational transformation, while explorations related to value formation, cultural innovation, and long-term sustainable development are still at an early stage (Figure 3.3).

Overall, global universities are shifting from the use of AI as a "tool" towards the systemic restructuring of education and research enabled by AI, and are progressively moving towards a more advanced stage that integrates technological innovation with social responsibility and humanistic values.

Figure 3.3 Scenario Distribution of AI-Related Measures

Systemic Transformation Characteristics of AI-Related Measures

The coverage of strategic dimensions exhibits a clear pattern of concentration, with most universities implementing AI-related transformation initiatives in a systematic manner. More than 90% of sampled institutions cover between 6 and 10 dimensions, with those covering seven dimensions accounting for the largest proportion. This indicates that leading global universities have reached a strategic consensus on advancing AI-driven transformation in a multi-domain, institution-wide manner.

Overall, while AI development in higher education has moved beyond fragmented, point-based pilot models, there is considerable scope for further development in cross-sectoral strategic coordination and resource integration across dimensions.

Looking ahead, universities need to further break down disciplinary silos and administrative boundaries, promote deeper synergy among various AI initiatives, and ultimately achieve a transition from localised pilot projects to comprehensive, institution-wide, and systemic transformation.

Part II

AI-Driven Innovations in Top Universities

Chapter 4

Key Measures on Learning and Education Empowered by AI

4.1 Digital Leadership and Faculty Transformation: From Fragmented Empowerment to Systematic Cultivation

The selected universities are increasingly demonstrating a systemic and institutionalised shift in digital leadership and faculty transformation. These universities have gradually established a collaborative paradigm of "leadership upgrading - faculty transformation - organisational restructuring." They have achieved this by creating dedicated AI governance positions, developing comprehensive faculty capacity-building systems, and integrating AI tools across all scenarios. This, in turn, is propelling institutional governance models into a new phase of digital modernisation.

A growing number of sampled universities have introduced institution-wide AI strategies. An increasing number of universities are establishing dedicated senior leadership roles in AI to coordinate and advance AI-driven transformation across teaching, research, administration, and governance from the strategic level. Nanyang Technological University, Singapore (NTU), has launched its NTU 2030, which outlines a strategic vision of integrating AI modules into 40% of all courses by 2030 and equipping every student with personalised AI learning assistants. This represents a systematic effort to embed AI across all disciplines and advance institution-wide educational transformation.

Similarly, the University of California, Los Angeles (UCLA) appointed its inaugural Chief Data and Artificial Intelligence Officer in 2025 to oversee the deployment of AI tools across the institution and the development of related policies. Paris Sciences et Lettres University (PSL) restructured its institutional governance in 2025, establishing a new Vice-President for Digital Infrastructure and IT Convergence. The role, held by an expert in AI and data management, is responsible for coordinating the university's digital development and AI infrastructure.

The sampled universities are progressively building multi-tiered training systems that encompass AI literacy, pedagogical applications of AI, digital ethics, and AI-related professional certification. The University of Oxford (Oxford) offers all faculty and staff free access to training resources in four areas - AI, cloud computing, cybersecurity, and process automation - to enhance teaching and research productivity through intelligent technologies. The University of British Columbia (UBC) has established the GenAI Training & Professional Development Sub-Committee to develop a standardised AI competency framework for faculty, staff and students. Sorbonne University (Sorbonne) has launched industry-collaborative training programmes in data science and AI, systematically cultivating AI literacy among faculty and students. Stellenbosch University (SU) offers an AI Literacy for All programme to strengthen teachers' capacity to integrate AI into instruction, thereby facilitating the deep integration of intelligent technologies into teaching.

A number of sampled universities have deployed context-specific AI tools to automate administrative processes. These tools are being applied across student services, administrative operations, research management, and even healthcare operations, contributing to measurable improvements in institutional efficiency. The University of Melbourne (UniMelb) has implemented the Agentic Process Automation System to streamline various administrative processes, saving approximately 10,000 hours annually. Yale University (Yale) launched YaleSites v2.22, enabling faculty and students to build department, course, laboratory, and student organisation webpages through a non-code interface, thereby supporting the

intelligent and standardised management of campus communications and administrative services. Johns Hopkins University (JHU) has applied AI-driven predictive models in its School of Medicine and affiliated hospitals to optimise revenue cycle management and bed resource allocation.

A number of sampled universities are launching executive education and leadership programmes for external professionals, while simultaneously using these initiatives to strengthen internal leadership capacity in AI. Columbia University's School of International and Public Affairs (Columbia SIPA) launched the AI Power executive programme in 2026, providing industry leaders with a systematic leadership framework for responsible AI-Driven transformation. Seoul National University (SNU) offers a six-month Big Data and AI CEO Program, tailored for CEOs and board-level executives to lead the digital transformation era. Duke University (Duke) and Northwestern University (Northwestern) have introduced executive programmes in AI-driven organisational change and AI strategy for business transformation, respectively, to enhance the AI strategic decision-making and organisational change capabilities of business leaders.

At the same time, the University of the Philippines (UP) has organised a series of Explainable AI (XAI) bootcamps for researchers and government officials, promoting human-centred, transparent, and accountable AI decision-making models. Chulalongkorn University (Chula), through its NEXUS AI Executive Programme, has brought together national AI experts and industry leaders to strengthen cross-sectoral AI application capabilities.

In addition, a number of other universities - including the University of Amsterdam (UvA), the National Autonomous University of Mexico (UNAM), and the University of São Paulo (USP) - have introduced executive training programmes or established strategic advisory committees to integrate AI strategic planning with organisational leadership. These efforts not only disseminate higher education experience in intelligent transformation to external professionals, but also contribute to improving digital governance and faculty development within the universities themselves.

Characteristics across Regions

Overall, universities worldwide are placing increasing emphasis on strategic AI governance, faculty digital capacity building, and campus administrative automation, though with varying regional priorities and developmental characteristics.

More specifically, **in North America**, universities are at the forefront of establishing dedicated AI governance positions and systematic AI training programmes. **In Europe**, universities place emphasis on compliance and ethical governance frameworks. Heidelberg University (Heidelberg), for example, has established a Chief AI Officer to proactively align with the regulatory requirements of the European Union's AI Act and promote standardised AI governance. **In Asia**, particularly in China and Singapore, universities are prioritising the intelligent upgrade of administrative processes and cross-sectoral AI leadership development.

In Oceania, universities are focusing on leveraging AI to optimise student services and streamline administrative operations, while also offering AI literacy micro-courses to enhance the digital teaching and governance capabilities of faculty and staff. **In Africa**, universities are prioritising faculty capacity building as a core strategic focus, establishing institutional AI innovation working groups and promoting campus digital transformation through regional training programmes, thematic workshops, and funding initiatives. **In Latin America**, universities are aligning with national and institutional AI strategies by establishing AI governance bodies, offices, and strategic committees, while also delivering faculty training and executive education programmes to strengthen the integrated application of AI in teaching, research, and administration.

Cases in Point

Your AI learning journey starts at UNSW Sydney's AI Hub

In 2025, the University of New South Wales (UNSW)

launched the AI Hub, a dedicated staff training platform, offering a structured, multi-level AI curriculum ranging from foundational literacy to advanced applications. The platform covers modules such as generative AI fundamentals, data ethics, prompt engineering, and automation tools. It adopts a self-paced online learning model, supplemented by practical exercises and a repository of case studies.

By early 2026, over 2,000 staff members had completed at least one course, with administrative staff accounting for 55 percent. Unlike most university training initiatives that focus primarily on academic faculty, UNSW's AI Hub is open to all staff, including teachers, technical professionals, and administrative and managerial personnel. This reflects a strategic commitment to institution-wide AI literacy and positions UNSW as a benchmark for workforce empowerment in the AI era among universities in Oceania.

USP Office to define parameters for AI use in university routine

In March 2026, the University of São Paulo (USP) created the Office for Digital Transformation and Artificial Intelligence (E-TIA). It does not have an operational role involving tool development or funding. Rather, its core mandate is guided by six principles, including academic integrity, ethical prudence, and human-centred oversight. The creation of this office aligns with the AI regulatory framework issued by the Brazilian Ministry of Education. It is responsible for coordinating the development of institutional AI policies and guidelines to ensure compliant and responsible AI deployment across all scenarios on campus.

At the initial stage, the office is focusing on organisational capacity-building and operational process mapping. Looking ahead, it will advance six strategic priorities - strengthening AI governance, advancing classroom transformation, cultivating AI literacy among staff and students, promoting digital upgrading of administrative processes, and fostering AI-enabled research and innovation - in alignment with international best practices. These efforts aim to drive a systematic and institution-wide transformation towards intelligent university development.

UIUC's Tiered AI Faculty Professional Development Training & Certification Framework

The University of Illinois Urbana-Champaign (UIUC) has developed an AI professional development series, offering structured training programmes - foundational and intermediate - for faculty, staff, and institutional leaders. The programmes focus on promoting the compliant use of mainstream generative AI tools, including Microsoft Copilot and ChatGPT.edu. The foundational AI curriculum includes 12 original 90-minute sessions supported by 68 activities. It is designed to equip employees with the knowledge, skills, and confidence needed to integrate AI responsibly while fostering a culture of continuous learning and human-AI collaboration.

The intermediate AI series centres on scenario-based practice, featuring tool-specific training and role-based cohort groups to embed AI competencies into daily workflows. Participants may obtain an intermediate-level badge certification, which serves as a standardised assessment of AI application skills, judgment, and operational proficiency. Overall, this system establishes a pathway from foundational literacy to applied competency and certification, offering a replicable model for universities to build cross-departmental and sustainable AI mechanisms.

4.2 Digital and Intelligent Infrastructure and AI Programmes: From Computing Power Competition to Platform as a Service

The sampled universities show distinct patterns in intelligent infrastructure and AI development. Computing resources are moving from decentralised faculty-level systems towards unified, institution-wide AI service platforms. Also, the focus is shifting from raw computational power to a broader set of priorities: performance, security, accessibility, and sustainability. This marks a strategic move from hardware-driven competition to service-oriented provision.

A growing number of sampled universities have launched unified generative AI access platforms, providing staff and students with secure, compliant, and user-friendly gateways to large language models. These platforms typically integrate multiple mainstream models and strictly enforce data privacy protections. Yale University (Yale) has introduced the Clarity Platform, which integrates models from OpenAI, Anthropic, and Google to support a range of applications including content creation, programming, and image analysis. Johns Hopkins University (JHU) has launched HopGPT, offering students, faculty, and staff unified access to models such as ChatGPT, Claude, and Llama. Chiang Mai University (CMU) has released the Matthew, providing all staff with access to AI tools for both teaching and administration. The State University of Campinas (UNICAMP) has designated Cacia 2.0 as its core AI infrastructure, delivering unified services for text generation, data analysis, and customised intelligent question-answering.

High-performance computing (HPC) upgrades have become a strategic priority for leading universities. Dedicated AI supercomputers and large-scale GPU clusters at many sampled universities now serve as the core infrastructure, which can support large-scale model training and AI-driven scientific research. Universities are strengthening their computational foundations through in-house development, hardware expansion, and cross-sector collaboration. Princeton University (Princeton) is expanding its Della GPU cluster, which features a hybrid architecture of A100 and H100 accelerators, to enhance its capacity for large-scale model training. The University of Pennsylvania (Penn) has upgraded its Advanced Research Computing Center, doubling its overall computational capacity. In Latin America, the University of Chile (UChile), in partnership with several universities and research institutes, has led the establishment of the SCAI-Lab AI Supercomputing Laboratory, creating AI computing infrastructure and fostering integrated ecosystem that spans research, talent development, governance, and industrial applications.

Many universities have engaged in collaboration with leading technology firms, leveraging such partnerships as a key pathway to accelerate the deployment of computing infrastructure and enhance AI model optimisation. Through mechanisms such as joint AI research centres, hardware donations, and shared cloud resources, universities are working with industry partners to enhance their AI research capabilities. The University of California, Berkeley (UC Berkeley), in collaboration with Intel, has established an AI Centre of Excellence to optimise the inference performance of generative AI models on Intel architectures. The Data Science Institute at the University of Chicago (UChicago) is partnering with Google on research addressing AI content detection, data privacy protection, and the secure application of large language models. The University of Illinois Urbana-Champaign (UIUC) has expanded its IBM-Illinois Discovery Accelerator Institute in partnership with IBM, integrating the National Center for Supercomputing Applications (NCSA) resources with IBM quantum computing systems to open new research directions in algorithm-chip co-design.

Locally deployed, self-hosted AI platforms are emerging as a key trend among sampled universities. Universities are prioritising the establishment of internal, closed-loop AI environments to maintain full control over institutional data and meet the requirements of academic ethics and regulatory compliance. The

University of British Columbia (UBC) has introduced an "LLM Sandbox" to provide privacy-preserving, locally hosted large language model services for teaching and learning. The University of Amsterdam (UvA) has developed its own UvA AI Chat platform, with data fully controlled by the university and planned for institution-wide access. Heidelberg University's computing center has developed and hosted its own AI infrastructure to provide secure access to generative AI models for all staff and students. École Polytechnique Fédérale de Lausanne (EPFL) has established an "Inference-as-a-Service" platform that consolidates multiple models under a unified API architecture, providing standardised and scalable inference services across the university.

Characteristics across Regions

Evidence from universities worldwide indicates that heightened data privacy and compliance requirements are accelerating the transition of AI infrastructure towards local deployment and self-hosted architectures. At the same time, AI is evolving from a standalone external tool into a foundational digital infrastructure layer for universities. This transformation is giving rise to differentiated development trajectories across regions, reflecting variations in regulatory environments, institutional priorities and technological ecosystems.

In North America, universities are prioritising large-scale GPU-based supercomputing and unified AI platforms, with a dual focus on advanced computing capacity and compliance systems. **In Europe**, under the constraints of the General Data Protection Regulation (GDPR) and the principle of data sovereignty, universities are moving towards "sovereign AI" systems based on open-source models and institution-controlled data environments. **In Asia**, development patterns are highly diverse. Universities in China tend to embed AI deeply into campus-wide digital governance systems, while universities in Southeast Asia rely more heavily on commercial cloud services to accelerate the deployment of education and skills-oriented AI platforms.

In Oceania, AI development is characterised by the integration of digital transformation with commercial cloud services. **In Africa**, the sector remains in the early stages of infrastructure development, with a focus on accessible AI applications and inclusive educational initiatives. **In Latin America**, universities are advancing local infrastructure capacity through a dual-track approach combining self-developed AI platforms with national-level supercomputing initiatives.

Cases in Point

Peking University's "Yanyuntong" Smart Campus Platform

Peking University (PKU) has advanced its smart campus development through the construction of the "Yanyuntong" platform, grounded in a people-centered approach to digital transformation. The first phase, built on a locally adapted version of WeCom (Enterprise WeChat), integrates over ten institutional systems and more than one hundred functional modules. Following a pilot implementation in the College of Urban and Environmental Sciences, the platform has enabled end-to-end integration across teaching, research, and administrative management, serving as a central hub for the campus community that connects work, study, and daily life. In 2025, the university launched the second phase, incorporating AI technologies and aligning it with existing digital service systems, to enhance the intelligent service experience for students and staff.

The University of Copenhagen is advancing quantum computing research using national AI supercomputing resources

Denmark's first national AI supercomputer, Gefion, has been deployed in Copenhagen. The system is equipped with 1,528 NVIDIA H100 GPUs and is made available to universities, start-ups, and research institutions. Leveraging this high-performance computing infrastructure, research teams at the University of Copenhagen (UCPH) have conducted large-scale distributed simulations of quantum computing circuits, successfully extending the number of entangled qubits that can be simulated from 36 to 40. Beyond quantum research, the supercomputer also provides computational capacity for projects in biotechnology and

renewable energy, strengthening the university's cross-disciplinary infrastructure.

UC Berkeley announces AI Center of Excellence

The University of California, Berkeley (UC Berkeley), in collaboration with Intel and multiple Berkeley laboratories, has established an AI Centre of Excellence to advance research in generative AI. The centre focuses on optimising the performance and efficiency of inference frameworks such as vLLM across Intel Xeon processors, Gaudi AI accelerators, and GPU Max platforms. The goal is to enable the efficient deployment of large-scale models in both data centre and edge computing environments. Through the co-optimisation of opensource software stacks including vLLM and oneAPI, the initiative seeks not only to enhance AI software performance, but also to inform the design of future hardware and system architectures, thereby contributing to the ongoing evolution of AI infrastructure.

4.3 AI Literacy and Career Development: Dual Engines of Degree Programmes and Universal Literacy

The sampled universities demonstrate a clear trajectory towards universal AI literacy and its integration into career development. This is reflected in their expansion from a limited number of AI-related degree programmes to comprehensive provision across undergraduate, master's and doctoral levels; from a focus on computer science students to AI literacy education for all students; and from classroom-based instruction to industry-integrated career development systems. These trends reflect a proactive response to the emerging consensus that AI constitutes a foundational competency in the new era.

The establishment of dedicated degree programmes in AI has become a strategic consensus among world-class universities. Many universities have developed comprehensive educational pathways spanning undergraduate, master's, and doctoral levels, while also showing a clear trend towards the internationalisation of talent development and cross-regional collaboration. Massachusetts Institute of Technology (MIT) offers Artificial Intelligence and Decision Making within its Department of Electrical Engineering and Computer Science, with related courses consistently ranking among the most popular on campus. The University of Pennsylvania (Penn) provides an undergraduate engineering degree in AI and supports interdisciplinary talent development through an "AI×Science" postdoctoral fellowship programme. In 2025, Columbia University (Columbia) established an independent Master of Science in Artificial Intelligence, with phased enrolment and gradual expansion.

At the doctoral level, Harvard University (Harvard) has developed AI-biomedical training pathways within its biomedical PhD programmes, focusing on talent development in intelligent healthcare. The University of Chicago (UChicago), as a participant in the Schmidt AI Fellowship programme, supports natural science researchers working on AI-related topics to pursue flexible, cross-team research.

AI general courses and interdisciplinary "AI+" degree programmes are increasingly emerging across universities. Universities are systematically fostering AI competence through intelligent learning companions, micro-credential programmes, and graduation requirements. These initiatives reflect an institutional commitment to universal AI literacy. Princeton University (Princeton) offers a Responsible AI graduate programme aligned with Microsoft's six AI ethics principles. Participants receive a certificate and a digital micro-credential upon completing a project defence. The Technical University of Munich (TUM) delivers an English-taught Master's in AI in Society, focusing on AI ethics, governance, and social impact to prepare interdisciplinary talent for AI-driven societies.

The Ohio State University (OSU) has integrated AI literacy into its first-year curriculum, with core modules on generative AI principles, ethical and effective use, and long-term academic application, alongside an elective course on generative AI open to all students. The Faculty of Engineering at the University of Indonesia (FTUI), in partnership with the Indonesian Artificial Intelligence Users Association and the National Professional Certification Agency, has developed an accredited training programme in AI and digital marketing to equip students and staff with practical AI skills. It helps to address local talent gaps and meet the demands of Southeast Asia's rapidly growing AI industry.

Career development and internship opportunities have become a significant extension of AI talent development in universities. Universities are strengthening collaboration with leading AI and technology firms, implementing practice-oriented AI projects and employment support services to help students navigate the AI-reshaped labor market. At the University of California, Los Angeles (UCLA), the OARC centre, through its local tech community Innovate@UCLA, integrates Google design thinking and project-based pedagogy to equip students with digital, business, and interdisciplinary competencies. Students work on real-world projects, develop products, deliver pitch presentations, and engage with government and corporate partners for internships and employment. McGill University (McGill)'s DataSphere Lab runs industry-related projects where students apply machine learning and AI to solve commercial challenges for companies such as L'Oréal and ALDO Group. King's College London (KCL) offers a fully funded Master of Laws in law and technology in partnership with a leading law firm.

The University of California (UCI), Irvine's Academic Study Abroad Program (ASAP) offers students a 10-week professional internship experience with organisations across Southern California, integrating academic learning with workplace practice and industry engagement. Alexandria University (AlexU) has integrated foundational AI courses across bachelor's, master's, and doctoral levels. The University of Indonesia (UI), through its Bangkit programme in partnership with Google and Gojek, delivers targeted AI training and, together with local AI industry associations, offers professional certification pathways to bridge AI internships and employment for students.

AI learning communities and extracurricular practice platforms at universities have become an important complement to formal curricula. The Boston University (BU) AI Association is open to all students without prerequisites, offering foundational AI knowledge through seminars, projects, and peer exchange. McGill University (McGill)'s "McGill Talks AI" series invites senior experts, including the Vice President of Meta AI, to share cutting-edge insights and foster academic exchange. Washington University in St. Louis (WashU) runs the "AI for Research" undergraduate summer programme, pairing students with faculty mentors on interdisciplinary AI projects across law, medicine, and social work. The University of Lagos (UNILAG), in collaboration with OpenAI, provides locally adapted AI skills training for students, researchers, and innovation practitioners across education, governance, and creative industries.

Characteristics across Regions

Overall, universities across all regions are accelerating AI integration into education, shifting AI from a specialised technical skill to a core general

competency. Regional approaches to AI talent development reflect distinct priorities and institutional contexts.

In North America, universities are global leaders in systematic AI degree offerings, institution-wide AI literacy initiatives, and student career support systems. Top U.S. universities have pioneered undergraduate AI majors and introduced AI literacy as a graduation requirement. **In Europe,** universities emphasise interdisciplinary master's programmes focusing on AI ethics, governance, and societal impact, reflecting the region's distinctive positioning in "responsible AI" education. **In Asia,** universities demonstrate strong performance in large-scale AI literacy promotion and industry-academia integration.

In Oceania, universities prioritise industry-oriented AI capability development for professionals and executives, aligning with industrial upgrading needs. **In Africa,** universities focus on bridging the digital divide and advancing foundational AI literacy through partnerships with international organisations and global technology companies. **In Latin America,** universities are adopting top-down curriculum reforms while leveraging external competitions and cross-border academic exchanges to strengthen students' applied AI skills.

Cases in Point

Library Support in Academic Integrity (AI-powered tools) of The University of Hong Kong

The University of Hong Kong (HKU) Library leverages a range of generative AI tools, AI detection systems, and copyright resources to support teaching, research, and academic integrity. It provides faculty and students with access to authorized AI software and intelligent chatbots covering the full research workflow, while addressing misuse through plagiarism detection, AI-generated text screening, and related policy measures. In addition, the Library offers training on reference management tools such as EndNote and Zotero to strengthen academic writing and citation practices.

The UAE establishes its first PhD programme in Artificial Intelligence

During Dubai AI Week, the University of Birmingham Dubai (UBD) launched the United Arab Emirates' first PhD programme in Artificial Intelligence. The launch ceremony was attended by His Highness Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai, who endorsed the programme's contribution to national higher education and AI talent development, alongside senior government officials. The programme covers advanced fields including natural language processing, computer vision, and AI ethics. Drawing on strong research resources, it aims to develop AI specialists for key sectors such as smart cities, advanced healthcare, and sustainability. The initiative supports Dubai's digital transformation and contributes to the UAE's broader efforts to build an international industry-academia-research collaboration and strengthen its domestic innovation ecosystem.

New AI Program in University of Indonesia

To meet the growing demand of the national AI industry, the University of Indonesia (UI) has expanded its AI academic offerings. In October 2025, the Academic Senate approved the establishment of a Bachelor's programme in Artificial Intelligence within the Faculty of Computer Science. The programme was prepared for launch in 2025 and will admit its first cohort in the 2026/2027 academic year. UI aims to cultivate specialised AI talent and promote the application and innovation of AI technologies across Indonesia's industrial sector.

4.4 Reshaping Pedagogy and Curriculum Restructuring: Synergizing Faculty Development, AI Integration, and Assessment Redesign

The sampled universities are exhibiting a multi-dimensional, coordinated pattern in the reshaping of teaching and curriculum structures. This encompasses the transition from fragmented, tool-driven AI applications towards systematic pedagogical redesign, from passive faculty adaptation towards proactive empowerment, and from summative assessment models towards process-oriented, transparent and integrity-aware frameworks. These shifts represent a fundamental rethinking of how universities cultivate the "AI-native" generation of students.

Universities are building comprehensive AI teaching support systems for faculty. They have published AI application guidelines, dedicated teaching workshops, and targeted funding schemes, guiding the integration of AI into teaching objectives, curriculum design, and classroom practice. ETH Zurich-Swiss Federal Institute of Technology (ETH Zurich) has established an "AI in Teaching" webpage covering use cases, assignment design, and faculty competency framework. The University of Michigan (UMich) provides over 67,000 students and staff with access to internal generative AI tools, including UMGPT and Maizey. Stanford University (Stanford) offers regular AI teaching training through its IT department, along with tool comparison resources and Coursera-based courses.

The University of Wisconsin-Madison (UW-Madison) has launched an "AI Teaching Fellows" program to support faculty-led curriculum redesign and pedagogical innovation. Cornell University (Cornell) has issued official guidance encouraging instructors to apply AI in personalised learning, accessibility enhancement, and the redesign of course objectives and assessment. Imperial College London (Imperial) provides faculty with teaching toolkits covering instruction, learning, and assessment. City University of Hong Kong (CityU) has signed a strategic partnership agreement with Tencent Cloud to advance research innovation, talent development, and smart campus construction. The initiative aims to embed AI into teaching and research, while strengthening faculty digital capabilities.

Many universities are leveraging AI-enabled Learning Management Systems (LMS) to drive pedagogical innovation and enhance faculty professional capacity. The University of British Columbia (UBC) has funded multiple AI teaching initiatives, including "Chat UBC," the "GENRx" virtual consultation simulator, and the "GRASP" adaptive formative assessment system, enabling instructors to rapidly deploy AI tools within the LMS. The University of California, Los Angeles (UCLA) AIMS project supports STEM instructors with AI-generated prompts and personalised teaching materials, demonstrating measurable improvements in teaching outcomes and narrower learning gaps.

Faculty at the Ohio State University (OSU)'s Fisher College of Business has developed an AI teaching assistant, "Supply Chain Brutus," integrated into the LMS to facilitate personalised instruction and real-time interaction. Shanghai Jiao Tong University (SJTU)'s "Zhiyuan-1" platform provides AI teaching assistants across hundreds of courses, supporting "HI+AI" curriculum reform. Ain Shams University (ASU) has adopted the McGraw Hill Connect platform with AI adaptive learning tools that dynamically recommend resources and exercises based on student performance data, enabling data-driven personalised instruction.

Innovations in assessment methods and the establishment of AI usage integrity policies have become critical components of contemporary teaching reform in many universities. Many universities now require students to disclose their AI usage and have redesigned evaluation tasks to reduce inappropriate reliance on AI. From the second semester of 2025, the University of Sydney (USyd) implemented a two-lane assessment framework: open assessments permit generative AI use but require transparent acknowledgement. Columbia University (Columbia)'s Center for Teaching and Learning offers workshops such as "Crafting Your

AI Syllabus Statement" to help instructors develop course-level AI policies, clarifying expectations and academic integrity requirements. Monash University (Monash) has embedded standardised AI statement templates in its Moodle platform, requiring Chief Examiners to specify permitted AI use for each unit and assessment task. Vietnam National University, Hanoi (VNU-Hanoi) has launched an AI Tutor intelligent tutoring system that evaluates student learning through step-by-step reasoning and formative feedback, moving away from traditional "answer-delivery" assessment models.

Characteristics across Regions

Overall, universities across all regions are systematically reshaping curricula and pedagogy through AI usage policies, tiered training for staff and students, curriculum and assessment redesign, interdisciplinary and industry-academia collaboration, and the integration of AI ethics into teaching and learning.

In North America, leveraging strong research capacity and funding, universities focus on developing in-house AI teaching tools and interdisciplinary programmes. **In Europe,** universities prioritise regulatory frameworks and the systematic integration of AI ethics into curricula. **In Oceania,** universities emphasise standardised AI assessment policies and usage guidelines.

In Asia, universities draw on local tech industry partnerships to advance co-developed, industry-embedded curriculum reforms. **In Africa and Latin America**, where financial and technological resources are more constrained, universities are pursuing lighter-weight reforms through industry collaboration, external funding, hackathons, and applied training to steadily expand AI curricula and upgrade teaching.

Cases in Point

Peking University "Beida Wenxue" intelligent teaching platform

Peking University has developed the "Beida Wenxue" intelligent teaching platform, featuring four core modules: a mathematics problem-solving assistant, a code explanation assistant, a code debugging assistant, and an intelligent question-generation assistant. All four modules have been integrated into the Smart Education of China Platform for broader educational use. The mathematics assistant addresses common learning challenges by providing step-by-step guidance on textbook exercises rather than direct answers, fostering a human-AI collaborative model. The code explanation assistant analyses single or multiple code files, delivering functional overviews, key point explanations, and detailed code analysis. The code debugging assistant identifies and resolves programming errors based on submitted code and error logs. The question-generation assistant produces diverse exercises and scenario-based variants based on teacher-specified topics, course context, and past exam items.

ETH chatbot Ethel becomes a better practice tutor

ETH Zurich has developed "Ethel," a virtual teaching assistant that uses retrieval-augmented generation to restrict responses to course-specific materials uploaded by instructors, such as lecture notes and exercises. It will effectively mitigate the hallucination risks of general-purpose large language models. The university has also established a tiered AI training framework: "Booster" pedagogical workshops for faculty, machine learning practicum courses for students, and an AI skills programme for staff. An "AI-assisted Teaching" portal provides guidance on application scenarios, assignment design, and competency frameworks. Together, these initiatives position ETH Zurich as a benchmark for the systematic integration of AI into teaching in European higher education.

Universiti Malaya collaborates with EY to enhance course development and foster knowledge exchange in AI

The University of Malaya (UM) has established a strategic partnership with Ernst & Young Consulting Sdn. Bhd. (EY) to redesign its AI curriculum and talent development model in response to industry needs. Drawing on EY's expertise in AI, data analytics,

and digital transformation, the university has engaged industry professionals as guest lecturers and supervisors, exposing students to real-world challenges and cutting-edge technologies. Through structured internships, academic exchanges, and joint course development, the partnership aligns classroom learning with industrial practice and ensures curricula keep pace with AI advancements and evolving labor market demands. This model represents a shift towards a competency-based, practice-oriented, and industry-integrated approach, equipping students with the skills to apply AI to real-world problems and enhancing their future employability.

Chapter 5

Innovative Projects on AI for Human-AI Teaming Research and Co-Generative Knowledge Building

5.1 AI for Science and Interdisciplinary Collaboration: A Paradigm Shift from Disciplinary Silos to Collaborative Innovation

Universities are no longer merely embedding AI into existing research workflows. Instead, through automated research tools, autonomous scientific agents, interdisciplinary collaboration platforms, and global research networks, they are moving scientific inquiry from disciplinary separation toward collaborative innovation.

AI-driven basic science is entering a stage of automated discovery, as scientific agents begin to reshape the paradigm of scientific exploration in universities. The most transformative effects of AI are first becoming visible in fundamental research. Selected universities are experimenting with autonomous scientific agents, automated laboratory platforms, and AI scientist systems, shifting research from experience-driven models toward continuously operating and rapidly iterative systems of human-AI collaborative discovery.

In 2024, UChicago, in collaboration with Argonne National Laboratory (Argonne), explored an AI-enabled materials science project that uses machine learning to help researchers optimise polymer properties and shorten experimental cycles. Carnegie Mellon University (CMU)'s AI Science Foundry project combines AI agents, programmable robots, and automated instruments to design, manage, and analyse experiments in closed loops.

AI is becoming an important tool for addressing major global challenges and translating university research innovation into real-world problem solving. Climate change, energy transition, public health pressures, and population ageing are intensifying. In response, universities are increasingly embedding AI capabilities into research projects on these major societal issues. This shift moves AI for Science from academic breakthroughs toward practical governance.

In 2024, Karolinska Institute (KI) strengthened AI-enabled drug discovery through chemical biology platforms that combine automated screening and predictive methods to accelerate the identification of candidate drugs. In 2025, University of California, San Diego (UCSD) worked with industry partners to connect AI, fusion data science, and digital engineering, using AI to support fusion experiments and energy-system modelling for clean energy development. In 2024, research teams at Oxford applied machine learning to climate and public health risk prediction, exploring AI-enabled approaches to disease-warning systems and environmental governance.

The deeper integration of AI with the humanities and social sciences is generating new paradigms of knowledge production in universities. Beyond the natural sciences, AI is entering fields such as history, philosophy, linguistics, sociology, and communication studies, creating new research methods and epistemic approaches.

In 2024, Penn, through platforms such as the Price Lab for Digital Humanities, explored the use of large language models and computational methods in humanistic inquiry, including historical text analysis, cultural data mining, and knowledge discovery. Related projects on early modern correspondence networks, cultural heritage data, and the reconstruction of historical knowledge systems illustrate how AI and digital technologies can extend humanities research. Heidelberg's "Humans and Machines" project has brought together social robotics, AI-driven technologies, linguistics, cognitive science, psychology, artificial intelligence, and ethics.

Characteristics across Regions

Overall, universities worldwide are collectively advancing AI from a research support tool toward foundational infrastructure for scientific discovery, while actively exploring scientific agents, autonomous experimentation systems, and interdisciplinary collaborative innovation models. More specifically, **in North America,** universities focus on frontier scientific discovery and are taking the lead in exploring AI scientists and autonomous laboratories. **In Europe,** universities emphasise interdisciplinary communities and open science networks. **In Asia,** universities highlight engineering applications and industry-oriented collaborative innovation. **In Africa,** universities focus on practical challenges in agriculture, healthcare, and public governance. **In Latin America,** universities mainly rely on international cooperation and open innovation networks to strengthen regional research capacity.

Cases in Point

Stanford Medicine's Virtual Lab for AI-Driven Scientific Discovery

In 2025, Stanford Medicine released the "Virtual Lab" project, exploring a new research model in which multiple AI scientist agents participate in scientific inquiry. The platform consists of an AI principal investigator and several AI research agents, enabling literature retrieval, hypothesis generation, research discussion, and experimental design under the supervision of human researchers. In a study on nanobody design for recent SARS-CoV-2 variants, the system proposed innovative research directions within only a few days and successfully designed candidate nanobodies that were experimentally validated for strong binding capacity. Published in Nature, the project shows that AI is gradually evolving from a research support tool into an active participant in scientific discovery, pushing basic science toward a new stage of human-AI collaborative discovery.

Swiss AI Initiative for a National AI Research Community

In 2023, the Swiss Federal Institute of Technology Zurich (ETH Zurich) and École Polytechnique Fédérale de Lausanne (EPFL) jointly launched the Swiss AI Initiative, integrating universities, research institutions, and national supercomputing resources to advance foundation model development and AI-enabled scientific research. The project brings together research teams from fields such as life sciences, climate science, engineering, and social sciences to build open and shared data and computing platforms and promote interdisciplinary collaborative innovation. As one of Europe's largest academic AI collaboration networks, the project illustrates how AI is becoming an important infrastructure for connecting disciplines and research actors.

AI for Education and Wildlife Conservation Research at the University of Nairobi

In 2025, UoN, in collaboration with Linköping University, hosted the international workshop project "AI in Education and Science: Applications and Challenges", promoting interdisciplinary research that connects AI with educational science, ecological conservation, and data science. Through practical sessions, the project demonstrated AI-driven wildlife conservation technologies, including elephant footprint recognition and acoustic monitoring of giraffe movement. It used machine learning methods to analyse ecological data and support biodiversity conservation. Computer scientists, education researchers, and ecologists jointly participated in the project, showing how AI is becoming an important bridge between natural science and social needs. This provides a representative practical example for Global South universities exploring AI-enabled scientific research and sustainable development.

5.2 Organisation Transformation and Resource Integration: Systematic Construction of University-Level AI Hubs and Collaborative Ecosystems

Through university-level AI institutes, interdisciplinary research centers, and transnational collaboration alliances, universities are turning AI development from fragmented experimentation into more systematic institutional planning. This transformation is changing how universities allocate internal resources and is also repositioning them from knowledge-producing organisations into innovation hubs that connect academia, industry, and systems of social governance.

University-level AI institutes are becoming core hubs for coordinating institution-wide resource allocation. As AI continues to penetrate research, teaching, and social service, organisational models based mainly on independent departments are increasingly unable to meet the needs of interdisciplinary innovation. More universities are therefore establishing university-level AI institutes, interdisciplinary schools, or integrated AI platforms to coordinate talent, funding, and research resources and to implement AI strategies across the institution. These bodies often take responsibility for disciplinary planning, major project organisation, and resource coordination.

Established in 2023, JHU's Data Science and AI Institute (DSAI) has developed seven interdisciplinary research clusters while expanding faculty recruitment and research infrastructure. In 2024, HKU established its School of Computing and Data Science to integrate disciplinary resources across talent development and research innovation.

Inter-university platforms are promoting resource sharing and joint innovation. As AI research requires increasing levels of computing capacity, data resources, and interdisciplinary expertise, it is becoming more difficult for individual universities to address complex innovation tasks alone. Universities are therefore building joint research centres, sharing research infrastructure, and co-organising major projects to form more institutionalised mechanisms for collaboration.

Since 2020, the Munich Center for Machine Learning (MCML), jointly developed by TUM and LMU, has brought together research teams for long-term collaboration in machine learning and AI. In the Global South, University of Pretoria (UP, Pretoria) launched the African Institute for Data Science and Artificial Intelligence (AfriDSAI) in 2025, bringing together expertise from engineering, health sciences, law, and education to advance collaborative AI research in agriculture, healthcare, and climate resilience.

International collaboration networks are expanding the boundaries of AI innovation ecosystems. Because AI development is inherently global, more universities are integrating innovation resources through international alliances and transnational networks to advance frontier research and technological innovation. Compared with traditional international projects, the new generation of AI collaboration networks places greater emphasis on long-term mechanisms, shared resources, and joint research agendas.

In 2025, Paris-Saclay University (Paris-Saclay), together with Oxford and Cambridge, launched the Entente CordIAle project to promote an open, trustworthy, and sovereign European AI ecosystem. In 2025, Sorbonne University established the PostGenAI@Paris consortium, bringing together 16 academic institutions and more than 60 industry partners to advance post-generative AI research.

Characteristics across Regions

Overall, universities worldwide are moving from fragmented AI initiatives toward systematic organisational transformation through AI institutes, interdisciplinary platforms, and collaborative innovation mechanisms. Resource integration has become an important pathway for enhancing institutional innovation capacity, with universities seeking to break down departmental boundaries and promote deeper collaboration among research, teaching, industry, and society. More specifically,

In North America, universities place greater emphasis on institution-wide coordination and platform development, integrating resources through AI institutes and cross-school programmes to build comprehensive ecosystems for collaborative innovation. **In Europe,** universities focus on research alliances and open collaboration networks, leveraging centres of excellence and transnational partnerships to promote resource sharing and coordinated development. **In Asia,** universities are more strongly aligned with national strategies and industrial priorities, using AI schools, future-oriented colleges, and university-industry platforms to integrate education, research, and industrial innovation.

Cases in Point

ICL's School of Human and Artificial Intelligence

In 2025, ICL launched its Schools of Convergence Science framework and established the School of Human and Artificial Intelligence as one of its four core schools. Rather than operating as a traditional academic department, the school serves as an interdisciplinary organisational platform designed to address complex challenges. It connects computer science, engineering, medicine, social sciences, and business, creating a shared structure for integrating research, education, and innovation resources. By focusing on human-AI collaboration and breaking down conventional disciplinary boundaries, the project reflects a broader trend in which universities are restructuring their research systems through new organisational units.

Center for Artificial Intelligence and Digital Ethics

Melbourne's Centre for AI and Digital Ethics (CAIDE) focuses on issues related to AI ethics, policy, law, and societal impacts. Through interdisciplinary teams, the centre integrates technological development, social science research, and legal and policy studies, creating a comprehensive AI research and education ecosystem. In areas such as transparency in AI decision-making, digital ethics governance, and the responsible application of AI technologies in society, CAIDE provides an institutionalised platform that supports collaboration among academia, government, industry, and civil society. The centre demonstrates how universities can organise AI-related expertise around ethical, legal, and societal challenges.

Applied Research Center for 5G and Generative AI

In 2025, USP, in partnership with Claro and FAPESP, established the Applied Research Center (CPA) for 5G and Generative AI. With an investment of more than BRL 40 million, the centre brings together over 100 researchers and supports more than 40 research projects in areas such as smart cities, Industry 4.0, and smart agriculture. Unlike a conventional laboratory, CPA adopts a collaborative governance model linking universities, enterprises, and funding agencies. By sharing financial resources, research infrastructure, and application scenarios, the centre creates an integrated innovation chain from basic research to technology transfer, representing an important example of how Latin American universities are building collaborative AI ecosystems.

5.3 Education Governance and Ethical Guidelines: Systematic Construction from Policy Guidelines to Institutional Frameworks

More universities are issuing institution-wide policies, establishing ethics review mechanisms, creating dedicated governance bodies, and developing responsibility frameworks to move AI from being merely usable toward becoming trustworthy, controllable, and accountable. This trend indicates that AI governance has become a foundational component of digital transformation in higher education. Its core purpose is not only to reduce risk but also to establish a long-term balance between innovation and regulation.

Data privacy and intellectual property protection are becoming the baseline principles of university AI governance. As generative AI is increasingly used in teaching and research, universities are placing growing emphasis on the protection of personal privacy, sensitive data, and intellectual property. More institutions are clarifying which types of data may be entered into AI systems, which content should not be uploaded, and how data should be managed through classification mechanisms.

In 2025, UC Berkeley issued guidance on the appropriate use of generative AI tools, emphasising that AI tools should support innovation without putting institutional, personal, or proprietary information at risk, and linking AI use to campus data protection levels. In recent years, UBC has similarly assessed the risks associated with external AI models, including DeepSeek, from the perspective of information security and institutional data protection.

University-wide policies and academic integrity rules are forming more standardised governance frameworks. As AI tools become integrated into coursework and research practice, universities are using institutional policies to define the boundaries of appropriate AI use and reshape academic integrity rules. Compared with traditional academic norms, the new generation of governance frameworks focuses more concretely on what is permitted, how AI use should be disclosed, and which behaviours constitute misconduct.

Cornell has proposed a flexible framework in which instructors may prohibit, allow with attribution, or encourage generative AI use. Oxford further emphasises that unacknowledged AI-generated content in summative assessment may constitute academic misconduct unless otherwise specified. PKU has developed a three-level classification framework for AI use in academic research, covering open use, limited use, and prohibited use across the research process, including topic selection, literature review, manuscript writing, and peer review. SJTU has developed differentiated categories for AI use in teaching activities, including prohibited, limited, encouraged, and open use scenarios. Universities in the Global South, including UoN and UMalaya, are also introducing AI-use guidance in courses and research projects, gradually institutionalising the principles of responsible AI use.

Dedicated governance bodies and ethics committees are moving AI governance toward routine operation. Beyond policy documents, more universities are creating specialised governance structures that embed AI ethics and risk management into long-term organisational arrangements. These bodies help shift governance from written rules to continuous implementation.

Heidelberg has established an AI Commission as an important advisory body to university leadership, supporting the development of institution-wide AI principles and risk-assessment mechanisms. In 2019, TUM established the Institute for Ethics in Artificial Intelligence (IEAI), focusing on long-term research into AI ethics across areas such as healthcare decision-making, autonomous systems, and social media governance. Universities in the Global South are also advancing institutionalised governance. UCT participates in the African Hub on AI Safety, Peace and Security, helping to strengthen African participation in global discussions on AI safety and governance.

Characteristics across Regions

Overall, universities worldwide are accelerating the construction of governance and ethical frameworks for the AI era, moving AI applications from exploratory practice toward institutionalised governance. Universities are increasingly establishing governance frameworks around academic integrity, data security, privacy protection, and accountability mechanisms to balance technological innovation with risk control. More specifically, **in North America,** universities place greater emphasis on risk governance and accountability mechanisms, strengthening regulatory management through AI-use disclosure systems, data classification, and institution-wide governance bodies. **In Europe,** universities focus on trustworthy AI and ethical governance, building systematic governance frameworks through policy frameworks, ethics review, and transnational cooperation. **In Asia,** universities mainly concentrate on academic integrity management in teaching and research contexts, promoting responsible AI use through clearer boundaries for AI application and more detailed research ethics standards. **In Oceania,** universities link AI governance with assessment reform, curriculum design, and student capability development. By contrast, **in Africa and Latin America,** universities focus more strongly on digital equity, capacity building, and institutional improvement, actively exploring governance pathways that align with regional development needs.

Cases in Point

DukeGPT to Build a Privacy-Centerd AI Governance Framework

In 2024, Duke launched DukeGPT as a university-level generative AI platform that provides AI services for faculty, staff, and students within the university's governance framework. The platform adopts a "Privacy by Design" approach and uses dedicated data agreements to ensure that user inputs are not used for external model training, thereby protecting personal privacy, research data, and intellectual property at the institutional level. Unlike a policy-only approach, DukeGPT embeds data security requirements directly into platform construction, creating a dual governance model that combines institutional rules with technical infrastructure. The project represents an important North American example of building a trusted AI ecosystem in higher education.

AI Policy Framework at the University of Cambridge

In 2024, Cambridge released its AI Policy Framework to regulate the use of generative AI in teaching, learning, and assessment. The framework requires students to disclose AI use and states that undeclared use may constitute academic misconduct where disclosure is required. It further emphasises that academic judgement should remain the responsibility of human assessors and that generative AI should not be used to replace direct evaluation of student work. By emphasising transparency, accountability, and academic integrity, the framework provides an important reference for UK universities seeking to establish governance systems for generative AI.

Institute for Ethics in Artificial Intelligence

In 2019, TUM established the Institute for Ethics in Artificial Intelligence (IEAI), focusing on AI ethics, governance, and societal impacts. The institute conducts interdisciplinary research, policy engagement, and public dialogue on topics including autonomous systems, medical AI, algorithmic accountability, and public policy. By promoting the translation of AI ethical principles into governance practice, the institute demonstrates how universities can institutionalise AI governance through specialised organisations, long-term research capacity, and sustained ethical inquiry.

Chapter 6

Typical Activities on Community Engagement and Human Cultural Inheritance toward an Intelligent Society

6.1 Social Partnerships and Community Empowerment: Social Extension of AI Resources and Public Services

Universities no longer view AI only as a tool for improving research, teaching, and administrative efficiency. Instead, they are extending AI knowledge, technologies, and platform capabilities to broader society. This includes outreach to basic education, support for vulnerable groups, open educational resources, and transnational public-interest partnerships. These efforts reach primary and secondary schools, community organisations, disadvantaged groups, public-sector institutions, and developing countries. This shift reflects the social responsibility of universities as public knowledge institutions. It helps transform AI from an elite technological resource into a more inclusive capability that advances educational equity, social inclusion, and public well-being.

AI resources are increasingly extending into basic education to foster early AI literacy among children and adolescents. University-led AI outreach for K-12 learners is evolving from short-term awareness-raising activities into more structured curricula, summer schools, and competition platforms. In 2025, New York University (NYU) Shanghai launched an AI summer programme for high school students aged 15 to 18, offering a two-week immersive course on AI fundamentals, data science, and application development. Fudan University (Fudan) hosted the China event of the UN-based Robotics for Good Youth Challenge, with the theme of safeguarding food security with AI, encouraging students aged 10 to 18 to address sustainability challenges through robotics and AI.

Public-interest AI applications are offering targeted support for specific groups. In the area of community empowerment, universities are paying increasing attention to the value of AI for vulnerable groups and frontline public services. In 2025, a computer science team at the University of Southern California (USC) partnered with non-profit organisations serving people experiencing homelessness. They carried out an "AI for Social Good" activity, using natural language processing to analyse caseworkers' outreach records, assess the impact of street-level interventions, and develop practical tools. Related social-technology work at the University of Zurich (UZH) through the "Simplify!" activity explores how AI can translate complex welfare documents into plain language, improving access to public services for disadvantaged groups.

In the Global South, UI and international partners ran a workshop on AI, data science, and women's leadership in 2024, providing women from across Indonesian provinces with training in coding, data science, and leadership in order to strengthen their participation in the AI sector. University of South Africa (UNISA), Women in Tech South Africa, and Amazon Web Services (AWS) co-hosted a one-day Women-in-Tech workshop on "Empowering Africa's Digital Future", aiming to strengthen women's technological capabilities and AI industry awareness among students and emerging professionals. Tsinghua University (THU) deployed age-friendly intelligent agents and provided one-on-one companion services to retired faculty living at home, creating a smart eldercare collaborative service model that is assessible, replicable, and scalable. This activity not only improves the quality of life for older adults but also explores a practical example of AI-enabled community eldercare.

Open educational resources are making AI knowledge more accessible to the public. Universities are extending AI learning beyond the classroom through public exhibitions, MOOCs, online certificates, and open courses. In 2024, University of Birmingham (UoB) held a "Demystifying AI" public

engagement activity in urban public spaces, using robots, virtual reality, and interactive experiences to explain AI principles and risks to families and members of the public. Vanderbilt University (Vanderbilt) has made generative AI courses and specialisations available on Coursera, opening university-level AI teaching resources to learners worldwide.

University of Edinburgh (Edinburgh) has established a UK AI Factory outpost to provide AI infrastructure, training, and support services for start-ups, small and medium-sized enterprises, industry, and the public sector. Universities in the Global South are also advancing open learning platforms. Chula, through Chula MOOC and related public platforms, continues to provide courses in AI literacy, digital competence, and legal technology to learners regardless of background. University of Toronto (U of T) partnered with Palette Skills to build a national upskilling ecosystem that integrates higher education institutions, employers, and community organisations.

Transnational collaboration networks are extending AI capacity-building to developing countries and public organisations. At the global level, universities are using international partnerships to extend AI knowledge, expertise, and capacity to developing countries, international organisations, and public-service institutions. UChicago's AI for Climate Initiative and its partners are strengthening AI-driven weather forecasting capacity in low and middle income countries, supporting agricultural weather services in countries including Bangladesh, Chile, Ethiopia, Kenya, and Nigeria. EPFL's Geneva AI Initiative provides AI training, expert support, and activity funding to international organisations and non-governmental organisations, supporting the integration of AI into their operations and programmes. WashU School of Law has also developed a global AI and law collaboration network, promoting knowledge exchange on AI and law among law schools in different countries.

Characteristics across Regions

Overall, universities worldwide are actively extending AI outcomes into society through open courses, community services, capacity-building activities, and cross-sector collaboration, moving AI resources from campus settings into broader social contexts. Social partnerships and community empowerment have gradually become important components of institutional AI strategies. Universities are no longer only knowledge-producing institutions but are increasingly becoming key hubs connecting technological innovation, public services, and social development.

More specifically, **in North America,** universities place greater emphasis on basic education support and community empowerment, expanding AI access through K-12 curricula, public-interest research, and public training. **In Europe,** universities emphasise social inclusion and public governance, applying AI to public-sector capacity-building and social service innovation. **In Asia,** universities combine local outreach with international influence, using summer schools, competitions, open courses, and international cooperation activities to cultivate regional AI talent. **In Oceania,** universities focus more strongly on the development needs of remote communities, Indigenous groups, and vulnerable populations, highlighting the value of AI in promoting social equity. By contrast, **in Africa and Latin America,** universities focus more on capacity building, youth innovation, and digital inclusion, using regional cooperation networks and community activities to narrow the digital divide and strengthen society-wide digital capabilities.

Cases in Point

MIT Day of AI for Global K-12 AI Literacy

In 2021, MIT RAISE launched Day of AI as a free learning platform for K-12 learners and educators worldwide. The activity provides AI curricula, teacher guidance, classroom activities, and open resources designed to help teachers introduce AI literacy regardless of their technical backgrounds. Its learning materials cover foundational AI concepts, ethical risks, social impacts, and practical applications, enabling educators without formal computer science training to support early AI education. Day of AI has become one of the largest global K-12 AI literacy activities, translating the AI

education capacity of a world-class university into a public resource for basic education systems.

University of Queensland AI Tools for Remote and Disabled Communities

In 2025, research teams at UQ presented several AI applications addressing social needs, including an AI-powered eye screening device for remote communities, real-time sign language translation systems, and tools for identifying sporting talent. These activities apply computer vision and machine learning to healthcare access, accessible communication for people with hearing impairments, and public-service contexts. They demonstrate how university AI research can be translated into practical support for specific groups and grassroots communities. This case illustrates that Oceanian universities place particular emphasis on accessibility, inclusion, and regional public services in harnessing the social empowerment potential of AI.

University of Tokyo AI Talent Development for Africa

In 2025, the Matsuo-Iwasawa Laboratory at UTokyo announced cooperation with the government to extend its AI education activities, developed in Japan, to Africa, with a plan to train 30,000 AI professionals across Africa. The activity includes courses and skills training while also emphasising collaboration with local institutions to explore sustainable AI education models. Its broader aim is to support the development of an autonomous AI talent system in Africa. As an activity of transnational social empowerment, it illustrates how a leading Asian university can contribute to the digital development of the Global South through education, capacity building, and international partnership.

6.2 Fund Mobilisation and Enterprise Incubation: Building Diverse Investment and Innovation Ecosystems

In the dimension of fund mobilisation and enterprise incubation, world-class universities are moving from reliance on single-source research funding toward the construction of more diversified innovation ecosystems. Universities no longer rely solely on traditional research grants. Instead, through internal seed funds, innovation incubators, industry partnerships, philanthropic giving, and national-level funding, they are supporting AI activities as they move from early proof of concept to prototype development, technology transfer, and venture incubation. This transformation reflects a broader shift in the role of universities, from knowledge-producing institutions to innovation ecosystem hubs that connect research, capital, industry, and societal needs.

National funding and philanthropic giving form the long-term funding foundation for AI innovation ecosystems. Beyond internal incubation and corporate collaboration, public funding and philanthropic giving provide universities with sustained support for AI innovation. In 2021, the University of Minnesota Twin Cities (UMN) became the lead institution of the AI-LEAF Institute, supported by a five-year, US$20 million award from the National Science Foundation and the U.S. Department of Agriculture to advance AI applications in agriculture, forestry, and climate adaptation. In 2025, the University of Texas at Austin (UT Austin) secured a US$8.5 million investment from Emerson to advance AI and semiconductor research, strengthen industry-university collaboration, and support talent development through a new master's programme.

The Malaysian government allocated RM20 million in its 2024 budget to establish a national artificial intelligence learning centre at Universiti Teknologi Malaysia (UTM) and subsequently expanded AI-related funding for public research. In South Africa, the Wits MIND Institute received US$1 million in core funding from Google.org in 2025 to support

African-led AI research, interdisciplinary activities, and capacity building. Together, public funding and philanthropic investment provide a stable foundation for the development of AI innovation ecosystems.

Corporate funding and joint R&D are accelerating the translation of AI research into real-world applications. Corporate funding is becoming an important driver of the translation of AI research into practical applications. Unlike traditional forms of corporate sponsorship, newer models of collaboration place greater emphasis on jointly defining problems, co-developing prototypes, and supporting implementation. In 2025, the Federal University of Rio de Janeiro (UFRJ)'s Science Park expanded partnerships in areas such as digital health, biotechnology, and artificial intelligence through international cooperation, while COPPE/UFRJ continued to strengthen partnerships with corporate R&D organisations in AI, embedded intelligence, and data science. Such collaborations combine corporate funding, industry use cases, and university research capacity, facilitating the translation of AI research outcomes from academic publications and laboratory environments into real-world applications.

Internal funding and incubators are helping early-stage AI activities grow. Universities' seed funds, accelerators, and incubators are becoming important mechanisms for moving AI innovation from ideas to prototypes. University of North Carolina at Chapel Hill (UNC)'s AI Acceleration programme supports generative AI prototype development by providing funding, guidance, and cloud-based resources for faculty, staff, and students. It enables rapid experimentation with AI applications in research, teaching, and institutional operations.

In 2026, Katholieke Universiteit Leuven (KU Leuven) launched an AI-as-a-Service (AIaaS) call, providing AI consulting and engineering support for interdisciplinary research activities, with dedicated technical expertise available through a structured service model. The value of such mechanisms lies less in large-scale research investment and more in lowering the barriers to early-stage innovation, transforming dispersed campus ideas into activity pipelines that can be tested, iterated, and incubated.

Characteristics across Regions

Overall, universities worldwide are actively exploring diversified resource mobilisation and innovation translation mechanisms, providing sustained support for AI development through dedicated funds, corporate partnerships, venture capital, and start-up incubation platforms. Funding inputs have gradually expanded from single-source research grants to multiple stages, including talent development, technology R&D, research translation, and enterprise incubation, supporting an ecosystem in which innovation, industry, and talent chains develop in coordination.

More specifically, **in North America,** universities place greater emphasis on innovation and entrepreneurship ecosystems, using seed funds, accelerators, and university-industry partnerships to promote the commercialisation of research outcomes and form relatively mature technology transfer models. **In Europe,** universities rely on large-scale research programmes, transnational cooperation activities, and research alliances to strengthen frontier research capacity and concentrate innovation resources. **In Asia,** universities are more strongly aligned with national strategies and industrial collaboration, using dedicated funds, joint laboratories, and industrial platforms to promote the deep integration of scientific innovation and economic development. **In Oceania,** universities mainly rely on government research funding and industry partnerships to support AI application innovation in key fields. By contrast, **in Africa and Latin America,** universities place greater emphasis on capacity building and innovation ecosystem development, using international funding, start-up incubation, and regional cooperation networks to strengthen local innovation and research translation capacity.

Cases in Point

University College London (UCL) Computer Science Venturer Programme

In 2023, UCL Computer Science launched the Computer Science Venturer programme to support AI and deep-tech researchers with entrepreneurship training, mentoring, investor engagement, and co-founder networks. The programme targets PhD students, postdoctoral researchers, and research staff, helping them translate research outcomes into deep-tech start-ups. UCL has also noted that AI companies founded by its computer science researchers over the past five years have reached a combined valuation of £1.3 billion, illustrating how university incubation mechanisms can strengthen the AI entrepreneurship ecosystem by connecting research talent, venture capital, and commercialisation pathways.

Vanderbilt's Dare to Grow and Ignite Tech Development Grants

In 2025, Vanderbilt announced that its Dare to Grow campaign had surpassed its US$3.2 billion fundraising goal ahead of schedule, providing a long-term financial foundation for the institution's research and innovation. In the same period, its Learning Innovation Incubator announced Ignite Tech Development Grant activities supporting emerging learning technologies in areas such as mathematics learning, empathy-focused learning technologies, and AI ethics. This case illustrates how philanthropic giving and internal activity funding can form a continuous support mechanism linking fundraising, educational technology development, and innovation incubation.

Mahidol University (Mahidol) x Siam AI Venture Lab

In 2025, Mahidol and Siam AI Cloud launched the Mahidol x Siam AI Venture Lab, using mentoring, accelerator support, and fund-matching mechanisms to promote the commercialisation of AI research. The initiative focuses on addressing societal needs in sectors such as healthcare. Engineering teams developed AI-enabled diagnostic and automation solutions, received funding, and progressed towards industry partnerships and commercialisation. As a Global South case, this model offers a viable pathway for Southeast Asian institutions to translate AI research into practical applications through corporate investment and professional incubation support.

6.3 Cultural Inheritance and Sustainable Development: Value Leadership and Long-Term Mission in the AI Era

Universities are no longer concerned only with whether AI can improve research, teaching, or administrative efficiency. They are also asking what human purposes AI should serve, how cultural diversity can be protected, how cross-cultural understanding can be promoted, and how the long-term social and environmental costs of technological development can be reduced. Through human-centred value narratives, cultural heritage and local knowledge innovation, multilingual model development, and sustainability practices, universities are transforming AI from a purely technical tool into an important force carrying humanistic concern, cultural continuity, and responsibility for the future.

Human-centred values are becoming central to how universities articulate AI culture. As AI rapidly changes learning, work, and social relations, universities are using value narratives to express the basic position that technology should serve people, rather than approaching AI only through leadership or strategic management. Harvard's Kempner Institute is dedicated to studying the fundamental mechanisms of biological and AI, with a mission to harness AI for the benefit of humanity. Kyoto University (KyotoU)'s "Society and AI" activities reflect on the implications of AI from humanities and social science perspectives, emphasising human dignity, social harmony, and sustainable futures.

The University of Manchester (Manchester), in collaboration with UNESCO and the Manchester Institute of Education, organised an online seminar on inclusivity and equity in AI competency building. The event brought together participants from Manchester and the international higher education community to reflect on the role, opportunities, and challenges of AI in education. Universities in the Global South are also participating in this value discourse. At UNILAG, the 2025 International Week was held with the theme of equitable partnerships and African AI futures, emphasising that technology should respond to specific social contexts rather than simply reproduce external models.

AI is emerging as an important tool for cultural heritage preservation and local cultural innovation. Universities are exploring how AI can revitalise cultural resources, reconstruct cultural memory, and support the expression of local knowledge. In 2025, Princeton's Center for Digital Humanities launched the "Modeling Culture" activity, using seminars, public talks, and open courses to examine how generative AI engages with humanistic traditions, cultural interpretation, and teaching practice. The "Two-Eyed Seeing Indigenous Network" activity supported by McGill's Pathy Fellowship combines Michif language data, historical images, and AI-generated art to create the "Michif Stories" series, exploring how machine intelligence can present Indigenous narratives and cultural memory. These practices show that AI is not only a tool for processing cultural content, it is also becoming a new medium for cultural reinterpretation and local expression.

Characteristics across Regions

Overall, universities worldwide are integrating AI development with human values, cultural inheritance, and sustainable development goals, moving AI from a tool of technological innovation toward an important force serving social well-being, cultural continuity, and ecological responsibility. Universities generally emphasise human-centred AI, responsible AI, ethical governance, digital humanities, and sustainable infrastructure.

More specifically, **in North America,** universities place greater emphasis on human-centred AI and public value, strengthening technology for good through AI policy centres, humanities-oriented AI activities, and interdisciplinary initiatives. **In Europe,** universities emphasise trustworthy, open, ethical, and sovereign AI, linking AI development with democratic values, environmental responsibility, and social governance. **In Asia,** universities more strongly integrate national strategies, industrial development, and cultural values, emphasising AI's contribution to talent development, social progress, and local development needs. **In Oceania,**

universities focus on indigenous cultures, environmental sustainability, and social equity, highlighting the green transition of AI infrastructure. By contrast, **in Africa and Latin America,** universities place greater emphasis on local languages, community knowledge, ecological protection, and equitable partnerships, promoting AI as a means of supporting cultural diversity and sustainable development.

Cases in Point

Australian National University (ANU)'s Human-Scale AI Project

In 2025-2026, the School of Cybernetics at ANU made "Human-Scale AI" the central theme of its Cybernetic Studio. Through interactive installations, physical sculptures, and public workshops, the activity translates abstract computational processes into cultural experiences that can be perceived and discussed. Emphasising "slowing down and observing closely", it encourages the public to reflect on how AI shapes human judgement, perception, and social relations. Rather than pursuing technical efficiency as its primary goal, the initiative centres on human experience and public understanding, demonstrating how universities can communicate human-centred AI values through artistic and embodied forms of engagement.

National University of Singapore (NUS) and AI Singapore's SEA-LION for Southeast Asian Language Inclusion

NUS, as the host institution of AI Singapore, has initiated SEA-LION and SEALD multilingual activities, which build open large language models and data resources for Southeast Asian languages and cultural contexts. The activity covers languages such as Indonesian, Malay, Tamil, Burmese, Filipino, Vietnamese, Thai, Lao, and Khmer, aiming to strengthen the expressive capacity of low-resource and smaller languages in the age of generative AI. This case illustrates the institution's role in cross-cultural communication, language inclusion, and the protection of regional cultural agency.

University of Costa Rica (UCR)'s AI Model for Marine Ecosystem Restoration

In 2025, UCR participated in FIFCO's "De Vuelta a Casa" activity, co-developing an AI model based on image recognition to determine whether seashells originated from the Caribbean or the Pacific coast, so that they could be returned to the correct ecosystem. The activity has supported the classification and return of large numbers of shells to the ocean, applying AI to local ecological restoration and marine protection. As a Global South case, it demonstrates the practical value of AI for sustainable development, local environmental governance, and long-term ecological responsibility.

Chapter 7

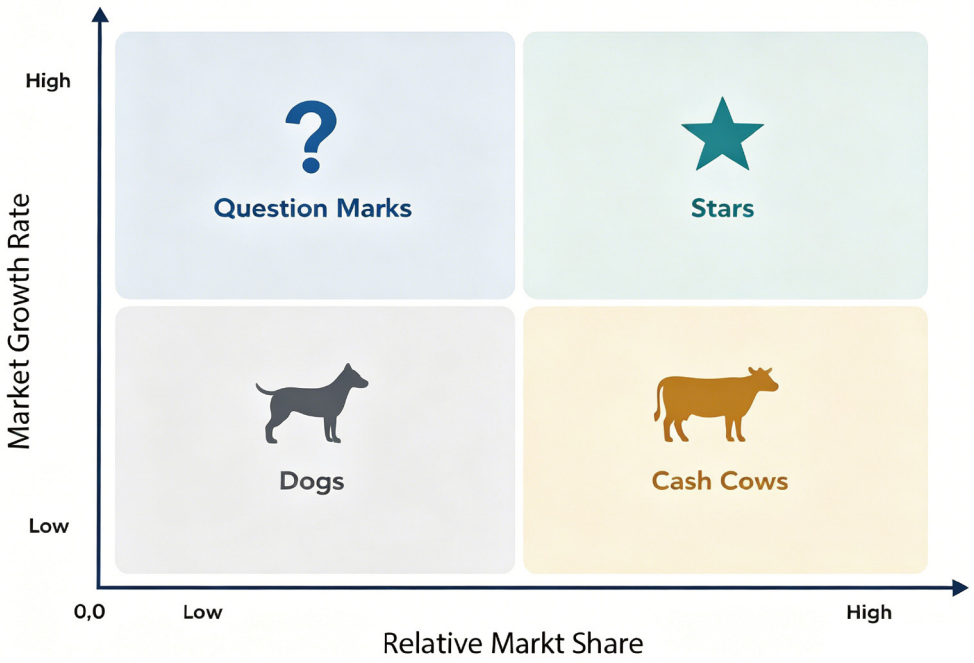
The Regional Comparison on AI in Education at University Level

7.1 Theoretical Underpinnings: Adapting the BCG Matrix for Selected Universities

For a more systematic understanding of regional differences in AI-driven transformation among global universities, this study adopts a regional comparative perspective to analyse the development pathways of universities across six world regions. Existing global university rankings primarily emphasise research performance, academic reputation, and international influence, and they often fail to capture regional differences in policy environments, resource endowments, developmental stages, and strategic priorities. A regional perspective helps move beyond the limitations of conventional evaluation frameworks. It provides a deeper understanding of how universities in different geopolitical contexts respond to AI-driven opportunities and challenges, while also revealing their developmental potential in the intelligent era.

The Boston Consulting Group (BCG) matrix, proposed by Bruce Henderson in 1970, remains one of the most influential analytical tools in strategic management (Figure 7.1a). Based on two dimensions, market growth rate and relative market share, the framework classifies organisations or business units into four categories: Stars, Question Marks, Cash Cows, and Dogs, each associated with different resource allocation and development strategies (Henderson, 1970). Owing to its clear structure, strong visualisation capability, and comparative value, the BCG matrix has been widely applied in organisational strategy analysis and performance assessment.

Figure 7.1a The Boston Consulting Group (BCG) Matrix



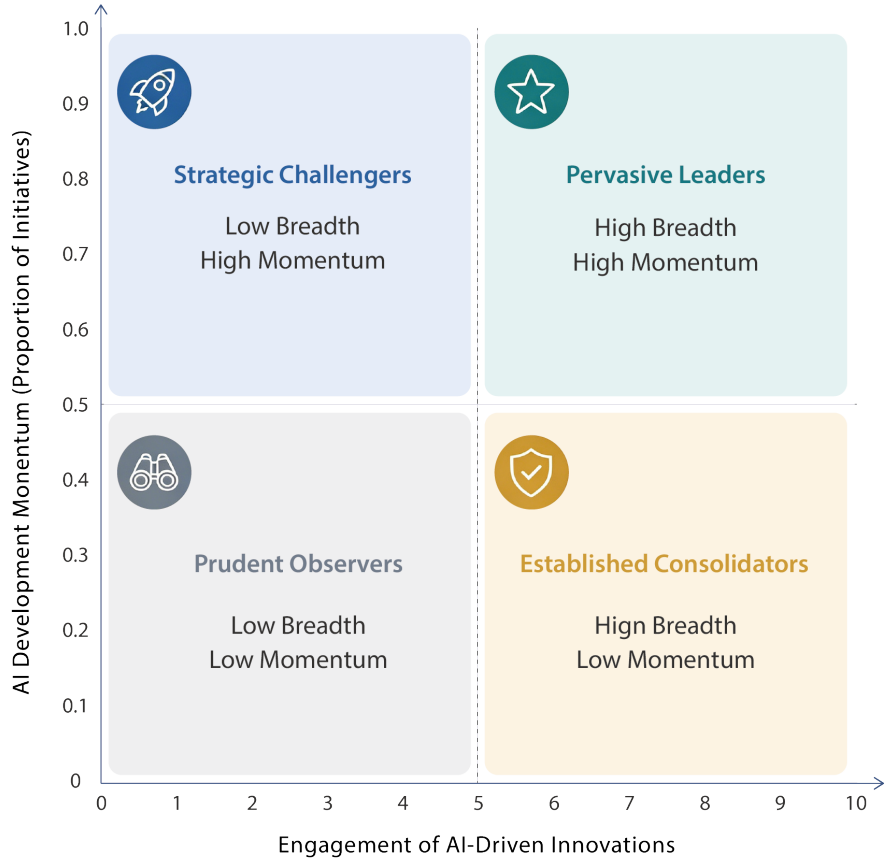
However, universities are fundamentally different from commercial enterprises, and their AI-Driven transformation trajectories cannot be adequately explained through market competition and profit-oriented growth. Therefore, this study adapts the original BCG framework while retaining its core

analytical logic in order to better capture the characteristics of AI-Driven transformation in higher education. Specifically, the traditional dimension of market growth rate is replaced by **AI Development Momentum**, which reflects the dynamism, expansion potential, and sustainability of AI-related development within universities.

It should be noted that the adapted BCG matrix is intended as a descriptive mapping tool rather than a comprehensive evaluation framework. The two dimensions primarily capture the breadth of AI-related engagement and the recent intensity of documented initiatives. As a result, the framework does not directly assess the extent to which human judgement, authorship, accountability, or epistemic agency remain anchored in institutional practices. Future research may incorporate such dimensions to provide a more comprehensive understanding of the relationship between AI adoption and human agency in higher education.

Based on this adapted framework, the study develops a strategic mapping model for AI-Driven transformation in higher education and applies it to six regions: North America, Europe, Asia, Oceania, Africa, and Latin America. By examining the distribution of universities across the two dimensions of AI Engagement Degree and AI Development Momentum, the study identifies diverse regional pathways of AI-Driven transformation and explores the underlying resource configurations, institutional environments, and strategic choices that shape these trajectories (Figure 7.1b).

Figure 7.1b AI-Driven Transformation BCG Matrix for Universities



The horizontal axis replaces relative market share with **AI Adoption Breadth**, defined as the number of analytical dimensions in which a university has documented AI-related initiatives. The vertical axis replaces market growth rate with AI Development Momentum, defined as the proportion of an institution's documented AI initiatives launched during the most recent period (2025-2026). For visualisation and comparative purposes, a breadth threshold of 5.0 and a momentum threshold of 0.5 are applied to generate a four-quadrant typology. These thresholds serve as descriptive cut-points

rather than theoretically derived or statistically optimised boundaries. Accordingly, the resulting quadrants should be interpreted as heuristic groupings along continuous distributions of AI adoption breadth and development momentum, rather than as fixed or mutually exclusive institutional categories.

Pervasive Leaders (formerly "Stars"): high breadth and high momentum. These institutions invest deeply in AI-Driven transformation across most dimensions, while continuously rolling out new initiatives to sustain their leading position.

Strategic Challengers (formerly "Question Marks"): low breadth and high momentum. These institutions build capacity rapidly in selected priority areas and may expand their breadth if focused investments succeed.

Established Consolidators (formerly "Cash Cows"): high breadth and low momentum. These AI early movers are shifting from expansion to consolidation and quality enhancement.

Prudent Observers (formerly "Dogs"): low breadth and low momentum. AI is not yet a strategic priority for these institutions, which are proceeding cautiously, often due to resource or positioning constraints.

This methodological design transforms scattered descriptive initiative data into a standardised, replicable, and comparable quadrant-based analytical tool. It enables the identification of dominant strategic orientations across regions, the quantification of the relationship between AI Engagement Degree and AI Development Momentum, and the selection of specific institutional examples representing each strategic type. The following sections present the results of this analysis and reveal distinctive regional paradigms within the global landscape of AI-driven higher education transformation.

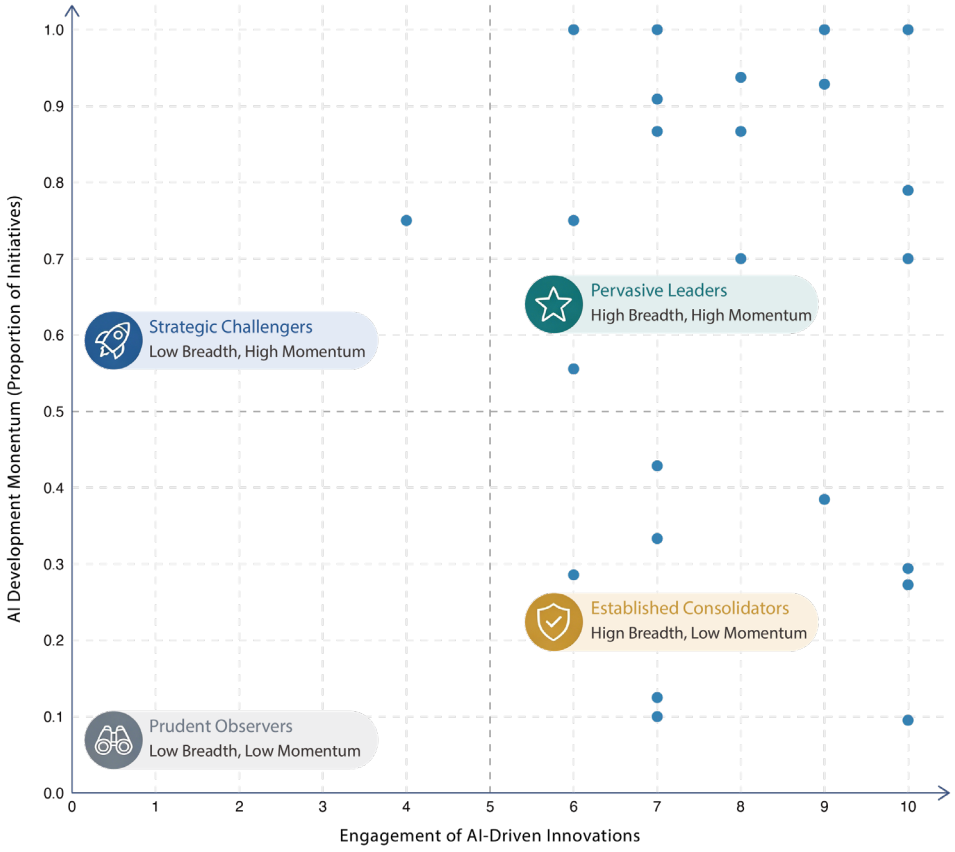
7.2 The North American Model: A Differentiation Landscape Driven by Market Competition

Based on the strategic mapping of the adapted BCG matrix, North American universities show the most pronounced scale heterogeneity and strategic differentiation. This differentiated pattern is rooted in the decentralised and highly market-oriented institutional logic of U.S. higher education. Freed from the rigid constraints of a unified administrative model, universities develop AI strategies autonomously. They draw on their comparative advantages in talent competition, resource mobilisation, academic reputation, and industry engagement. By weighing innovation gains against potential risks, they form diverse and mutually differentiated AI development pathways.

A clear pattern of asymmetric strategic anchoring is observed in North American universities. Approximately 43% of the AI-related initiatives identified in the North American sample are concentrated in three core dimensions: AI Literacy and Career Development, AI for Science and Interdisciplinary Collaboration, and Education Governance and Ethical Guidelines. The remaining approximately 57% of initiatives are distributed across the other dimensions, including digital infrastructure, organisational transformation, and community engagement. This distribution reflects a diversified pattern of AI-related activity across multiple areas of university transformation.

The BCG strategic mapping based on multidimensional quantitative data reveals a clear tiered structure and differentiated pathways in the AI development of North American universities (Figure 7.2). Institutions such as Columbia University, Johns Hopkins University (JHU), the University of Washington (UW), the University of California San Diego (UCSD), and Washington University in St. Louis (WashU) fall into the high-breadth, high-momentum category of Pervasive Leaders. These universities demonstrate a strong capacity to identify emerging opportunities and promote integrated AI innovation across disciplines and institutional functions.

Figure 7.2 AI-Driven Transformation in North American Universities



Universities Involved	
BU	UCLA
Caltech	UCSD
Columbia	UChicago
Cornell	UIUC
Duke	UMich
Harvard	UMN
JHU	UNC
MIT	Penn/UPenn
McGill	USC
NYU	UT Austin
Northwestern	U of T
Princeton	UW
Stanford	UW-Madison
UBC	Vandy
UC Berkeley	WashU
UC Davis	Yale
UCI	

For instance, UW advanced its AI STARS strategy through top-level institutional planning and dedicated computing infrastructure, connecting frontier research with student innovation and enabling AI resources to reach all levels of the university. Similarly, WashU's Transcend Initiative supports cross-school and interdisciplinary AI projects, reflecting sustained investment in AI for Science and interdisciplinary innovation. Together, strategic investment and institution-wide coordination have enabled these universities to build AI ecosystems characterised by broad participation, strong integration, and sustained innovation momentum.

By contrast, long-established world-class universities such as the Massachusetts Institute of Technology (MIT), Harvard University, Stanford University, the University of Michigan (UMich), and the University of California, Davis (UC Davis) have entered a high-breadth, low-momentum stage of Established Consolidators, benefiting from earlier investments in AI infrastructure and governance frameworks. Their strategic logic has moved beyond extensive expansion and experimental innovation toward paradigm refinement and institutionalised governance. This trend is particularly evident in North America's strong concentration of resources in Education Governance and Ethical Guidelines.

While maintaining openness in research and innovation, MIT has strengthened AI governance through collaboration between the Schwarzman College of Computing and the MIT Sloan School of Management, integrating technological innovation with ethical, organisational, and policy considerations. Stanford University relies on high-level advisory and professional structures to address academic integrity, data privacy, procurement review, algorithmic transparency, and bias mitigation. UMich has also strengthened campus AI policies, requiring application materials to reflect applicants' own abilities and adopting a cautious stance toward inappropriate uses of generative AI. Overall, these established institutions are building comprehensive governance frameworks

that support the responsible, trustworthy, and sustainable use of AI in education and research.

Within this differentiated landscape, the California Institute of Technology (Caltech) represents a rare low-breadth, high-momentum case of a Strategic Challenger. Rather than pursuing broad institutional expansion across all AI domains, Caltech concentrates on deep exploration in foundational scientific fields, generating strong research momentum. Its focus on AI for Science reflects intensive investment in scientific intelligence as a core pathway for institutional AI development. Through close engagement with advanced AI research ecosystems and leading technology companies such as Google DeepMind, Caltech pursues focused breakthroughs in specialised scientific domains and generates high-impact innovation. This case shows that concentrated technological advancement in specific fields can compensate for limited overall breadth and be transformed into stable and powerful research momentum.

The durable competitive advantage of North American universities' AI innovation systems lies in highly responsive market mechanisms and mature university-industry-research incubation ecosystems. In governance and executive education, Penn's Wharton School and Northwestern's Kellogg School of Management have launched advanced executive programmes on responsible AI strategy. These programmes respond directly to global managers' needs in AI risk management, compliance system building, and intelligent governance implementation, translating frontier academic knowledge into standardised and actionable corporate governance tools. In deep-tech commercialisation, UChicago has worked with the Silicon Valley accelerator Alchemist to develop Alchemist Chicago, using the Polsky Center for Entrepreneurship and Innovation to connect AI computing resources with venture building. This helps move frontier laboratory technologies toward market adaptation and real-world deployment, creating a complete innovation loop from basic research to industrial translation.

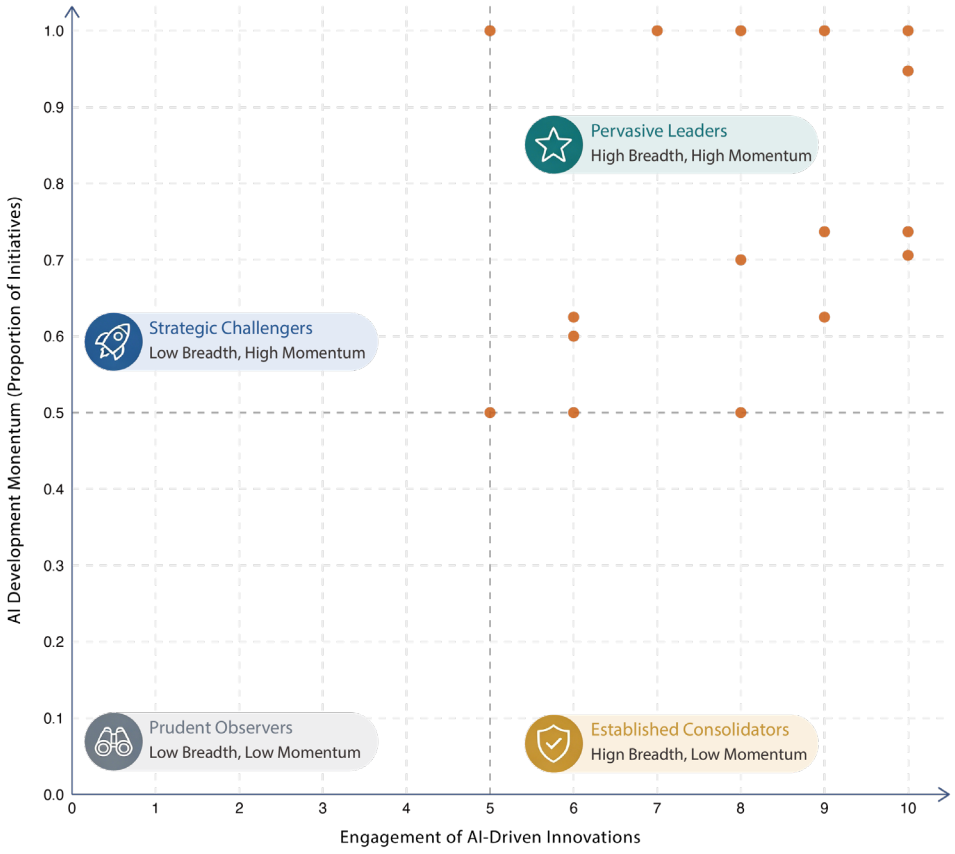
In summary, AI development in North American universities is not merely a matter of technological iteration or research competition. It represents a systematic paradigm of organisational transformation centred on market logic, supported by differentiated strategic positioning, and aligned with competition in the global knowledge economy. This innovative system, characterised by tiered differentiation, focused positioning, market empowerment, and institutional safeguards, has created a core competitive advantage that is difficult to replicate. It provides North American universities with strong institutional mechanisms and ecosystem support for maintaining long-term leadership in global AI innovation.

7.3 The European Model: Overall Convergence Driven by Policy

Compared with the market-driven and differentiated AI development landscape in North America, European universities exhibit a markedly different structural pattern in global AI innovation. This difference is rooted in the institutional logic of European higher education, where policy steering, administrative coordination, and public value commitments shape institutional development. Rather than following a disorderly expansion model driven by commercial trends, European universities operate within top-level regulatory frameworks such as the EU AI Act, while UK universities are guided by frameworks such as the Russell Group principles. Their strategic choices are shaped by three core objectives: technological sovereignty, compliance and safety, and inclusive education. Top-down policy constraints help prevent purely commercial forms of competition and have fostered a distinctive European pathway characterised by a regulation-first approach, multi-centre collaboration, and policy-driven convergence.

In resource allocation, European universities show a centripetal and structured focus. Strategic investment is strongly policy-oriented and closely tied to public-service objectives. Among European AI initiatives, the top resource dimensions are AI Literacy and Career Development (16.96%), AI for Science and Interdisciplinary Collaboration (13.15%), and, tied in third place, Reshaping Pedagogy and Curriculum Restructuring and Fund Mobilisation and Enterprise Incubation (11.76% each). Together, these four dimensions absorb 41.87% of total strategic resources. Many initiatives are organised through interdisciplinary master's programmes and doctoral training centres (CDTs), directly serving the EU's goals of digital sovereignty and global talent competition. The remaining 58.13% of resources are distributed more evenly across peripheral areas such as infrastructure renewal and transnational consortium-based collaboration. Teaching reform and funding are strongly supported by EU and national programmes, while computing infrastructure relies on inter-university sharing and interconnected supercomputing systems, forming a sharp contrast with the market-driven and uneven North American model.

Figure 7.3 AI-Driven Transformation in European Universities



Universities Involved	
Cambridge	EPFL
PSL	KCL
UCL	UPSaclay
ICL	Heidelberg U
ETH	UvA
UoE	UoB
UoM	LMU
UCPH	TUM
KU Leuven	Sorbonne
Oxford	UZH
TUM	

AI development in European universities follows a highly coordinated and convergent trajectory, with weaker tiered differentiation than in North America. Institutions such as Cambridge, ETH Zurich, ICL, Edinburgh, KCL, TUM, and Paris-Saclay belong to the high-breadth, high-momentum category of Pervasive Leaders (Figure 7.3). They combine strong policy responsiveness with cross-domain innovation capacity, advancing integrated AI innovation across disciplines and institutional functions.

For instance, through its strategic partnership with OpenAI, Cambridge has piloted the ChatGPT Edu product to support university-wide intelligent teaching reform. ETH Zurich leverages the Innovedum Fund to foster the deep integration of technologically autonomous AI systems and personalised intelligent education, providing substantial support for AI-enabled educational innovation. Meanwhile, its independent AI Center reinforces institutional autonomy in AI research and technological development. Paris-Saclay has built the large-scale DataIA Cluster under the France 2030 national investment plan, linking AI research and talent development across laboratories, institutions, and international training platforms such as the Franco-German AI Summer School. This dual model of national-level investment and multi-centre transnational collaboration supports a dynamic and rapidly evolving AI innovation ecosystem among leading European universities.

UCL and UvA have entered the stage of Established Consolidators, supported by earlier development of infrastructure and institutional governance. Their strategic focus has shifted from broad expansion and experimental innovation toward paradigm refinement, compliance governance, and system optimisation. They now emphasise the detailed improvement of AI policy systems and the long-term implementation of risk governance. While maintaining open research cultures, UvA has advanced a systematic AI vision and collaborated with multiple institutions in cultural and human-centred AI initiatives such as the Cultural AI Lab and related ELSA labs. UCL adopts a differentiated governance approach for students and staff: it allows transparent student use of AI under appropriate conditions while providing stricter guidance for instructors, especially by advising against the use of unauthorised AI detection tools for grading, thereby safeguarding assessment fairness. This creates a dynamic balance between AI-enabled learning and educational equity.

The durable competitiveness of European AI innovation lies in regional consortium networks and institutionalised university-industry-research incubation ecosystems, creating an advantage distinct from North America's market-based incubation model. In governance and talent transformation, German-speaking world-class universities such as TUM and Heidelberg offer compliance-oriented training in responsible leadership in the age of disruptive technologies, with course credits recognised under the European Credit Transfer and Accumulation System (ECTS). These programmes address the needs of managers working under the EU AI Act, including AI risk management, compliance frameworks, and intelligent governance implementation. In technology commercialisation, TUM operates TUM Venture Labs and strengthens hardware innovation through collaboration with TSMC, including regular advanced training in AI chip design.

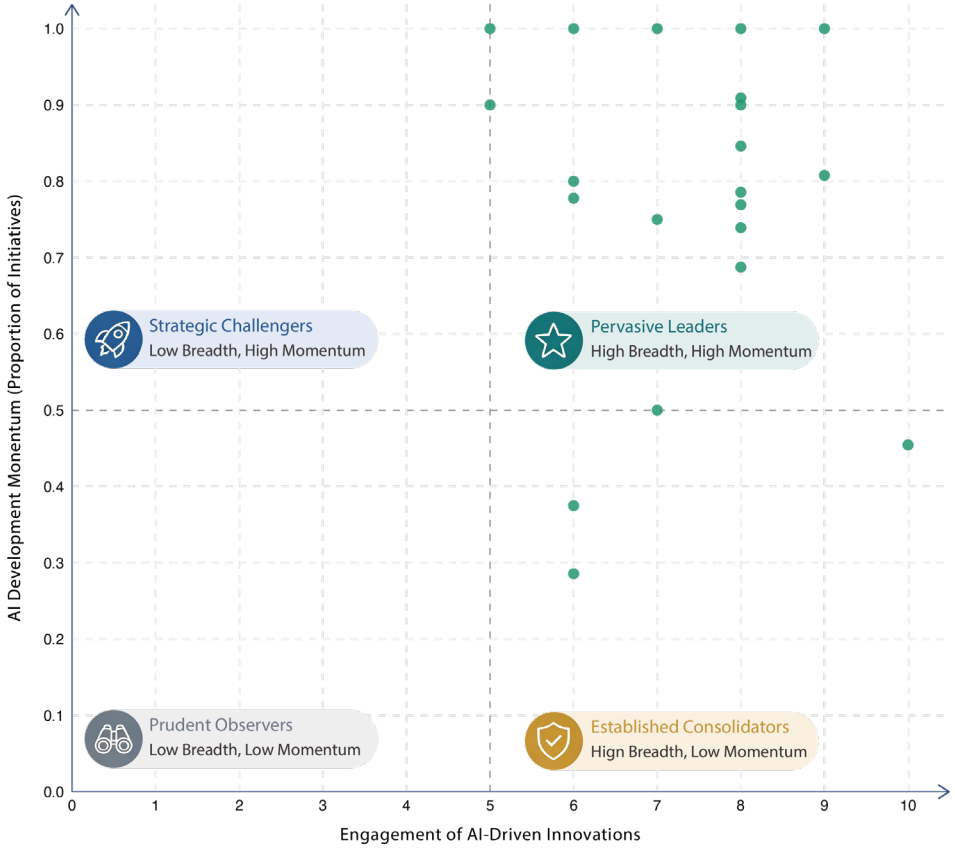
In summary, AI development in European universities is not a North American-style technological race or commercial venture driven by market profit. It is an institutionalised transformation paradigm grounded in regulatory compliance, centred on technological sovereignty, and oriented toward public value. Drawing on multi-level public administration networks and transnational consortium mechanisms, European universities achieve coordinated convergence while preserving institutional strengths. They have built an innovation system that balances efficiency, ethical safety, educational equity, and technological autonomy. This distinctive paradigm provides European universities with a durable institutional competitive advantage and gives them differentiated, sustainable leadership in global AI innovation, making them an important counterweight to disorderly commercialisation in the global AI landscape.

7.4 The Asian Model: A Catch-up Structure Driven by National Strategy

Asian universities display a distinctive pattern of systematic catch-up in the global AI innovation landscape, fundamentally different from North America's market competition and Europe's regulatory convergence. This pattern is rooted in the institutional logic of Asian higher education, which is closely tied to national strategies and industrial upgrading. Universities do not only perform basic academic research; they also serve as strategic institutional platforms for breakthroughs in key technologies, industrial transformation, and large-scale training of advanced technical talent. Many universities in ASEAN and South Asian developing countries face both high-skilled talent shortages and international industrial relocation. They therefore need accelerated and non-linear leapfrog development pathways to break the rigidity of global academic hierarchies. Unlike the more organic evolution seen in Europe and North America, Asian universities rely on strong administrative capacity, university-industry communities, and state-led resource allocation to form AI development pathways driven by national strategy.

Asian universities are characterised by institutional restructuring and the rapid deployment of AI across diverse application domains. Strategic resources are highly focused on foundational technical infrastructure and large-scale talent development. The three largest resource dimensions are AI Literacy and Career Development (15.24%), Organisation Transformation and Resource Integration (14.94%), and AI for Science and Interdisciplinary Collaboration (13.41%), together absorbing 43.59% of total strategic resources. This structure highlights the core of the Asian model: using administrative instruments such as newly established schools and reorganised disciplinary structures to break traditional disciplinary barriers quickly, while building large-scale talent pipelines aligned with Industry 4.0 needs. This is especially relevant for developing countries seeking to close technological gaps and seize development opportunities.

Figure 7.4 AI-Driven Transformation in Asian Universities



Universities Involved	
THU	Kyoto U
PKU	CityU
NUS	CU
UTokyo	CMU
SJTU	UI
ZJU	UM
FDU	UP
NTU	VNU-Hanoi
HKU	UTM
SNU	MU
USTC	IGNOU

By contrast, Fund Mobilisation and Enterprise Incubation (6.10%) and Cultural Inheritance and Sustainable Development (3.66%) receive smaller shares, suggesting that Asian universities currently prioritise foundational technology restructuring and frontier scientific research over long-term soft-empowerment domains.

Within the BCG matrix, Asian universities show a clear tiered pattern of AI development. Institutions such as THU, PKU, SJTU, ZJU, Fudan, USTC, HKU, SNU, and VNU-Hanoi fall into the high-breadth, high-momentum category of Pervasive Leaders. Their breadth and momentum indicators are both high (Figure 7.4). In 2026, the Shanghai Artificial Intelligence Laboratory and USTC signed a strategic cooperation agreement to advance AGI for Science. The partnership focuses on collaborative research, talent development, and platform co-construction, aiming to foster an AGI-driven ecosystem for scientific discovery and support China's national AI for Science strategy. SJTU has worked with Huawei to build the Zhiyuan-1 intelligent computing platform, providing 633 petaflops (PFlops) of peak computing power.

Mature institutions such as NUS, NTU Singapore, UTokyo, KyotoU, and CityUHK have entered a high-breadth, low-momentum stage of Established Consolidators, supported by early AI infrastructure and internationalised governance systems. Their strategic focus has shifted from extensive expansion toward refined governance and institutional quality improvement.

UTokyo has implemented the BOOST NAIS programme for advanced doctoral talent development and works with government to provide research and policy advice on AI governance. CityUHK became one of the first Hong Kong universities to adopt the DeepSeek model and offers an MSc in Business AI to address industry talent needs. NUS and NTU Singapore have established formal AI use frameworks that clarify faculty responsibilities in academic decision-making and rules on students' disclosure of AI use, creating a dynamic balance between enabling innovation and compliance governance.

The most distinctive feature of Asian universities is the targeted breakthroughs and structural leapfrogging of regional core institutions in developing countries. Under resource constraints, benchmark institutions such as Chula, Chiang Mai, UI, UTM, UMalaya, and IGNOU rely on policy support and global ecosystem linkages to achieve focused breakthroughs in selected domains. In technical infrastructure, UMalaya and UTM have received government funding to support the establishment of national AI institutes. In inclusive education, IGNOU works with international partners such as GIZ, Cisco, and IBM to build AI micro-credential systems and competition platforms, using AI-enabled translation to reduce learning barriers and extend AI skills to grassroots workers.

In summary, AI development in Asian universities is not merely technological iteration or research competition. It is a systematic paradigm of organisational transformation centred on national missions, driven by institutional restructuring, and adapted to global technological competition. Unlike the more organic evolution of European and North American universities, AI development in Asia, especially in developing-country universities, is both a defensive strategy to close technological gaps and reduce dependence in global knowledge systems, and an offensive strategy to capture future industrial opportunities and reshape regional influence in innovation. This catch-up innovation system, characterised by tiered differentiation, focused breakthroughs, university-industry collaboration, and institutional redesign, creates a distinctive competitive advantage for Asian universities and gives them a differentiated latecomer advantage in the global AI innovation landscape.

7.5 The Oceanian Model: Comprehensive Leadership of an Elite Cluster

Compared with North America's market-based differentiation, Europe's regulatory convergence, and Asia's state-led catch-up model, Oceanian universities, centred on Australia, show a distinctive pattern of elite concentration, comprehensive leadership, and balanced empowerment in the global AI innovation landscape. This pattern is rooted in the highly-concentrated institutional structure of higher education in Oceania, where the innovation ecosystem relies strongly on the Group of Eight (Go8).

Regional universities are not driven by the policy-led convergence seen in Europe. Instead, they operate through national regulatory and funding platforms such as the Australian Research Council (ARC) and the eSafety Commissioner, strategically aligning their efforts with two core objectives: strengthening university-industry-research collaboration and fulfilling regional social responsibilities. Through a highly cohesive alliance-based mechanism, Oceanian universities avoid resource dispersion and strategic friction. Supported by integrated federal funding, public research services, and elite disciplinary clusters, they have formed an AI development paradigm characterised by elite integration, high momentum across domains, and deep embedding of social value.

Oceanian universities show that their strategic resources combine frontier research, talent competition, and social governance. Quantitative data show that the three largest resource dimensions are AI for Science and Interdisciplinary Collaboration (15.49%), AI Literacy and Career Development (14.08%), and Fund Mobilisation and Enterprise Incubation (12.68%), together absorbing 42.25% of total strategic resources. These investments serve frontier research breakthroughs and international competition for high-end talent, reflecting a strong capacity for resource conversion and capital mobilisation.

Figure 7.5 AI-Driven Transformation in Oceanian Universities

Universities Involved	
UniMelb	Monash
UNSW	UQ
USYD	ANU

Unlike other regions, Oceanian universities also invest heavily in soft governance and value-oriented empowerment: Education Governance and Ethical Guidelines account for 11.27%, while Cultural Inheritance and Sustainable Development account for 9.86%. The remaining 57.75% of resources are distributed across areas such as shared computing infrastructure and adaptive pedagogical innovation. Computing infrastructure is supported by the National Computational Infrastructure's Gadi supercomputer, the Pawsey Supercomputing Research Centre, and university research computing services, forming an intensive, high-capacity, and regionally accessible public research support system.

Tier differentiation in Oceanian AI development is weak. The region as a whole shows broad leadership and high momentum, with most leading institutions entering the high-breadth, high-momentum Pervasive Leaders quadrant (Figure 7.5). Sydney and Monash are typical examples. Sydney has built a dual-track AI assessment framework that distinguishes between supervised secure assessment and open but regulated AI use, reshaping curriculum and assessment mechanisms to respond institutionally to the challenges posed by generative AI. This creates a balance between AI-enabled learning and assessment fairness. Monash has focused on its advanced AI computing cluster and the Monash Advanced visualisation and AI Research Infrastructure Capability (MAVERIC), deploying cutting-edge NVIDIA architecture to support frontier research such as multimodal generative models of the brain. At the same time, Monash emphasises renewable energy for MAVERIC operations, linking technical innovation with green and low-carbon development.

The lasting competitiveness of Oceanian AI innovation stems from an ecosystem of alliance-based coordination, multi-stakeholder collaboration, and inclusive, public-oriented science and education incubation. UNSW Sydney, UQ, and ANU form an effective innovation matrix that continues to strengthen the region's core AI competitiveness. In 2025, UQ and Cisco established a three-year strategic partnership and created the UQ-Cisco Chair in Network Security. The collaboration focuses on AI-driven cybersecurity research, particularly the use of advanced AI models for real-time detection and response to cyberattacks. This helps translate university research into national digital infrastructure and industrial application.

At the same time, Oceanian universities strongly uphold the principles of technology for good and regional public value, embedding cultural sovereignty and social inclusion throughout the AI innovation process. ANU follows indigenous data sovereignty principles in shaping appropriate approaches to the use of sensitive indigenous data in AI contexts and actively participates in global academic review and governance efforts, contributing Australian perspectives to global AI governance. Sydney works with indigenous elders and local governments to support digital protection of cultural resources and institutional recognition of cultural sovereignty, using AI and digital technologies to advance public benefit and social empowerment.

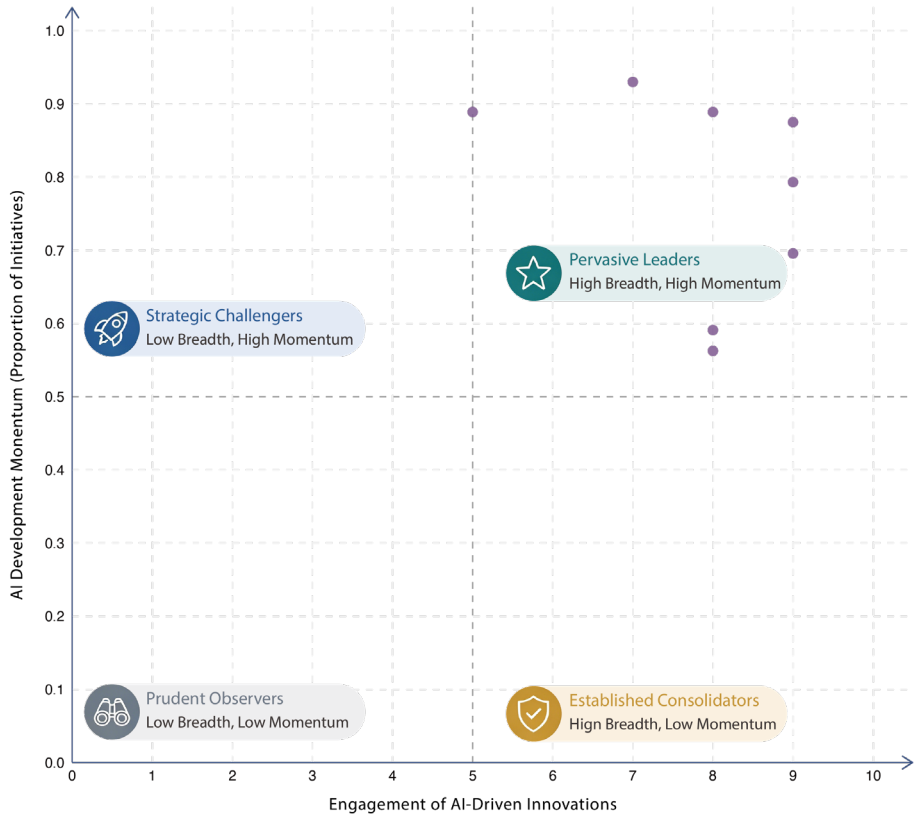
In summary, AI development in Oceanian universities is not a North American-style market-driven technological race or commercial venture. It is an integrated paradigm of organisational transformation built on elite alliances, supported by efficient capital mobilisation, and grounded in ethical safeguards and cultural sovereignty. Drawing on the innovation advantages of the Go8 cluster and integrated federal funding mechanisms, Oceanian universities have achieved broad coverage, balanced development, and sustained innovation momentum. They have built a comprehensive innovation ecosystem that combines innovation efficiency, computing support, ethical regulation, educational equity, and cultural inheritance. This distinctive paradigm creates a stable and unique global competitive advantage for Oceanian universities and gives them balanced and sustainable institutional leadership in the global AI innovation landscape.

7.6 The Latin American Model: Open Innovation Ecosystem and Transnational Collaboration

Latin American universities show a distinctive pattern of open collaboration and infrastructure-driven breakthroughs. This pattern is rooted in the institutional foundations of Latin American higher education: regional universities rely on national support and use digital transformation as a pathway to technological autonomy. Unlike capital-led expansion models, Latin American universities operate within research regulation and funding frameworks shaped by agencies such as Brazil's National Council for Scientific and Technological Development (CNPq) and the São Paulo Research Foundation (FAPESP). Their strategic goals include strengthening technological sovereignty, building sovereign and self-reliant foundational infrastructure, and empowering disadvantaged groups. The combination of top-down policy guidance and bottom-up social development needs has encouraged universities to build transnational university-industry consortia, regional HEI alliances, and cross-border science and innovation platforms. This has produced an AI development pathway characterised by public-private co-construction, multi-centre collaboration, and public value.

In resource allocation, Latin American universities follow a core logic in which infrastructure development drives research innovation and disciplinary upgrading. Strategic resources are strongly focused on frontier research and institutional restructuring. The top three resource dimensions are AI for Science and Interdisciplinary Collaboration (17.61%), Organisation Transformation and Resource Integration (14.79%), and Intelligent Infrastructure and AI Development (12.68%), together absorbing 45.08% of total strategic resources. This allocation is highly targeted. To narrow gaps with developed countries in foundational computing capacity and core technologies, and to move beyond technological dependency, Latin American universities concentrate nearly half of their core resources on interdisciplinary research platforms, transnational technology integration, and local computing infrastructure. These high-intensity and targeted infrastructure investments strengthen the foundations for autonomous regional AI innovation.

Figure 7.6 AI-Driven Transformation in Latin American Universities



Universities Involved	
UNAM	UFRJ
ITESM	USP
UCR	PUCP
UNICAMP	UCH

The BCG-based strategic analysis shows that Latin American AI development is characterised by concentration at the top and leadership by core institutions. Tier differentiation is relatively weak, while high-quality resources are concentrated in a small number of leading institutions (Figure 7.6). Institutions such as USP, UNICAMP, UFRJ, and ITESM all belong to the high-breadth, high-momentum category of Pervasive Leaders. They are the main forces driving AI iteration and ecosystem expansion in Latin America. USP has built one of the region's leading AI supercomputing clusters and developed its own legal large language model to support intelligent local governance. UNICAMP, through its leading Recod.ai research team, has developed infrastructure-oriented projects that improve teaching and administrative efficiency, while also establishing Brazil's first undergraduate programme in Artificial Intelligence and Data Science, strengthening regional talent development. As a leading private university in Latin America, ITESM has launched the TECgpt generative AI platform and worked with UNESCO to support a regional AI observatory, while exporting digital faculty development systems to countries such as Chile and El Salvador.

Open external collaboration and the use of global resources for catch-up are core strengths of Latin America's AI innovation system. Regional universities generally embrace openness and inclusion and are deeply embedded in global science and technology ecosystems. UNAM, UFRJ, and PUCP participate in Huawei's Seeds for the Future programme, leveraging access to frontier technologies and innovation resources. UFRJ has further deepened multilateral cross-border cooperation by signing a four-party strategic cooperation agreement with Petrobras, CNOOC, and China University of Petroleum (Beijing), focusing on joint research in frontier technologies and the translation of transnational research outcomes. UCR has also built the HPC@UCR supercomputing cluster to accelerate research in AI, meteorology, and bioinformatics, emerging as a landmark initiative in green AI innovation across the Global South.

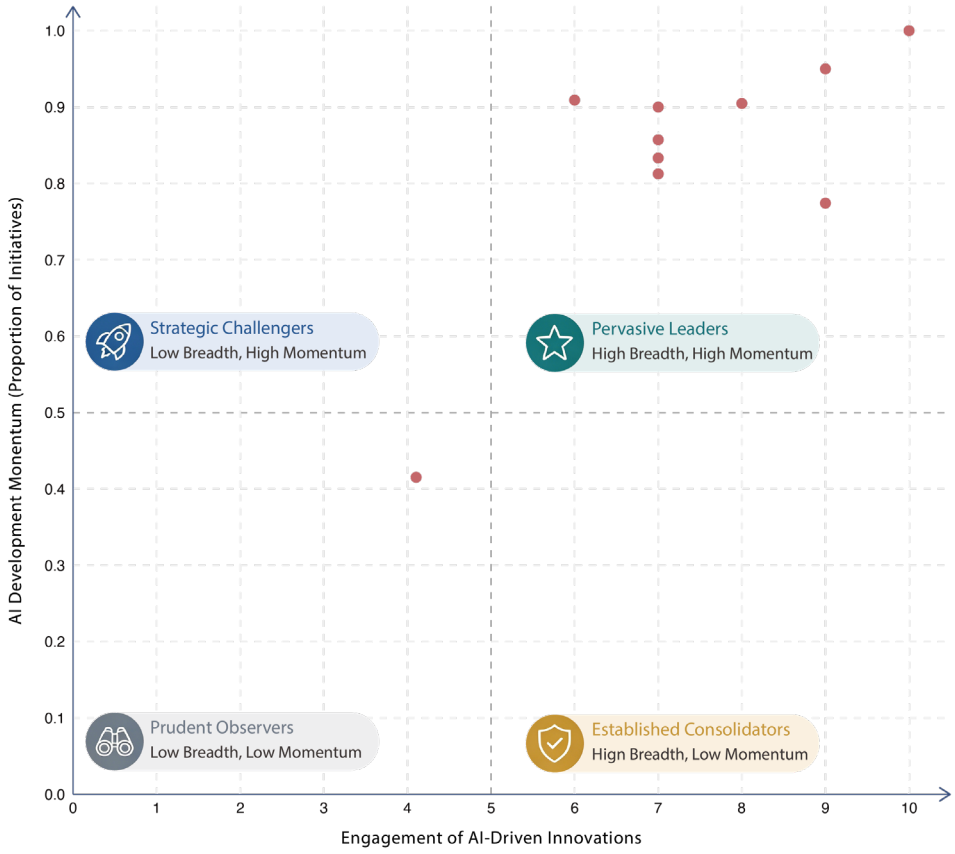
In summary, AI development in Latin American universities is not merely technological iteration or research competition. It is a systematic institutional transformation paradigm centred on technological autonomy, implemented through transnational collaboration, and grounded in social inclusion and fairness. Regional universities build on their public research missions, rely on multilateral international collaboration networks, and focus on foundational infrastructure and disciplinary restructuring. They have constructed an AI innovation system suited to regional development and attentive to both innovation efficiency and public value. This differentiated open catch-up model creates a distinctive competitive advantage for Latin American universities and provides institutional support for Global South universities seeking to consolidate regional innovation, secure greater autonomy in global knowledge production, and achieve sustainable technological autonomy.

7.7 The African Model: Resilient Innovation and Strategic Adaptation

Compared with North America's market-driven differentiation, Europe's policy-led convergence, Asia's state-led catch-up, and Oceania's elite balanced development, African universities show a distinctive pattern of resilience-driven innovation, strategic adaptation, and differentiated breakthrough in the global AI landscape. This paradigm is rooted in the specific development context of African higher education, which has long faced three structural tensions: weak digital infrastructure, pressure on public services, and limited voice in global technological discourse. African universities treat AI as a key tool for addressing practical bottlenecks such as resource scarcity, educational inequality, and limited healthcare coverage. Unlike the linear model of technology accumulation and deployment in developed regions, African AI innovation follows a logic of demand-driven development, strategic adaptation, and resilient leapfrogging. Low-cost and context-appropriate intelligent applications help compensate for gaps in traditional infrastructure, enabling improvements in both public-service capacity and research innovation within the Global South.

In resource allocation, African universities have developed a distinctive dual-core structure driven by scientific research and governance empowerment. The four largest strategic resource dimensions are AI for Science and Interdisciplinary Collaboration (17.50%), Digital Leadership and Faculty Transformation (14.37%), Education Governance and Ethical Guidelines (11.88%), and AI Literacy and Career Development (11.88%). Together, these areas absorb 55.63% of total strategic resources, a concentration significantly higher than in other regions. This allocation logic reflects the practical orientation of African AI development. Interdisciplinary collaboration integrates dispersed research capacity and compensates for weaknesses in isolated research units; faculty digital transformation strengthens the foundation for talent development; and systematic ethical governance builds risk safeguards. Under conditions of resource constraint, these elements together strengthen the resilience of digital transformation ecosystems in African higher education.

Figure 7.7 AI-Driven Transformation in African Universities



Universities Involved	
CU	UNILAG
UCT	Wits
UP	SU
UNISA	ASU
UoN	AlexU

The BCG-based strategic analysis shows that African universities as a whole display high momentum and focused breakthrough (Figure 7.7). Drawing on distinct regional advantages, they have formed a tiered pattern across three regional blocs: North Africa, Southern Africa, and East and West Africa. Together, these pathways represent a distinctive catch-up model adapted to regional development conditions.

North Africa shows a development pattern led by national policy and closely tied to state strategy, with Cairo as a representative example. Regional universities rely on national administrative empowerment and incorporate AI development into top-level national strategy. Guided by Egypt's AI strategy, Cairo has expanded its Faculty of Computers and Artificial Intelligence, restructured relevant disciplines, and built high-level think-tank capacity. This supports the connection between academic research and public governance, enabling the translation of research outputs into national intelligent governance policy. As a result, Cairo has become a core hub for AI innovation and decision support in North Africa.

Southern Africa has developed a governance-first and research-deepening paradigm, led by a cluster including Stellenbosch, UCT, and UP, Pretoria. Universities in this region prioritise formal institutional frameworks and use ethical governance to support high-quality research development. Stellenbosch has established an African Policy Innovation Lab, using AI-enabled quantitative methods to study poverty governance and public policy optimisation. UCT has issued AI guidance grounded in principles such as fairness and trust, developing an ethics framework suited to African contexts and setting a regional benchmark for standardised AI governance. UP, Pretoria, through AfriDSAI, focuses on local-language natural language processing and Africa-centred AI frameworks, addressing shortages of African-language data and linking academic depth with social inclusion.

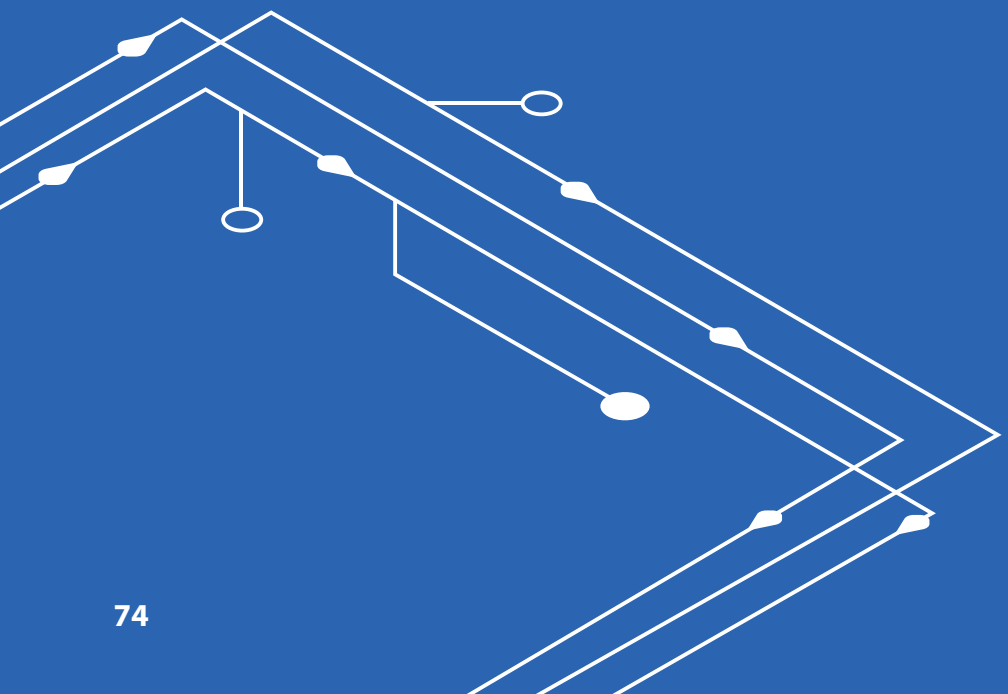
East and West Africa focus on innovation pathways centred on industry linkage and incubation-based breakthrough, with UoN and UNILAG as representative examples. Universities in these regions are building closed-loop ecosystems that connect academic R&D, start-up incubation, and industrial deployment, strengthening technology implementation and market-oriented empowerment. UoN has attracted strategic engagement from leading technology companies such as Google and Huawei, focusing on demand-driven areas including smart healthcare, smart cities, and intelligent agriculture, and building a regional AI industry ecosystem. UNILAG, with support from the United Nations Development Programme (UNDP), has developed the AI UniPod innovation hub, helping universities shift from traditional academic research platforms toward core regional platforms for AI entrepreneurship, technology transfer, and industrial empowerment.

Under resource constraints, highly open, collaborative, and adaptive mechanisms constitute a distinctive strength of African AI innovation. Rather than relying primarily on proprietary technologies and large-scale institutional resources, many African universities emphasise public benefit, knowledge sharing, and collaborative co-construction. Through open-source collaboration and transnational partnerships, they seek to overcome structural constraints and accelerate local innovation capacity. The University of the Witwatersrand (Wits) has strengthened connections with leading international research institutions through cross-continental research networks and collaborative AI initiatives, helping to reduce research costs, expand access to expertise, and narrow technological gaps. This approach has created a distinctive innovation model based on cooperation, shared resources, and mutual support across the Global South.

In summary, AI development in African universities is not a passive imitation of developed-country technology pathways or a form of blind catch-up. It is a resilient leapfrog development paradigm grounded in compliance governance, enabled by cross-domain integration, centred on urgent social needs, and characterised by strategic adaptation. Under conditions of relative resource scarcity, African universities rely on national strategic coordination, international consortium collaboration, and public-

interest technology empowerment to build highly adaptive, resilient, and implementation-oriented innovation systems. This distinctive paradigm creates a differentiated competitive advantage for African universities, positioning them as core hubs for addressing technological needs across the Global South and providing valuable African examples for inclusive AI governance and intelligent upgrading of public services worldwide.

Conclusion and Insights



Findings

While scholars and institutions continue to debate the long-term implications of AI for higher education, current evidence suggests that AI-driven transformation is increasingly unfolding across three interconnected areas. The first concerns learning and education, reflected in what this study refers to as a New Pact for Learning and Education, characterised by new forms of interaction and shared responsibility among learners, educators, and intelligent systems. The second relates to human-AI collaborative research and knowledge co-creation, where AI increasingly serves as a partner in scientific discovery and knowledge production. The third involves intelligent society development and cultural inheritance, through which universities extend their societal role in areas such as responsible AI governance, digital inclusion, community empowerment, and cultural sustainability.

On this basis, it establishes a ten-dimensional analytical framework for AI-driven transformation in higher education, namely: Digital Leadership and Faculty Transformation; Digital and Intelligent Infrastructure and AI Programmes; AI Literacy and Career Development; Reshaping Pedagogy and Curriculum Restructuring; AI for Science and Interdisciplinary Collaboration; Organisation Transformation and Resource Integration; Education Governance and Ethical Guidelines; Social Partnerships and Community Empowerment; Fund Mobilisation and Enterprise Incubation; and Cultural Inheritance and Sustainable Development.

Drawing on this framework, the present study adopts mixed quantitative and qualitative methods to select a sample of 100 top universities worldwide and collate more than 1,400 AI-related educational transformation initiatives from 2020 to 2026. The sampled institutions are located in 30 countries across six continents, including 73 top-tier universities from developed economies (ranked among the world's top 100) and 27 typical universities from developing countries (ranked within the world's top 1,000). These initiatives demonstrate that the global AI transformation among top universities in higher education has evolved from early fragmented pilots and superficial adoption of AI tools into an institutionalised, systematic and comprehensive reform.

The first concerns learning and education. In this report, the term "New Pact for Learning and Education" is used to describe the emerging reconfiguration of relationships among learners, educators, knowledge, and intelligent systems. Rather than replacing traditional educational goals, it reflects new forms of interaction, collaboration, and shared responsibility enabled by AI technologies. They are building collaborative educational communities, consisting of administrators, researchers, faculty and administrative staff, to promote AI adoption in terms of governance, infrastructure, talent cultivation and instruction. Typical practices include appointing university-level AI leadership roles, releasing institutional AI development strategies, building campus-wide inclusive AI sharing platforms, establishing integrated AI academic programmes for undergraduates, postgraduates and doctoral students, organising professional training to improve faculty's AI teaching competencies, normalising the application of intelligent teaching assistants, and optimising academic evaluation systems.

In terms of human-AI collaborative research and knowledge creation, various top universities are encouraging researchers to conduct scientific exploration on intelligent systems. Through joint efforts of research communities, organisational restructuring and governance improvement, they strive to realise theAI-driven paradigm of scientific research. Typical examples include setting up institutional AI research hubs, building campus-wide resource sharing platforms, developing AI tools and large language models tailored for research lifecycle, launching interdisciplinary AI projects, establishing AI ethics review committees, formulating codes of practice for AI use in research, and improving management systems for data privacy and intellectual property rights.

When it comes to community engagement and cultural inheritance for an intelligent society, several

top universities rely on AI and other intelligent technologies to deliver inclusive public services, facilitate cultural dissemination and innovation, and balance between the instrumental use of technology and the preservation of cultural subjectivity, to ensure sustainable social development. Major practices include carrying out public welfare programmes in partnership with social organisations, developing low-cost inclusive AI tools to support disadvantaged groups and remote communities, launching AI literacy outreach programmes for primary and secondary schools, using AI to preserve minority languages and revitalise intangible cultural heritage, conducting research on green AI, building joint laboratories with enterprises to secure special funding, and cooperating with philanthropic foundations to obtain grants for inclusive education.

Based on the analysis of AI-driven innovations of 100 global top universities, this study identifies and summarises the following ten major trends observed.

1. AI infrastructure is shifting from hardware- and computing-power-centred competition towards service-oriented digital and intelligent foundations. With greater emphasis on computing performance, security, compliance and inclusive sharing, AI infrastructure has become a core pillar of institutional digital transformation.

2. AI-enabled social service is becoming an important pathway for universities to fulfil their public missions. The universities are developing diversified service systems covering K-12 science outreach, livelihood support, industrial empowerment and transnational public welfare collaboration.

3. AI for Science is evolving from an auxiliary research tool into a core driver of scientific discovery. It is fostering a new research ecosystem characterised by agent-based autonomous research, interdisciplinary collaboration and deeper industry-university-research integration.

4. Teaching and learning are being comprehensively reshaped by AI. The universities are moving beyond the superficial adoption of standalone AI tools towards integrated general and discipline-specific AI education, human-AI collaborative teaching, AI-enabled faculty development and AI-supported multidimensional assessment.

5. Educational resources are becoming more dynamic, adaptive and shareable. Digital textbooks, virtual simulation experiments, academic data, intelligent learning systems and smart MOOC platforms are transforming the form, supply and sharing models of educational resources.

6. AI literacy is being mainstreamed into student development and employability enhancement. Through compulsory general education courses, interdisciplinary training, practical AI programmes and industry-linked initiatives, universities are strengthening students' core competencies for the digital and intelligent age.

7. Institutional organisation is undergoing systematic transformation in response to AI. Universities are establishing dedicated AI governance structures, institution-wide AI literacy training systems and university-level AI coordination hubs to support coordinated and institution-wide AI deployment.

8. Educational governance is becoming a fundamental institutional cornerstone of AI transformation. By establishing AI ethics systems, optimising intelligent administrative workflows and assuming sustainability-oriented responsibilities, universities are pursuing standardised governance, efficient operation and value-oriented development.

9. Innovation ecosystems are being strengthened through partnerships with enterprises and funding bodies.Joint research centres, seed funds, entrepreneurship incubators and specialised talent training programmes are helping universities connect frontier research, research translation and joint talent cultivation.

10. International cooperation is becoming more structured, long-term and strategically oriented. Through transnational academic alliances, cross-border talent training and global resource sharing, universities are building collaborative frameworks that support frontier AI research, talent reserves and sustainable development.

However, despite the overall positive progress of AI transformation among the 100 top universities covered in the present study, disparities remain in funding, policy support and technological environments, resulting in uneven progress across institutions and regions. High-quality resources remain concentrated at top-tier institutions. Many universities still need to strengthen the development of digital management teams, deliver systematic AI training for faculty, and promote the deployment of lightweight inclusive AI tools. Globally, unified standards for AI curricula and AI literacy certification have not yet been established, and cross-border mechanisms for credit recognition and qualification mutual recognition remain to be built. In addition, rules and frameworks for AI ethics governance are still under exploration. Further efforts are required to expand AI popularisation and industrial support in remote areas, provide long-term backing for small and medium-sized innovation projects, and advance the low-carbon and sustainable development of AI technologies.

From a regional perspective, global top universities have formed distinct development pathways for AI-driven educational transformation.

North American universities are following a different development model driven by market competition. Operating under market-oriented institutional mechanisms, these universities occupy diverse positions on the BCG Matrix, forming a landscape where pervasive leaders, established consolidators and institutions pursuing targeted breakthroughs coexist. Resources are unevenly allocated to research and talent cultivation, supported by a mature market-oriented industry-academia-research transformation system.

European universities, on the other hand, are showing an overall convergent trend driven by national policies. Restricted by EU regulations and public value principles, regional development is highly unified, and most top European universities are classified as pervasive leaders. With public finance coordinating resource allocation, universities share computing power and human resources via transnational alliances.

Asian universities are adopting a catch-up development model guided by national strategies. Top national universities generally rank as pervasive leaders, while regional institutions achieve breakthroughs in niche fields. Resources are mainly invested in departmental restructuring and cutting-edge scientific research.

Oceanian universities are characterised by comprehensive leadership from elite university clusters. The Group of Eight (Go8) shapes an elite aggregation pattern, and all top regional universities act as pervasive leaders. Resources are evenly allocated to scientific research, ethical governance and local cultural preservation, with public supercomputing facilities jointly built and shared across the region.

Latin American universities operate under a dual driving force of domestic public funds and international cooperation. Leading institutions prioritise the pervasive leadership pathway, investing heavily in computing infrastructure and interdisciplinary development. Open transnational collaborations help make up for local technological deficiencies.

African universities are pursuing resilient innovation and strategic adaptation based on local resource endowments. Constrained by limited resources, three major geographical development paths have emerged across North Africa, Southern Africa, East Africa and West Africa. Most local universities focus on targeted breakthroughs, and resources are mainly allocated to interdisciplinary research, faculty digital transformation and the development of AI governance systems.

Recommendations

Based on the development patterns identified above, this study proposes four sets of recommendations for the sustainable development of universities in the AI era.

Advance a New Pact for Learning and Education Empowered by AI

1. Universities should strengthen AI literacy and future-oriented competencies. AI courses should be designed according to local needs, economic conditions, and student development priorities. Talent cultivation programmes should be updated to foster lifelong autonomous learning, AI innovation capacity, flexible career adaptability, problem-solving skills under uncertainty, and the ability to live and work in intelligent environments. These reforms should be aligned with AI governance, ethical standards, and regulatory frameworks to ensure responsible and transparent AI use in education. Examples include Sorbonne University's digital literacy curriculum and East China Normal University's digitally enabled education practices on the Shuishan Online Platform.

2. Universities should build personalised and flexible learning ecosystems. AI general education should be embedded into interdisciplinary curricula, supported by modular course design, intelligent learning systems, and normalised use of AI teaching assistants. Partnerships with industry can further support AI training bases and project-based learning driven by real industrial challenges. Examples include Arizona State University's aerospace industry-education programme, the University of Chile's Antarctic metaverse interdisciplinary courses, and Xi'an Jiaotong University's intelligent manufacturing practice courses.

3. Universities with limited resources should develop low-cost and locally relevant AI learning pathways. They can use public digital platforms to build affordable AI teaching scenarios and practical projects, while cooperating with domestic and international institutions to develop micro-credential and credit recognition systems. These mechanisms can help students access external AI learning resources, obtain portable qualifications, and improve career competitiveness. Localised interdisciplinary courses, such as the project-based mechatronics courses of Jiangxi University of Science and Technology, can also strengthen students' capacity to solve complex practical problems linked to regional industries.

Strengthen Human-AI Teaming Research and Co-generative Knowledge Building

1. Universities should establish responsible AI research governance. A comprehensive governance system covering AI research ethics, data security, intellectual property, and research commercialisation is a prerequisite for AI-enabled university research. Beijing Institute of Technology's Jinggong Zhijiao Platform provides an example of full-lifecycle management, with closed-loop governance covering project approval, R&D, and research commercialisation, aligned with the ISO 29999 international standard for educational AI ethics.

2. Well-resourced universities should foster interdisciplinary AI research platforms. They can integrate institutional strengths to build cross-disciplinary platforms, develop large language models or domain-specific intelligent agents, and produce high-quality AI-enabled research outcomes. They should also establish research consortia with universities and technology enterprises at home and abroad. The AI joint laboratory co-built by Alef Education in the United Arab Emirates and international technology firms offers a useful reference.

3. Universities with limited resources should expand shared research capacity. They are advised to prioritise public cloud services, shared computing power, and implementable research projects in their distinctive disciplines. This can help them gradually build AI research capacity while avoiding excessive infrastructure costs. China Agricultural University's Shennong series of vertical research platforms is a representative case. Such universities are also encouraged to join academic communities and cooperate with top-tier institutions.

Enhance Community Engagement and Cultural Inheritance toward an Intelligent Society

1. Universities should promote digital inclusion and educational equity. They should participate in social welfare initiatives by delivering high-quality educational resources to underdeveloped regions and vulnerable groups. At the same time, they should strengthen cultural heritage protection and public service capacity through AI-enabled tools and platforms.

2. Well-resourced universities should strengthen policy engagement and public knowledge sharing. They can establish AI think tanks to provide policy consulting and strategic advice for governments, institutions, enterprises, and international organisations. Stanford's Human-Centered AI Institute has continuously provided policy outputs to the World Economic Forum and UNESCO, while Beijing Normal University's National Engineering Research Center for Internet Intelligent Technology and Applications has supported national AI strategy formulation in China. Universities can also open high-quality courses to the public, as seen in MIT's Day of AI platform and Ocean University of China's Zhiyu Platform.

3. Universities with limited resources should build regional partnerships and cultural innovation projects. They can work with governments, enterprises, and other universities to promote regional educational collaboration and smart education demonstration projects. Examples include Curtin University's blended teaching demonstration classrooms and Capital Normal University's Shuangyou Yunqiao Smart Education Platform for K-12 teacher training. They can also use distinctive disciplinary strengths to support local cultural heritage preservation, as illustrated by Shenzhen Technology University's use of AI to improve cultural relic restoration.

Build Institutional Capacity and Competencies for AI-Driven Transformation

1. Universities should develop strategic AI leadership and governance capacity. They should formulate medium- and long-term AI development plans based on institutional positioning, with phased objectives, resource allocation mechanisms, and evaluation rules. Supporting systems for AI ethics, tiered AI use, and achievement incentives are also needed to address weak organisational incentives in digital transformation. Shanghai Jiao Tong University's comprehensive AI implementation guidelines for teaching and research offer relevant experience.

2. Universities should strengthen AI capacity building for all staff groups. Differentiated AI training programmes should be designed for managers, teaching staff, researchers, and administrative personnel to improve digital leadership, AI teaching capacity, research capability, and social service competencies. Zayed University's institutional AI certification programme provides a complete tiered training model for managers and teachers.

3. Universities should invest in sustainable digital infrastructure and data-informed governance. They should adopt technology development strategies aligned with their funding and resource conditions, deepen industry collaboration, and consolidate campus-wide AI infrastructure. Examples include the University of Hong Kong's Wi-Fi 7-based intelligent campus foundation and the National University of Singapore's Hopper Supercomputing Platform. Universities should also accelerate the construction of campus-wide data centres and intelligent decision-making dashboards, embedding data analysis into admissions, resource allocation, student support, and financial management. The University of Amsterdam's dropout early warning system and Xidian University's campus governance dashboard demonstrate how data-informed tools can improve institutional governance.

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Appendix

List of the 100 Selected Top Universities

Ain Shams University, Ain Shams

Alexandria University, AlexU

Australian National University, ANU

Boston University, BU

Cairo University, Cairo

California Institute of Technology, Caltech

Chiang Mai University, Chiang Mai

Chulalongkorn University, Chula

City University of Hong Kong, CityUHK

Columbia University, Columbia

Cornell University, Cornell

Duke University, Duke

ETH Zurich-Swiss Federal Institute of Technology, ETH Zurich

Federal University of Rio de Janeiro, UFRJ

Fudan University, Fudan

Harvard University, Harvard

Heidelberg University, Heidelberg

Imperial College London, ICL

Indira Gandhi National Open University, IGNOU

Johns Hopkins University, JHU

Karolinska Institute, KI

Katholieke Universiteit Leuven, KU Leuven

King's College London, KCL

Kyoto University, KyotoU

Ludwig Maximilian University of Munich, LMU

Mahidol University, Mahidol

Massachusetts Institute of Technology, MIT

McGill University, McGill

Monash University, Monash

Monterrey Institute of Technology and Higher Education, ITESM

Nanyang Technological University, Singapore, NTU Singapore

National Autonomous University of Mexico, UNAM

National University of Singapore, NUS

New York University, NYU

Northwestern University, Northwestern

Paris Sciences et Lettres University, PSL

Paris-Saclay University, Paris-Saclay

Peking University, PKU

Pontifical Catholic University of Peru, PUCP

Princeton University, Princeton

Seoul National University, SNU

Shanghai Jiao Tong University, SJTU

Sorbonne University, Sorbonne

Stanford University, Stanford

Stellenbosch University, Stellenbosch

Technical University of Munich, TUM

The University of Amsterdam, UvA

The University of Hong Kong, HKU

The University of Manchester, Manchester

The University of New South Wales, UNSW Sydney

The University of Queensland, UQ

The University of Sydney, Sydney

The University of Tokyo, UTokyo

Tsinghua University, THU

University College London, UCL

University of Birmingham, UoB

University of British Columbia, UBC

University of California, Berkeley, UC Berkeley

University of California, Davis, UC Davis

University of California, Irvine, UCI

University of California, Los Angeles, UCLA

University of California, San Diego, UCSD

University of Cambridge, Cambridge

University of Campinas, UNICAMP

University of Cape Town, UCT

University of Chicago, UChicago

University of Chile, Uchile

University of Copenhagen, UCPH

University of Costa Rica, UCR

University of Edinburgh, Edinburgh

University of Illinois at Urbana-Champaign, UIUC

University of Indonesia, UI

University of Lagos, UNILAG

University of Malaya, UMalaya

University of Melbourne, Melbourne

University of Michigan-Ann Arbor, UMich

University of Minnesota Twin Cities, UMN, Twin Cities

University of Nairobi, UoN

University of North Carolina at Chapel Hill, UNC

University of Oxford, Oxford

University of Pennsylvania, Penn

University of Pretoria, UP, Pretoria

University of Science and Technology of China, USTC

University of South Africa, UNISA

University of Southern California, USC

University of São Paulo, USP

University of Technology Malaysia, UTM

University of Texas at Austin, UT Austin

University of the Philippines, UP, Philippines

University of the Witwatersrand, Wits

University of Toronto, U of T

University of Washington, UW

University of Wisconsin-Madison, UW-Madison

University of Zurich, UZH

Vanderbilt University, Vanderbilt

Vietnam National University, Hanoi, VNU-Hanoi

Washington University in St. Louis, WashU

Yale University, Yale

Zhejiang University, ZJU

École Polytechnique Fédérale de Lausanne, EPFL

List of the Included Initiatives

■ Digital Leadership and Faculty Transformation

University	Initiative
Columbia University	CHAT customizable AI conversational platform
Columbia University	SIPA AI Power executive education programme
Duke University	AI-Driven Organisational Transformation executive education programme
Johns Hopkins University	AI predictive models for revenue cycle management and hospital bed allocation
Nanyang Technological University, Singapore	NTU 2030 AI education transformation, embedding AI into 40% of courses by 2030
Northwestern University	AI Strategy for Business Transformation executive programme
Paris Sciences et Lettres University	Vice-Presidency for Digital Infrastructure and IT Integration
Seoul National University	Big Data and AI CEO executive programme
Sorbonne University	AI and data science training programmes with industry partners
Stellenbosch University	AI Literacy for All programme
The University of Melbourne	Robotic process automation for administrative efficiency
The University of New South Wales	Created an AI Hub, building staff AI capability and transformative teaching
University of British Columbia	Generative AI Training Group and AI competency framework
University of California, Los Angeles	Inaugural Chief Data and Artificial Intelligence Officer
University of Oxford	Free staff training in AI, cloud computing, cybersecurity and process automation
University of the Philippines	Explainable AI (XAI) bootcamps, transparent and human-directed policymaking, for researchers and government agencies
Yale University	YaleSites no-code website platform

Digital and Intelligent Infrastructure and AI Programmes

University	Initiative
City University of Hong Kong	Integration of the DeepSeek model into university AI development; specific university announcement not identified
École Polytechnique Fédérale de Lausanne	AI inference-as-a-service platform hosting AI models as managed, scalable, secure API services
Heidelberg University	YoKI / university-hosted AI infrastructure developed by the University Computing Center to provide secure access to generative AI models
Monash University	MAVERIC (Monash Advanced Visualization and AI Research Infrastructure Capability) and advanced NVIDIA-based AI computing cluster
National Autonomous University of Mexico	Participation in Huawei Seeds for the Future programme to gain access to frontier technology and innovation resources
Peking University	Yanyuntong smart campus platform integrating more than ten campus systems and over one hundred functions for teaching, research, management, and campus services
Pontifical Catholic University of Peru	Participation in Huawei Seeds for the Future programme to gain access to frontier technology and innovation resources
Technical University of Munich	Collaboration with semiconductor ecosystem partners including AI chip design training
The University of Amsterdam	UvA AI Chat: university-provided AI environment for students and staff with stronger data privacy and responsible-use controls
University of Copenhagen	Quantum computing research using Denmark's Gefion AI supercomputer to conduct large-scale distributed simulation and extend simulated entangled qubits from 36 to 40
University of Costa Rica	HPC@UCR supercomputing cluster accelerating AI, meteorology and bioinformatics research

AI Literacy and Career Development

University	Initiative
Alexandria University	Integration of foundational AI courses across degree levels
Boston University	BU AI Association
City University of Hong Kong	MSc Artificial Intelligence in Business programme addressing industry demand for AI talent
Columbia University	Master of Science in Artificial Intelligence
Harvard University	AI-Medicine interdisciplinary training within biomedical PhD programmes
King's College London	Law and Technology LLM with industry partner
Massachusetts Institute of Technology	AI and Decision-Making tracks within EECS
McGill University	DataSphere Lab industry AI projects
McGill University	McGill Talks AI series
Monterrey Institute of Technology and Higher Education	Institution-wide AI curriculum integration
Ohio State University	AI Fluency modules and Unlocking Generative AI course
Paris-Saclay University	DataIA Cluster and France 2030-supported AI talent cultivation ecosystem, including international AI summer schools
Princeton University	Responsible AI graduate training programme
Shanghai Jiao Tong University	Access to real computing resources across disciplines
Technical University of Munich	Master in AI in Society
The University of Tokyo	BOOST NAIS doctoral talent-development programme for advanced AI talent to lead next-generation intelligent society
University of Birmingham Dubai	UAE's first PhD programme in Artificial Intelligence

University	Initiative
University of California, Irvine	10-week professional internship program, connecting students with industry partners through experiential learning
University of California, Los Angeles	Innovate@UCLA industry-linked project learning and career development
University of Campinas (UNICAMP)	AI integration across disciplines and interdisciplinary diplomas
University of Chicago	Schmidt AI Fellowship participation
University of Hong Kong	Library AI tools supporting academic integrity
University of Indonesia	AI and Digital Marketing certification initiative with APAII
University of Indonesia	Bachelor's programme in Artificial Intelligence
University of Lagos	OpenAI collaboration for AI skills training
University of Pennsylvania	Undergraduate AI Engineering degree and AI×Science postdoctoral fellowship
Washington University in St. Louis	AI for Research undergraduate summer programme
Zhejiang University	AI STEP Advancement Programme

Reshaping Pedagogy and Curriculum Restructuring

University	Initiative
Ain Shams University	McGraw Hill Connect and AI adaptive learning tools
City University of Hong Kong	Strategic partnership with Tencent Cloud for talent development and smart campus
Columbia University	Crafting Your AI Syllabus Statement workshops
Cornell University	Guidance on AI for personalised learning, accessibility and assessment redesign
ETH Zurich-Swiss Federal Institute of Technology	AI in Teaching portal, faculty AI competency framework, assignment design guidance
ETH Zurich-Swiss Federal Institute of Technology	Ethel virtual teaching assistant using retrieval-augmented generation
ETH Zurich-Swiss Federal Institute of Technology	Innovedum Fund supporting AI-enhanced personalised teaching, learning and assessment innovation
Imperial College London	Teaching, learning and assessment AI toolkit
Monash University	AI declaration templates embedded in Moodle
Ohio State University	Supply Chain Brutus AI teaching assistant integrated into LMS
Peking University	Mathematics Problem-Solving Assistant, Code Assistant and Intelligent Question-Generation Assistant
Shanghai Jiao Tong University	Zhiyuan-1 AI teaching assistants supporting hundreds of courses
Stanford University	AI training, tool comparison resources, and Coursera-based learning
The University of Sydney	Dual-track AI assessment framework distinguishing supervised secure assessment and open regulated AI use
The University of Sydney	Two-lane assessment framework with AI disclosure requirements
University of British Columbia	Chat UBC, GENRx and GRASP AI teaching innovation projects
University of California, Los Angeles	AIMS project supporting STEM instructors with AI-assisted teaching design
University of Cambridge	Exploration/pilot use of OpenAI and ChatGPT Edu technologies to support university-wide teaching innovation

University	Initiative
University of Malaya	Strategic partnership with EY for AI curriculum co-development and internships
University of Michigan-Ann Arbor	UMGPT and Maizey institutional generative AI tools
University of Oxford	AI tools and free staff training for teaching and learning
University of Wisconsin-Madison	AI Teaching Fellows programme
Vietnam National University, Hanoi	AI Tutor intelligent tutoring system

■ AI for Science and Interdisciplinary Collaboration

University	Initiative
California Institute of Technology	Collaboration with Google DeepMind, focused breakthroughs in specific scientific domains
Carnegie Mellon University	AI Science Foundry: AI agents, programmable robots, automated experiments
École Polytechnique Fédérale de Lausanne	Swiss AI Initiative: interdisciplinary AI collaboration with ETH Zurich
ETH Zurich-Swiss Federal Institute of Technology	Swiss AI Initiative: national AI research community, foundation model development, interdisciplinary collaboration
Heidelberg University	Humans and Machines: interdisciplinary AI research across social sciences, cognition, and ethics
Karolinska Institutet	AI-driven drug discovery platform using chemical biology and automated screening
Ohio State University	BuckAI Observatory: AI-enabled earth, planetary, and computational science research
Peking University	Multi-physics-domain computing architecture for large-scale AI-enabled scientific research
Stanford University	Virtual Lab: multi-agent AI scientists for SARS-CoV-2 nanobody design
Stellenbosch University	Established African Policy Innovation Lab using AI-enabled quantitative models for poverty governance and public policy optimization
The University of Queensland	UQ-Cisco Chair in Network Security and joint AI-driven cybersecurity research partnership
University of California, Davis	AI research platforms for agriculture, food systems, health sciences and sustainability
University of California, San Diego	AI-enabled fusion energy modelling and digital engineering for accelerating scientific discovery and reactor development
University of Chicago	AI Scientist project with Argonne National Laboratory for materials discovery
University of Nairobi	AI in Education and Wildlife Conservation workshop with Linköping University
University of Nairobi	Strategic engagement with Google, Huawei; developed regional AI industry ecosystem for smart healthcare, smart cities, intelligent agriculture

University	Initiative
University of Oxford	Machine learning for climate and public health risk prediction
University of Pennsylvania	Price Lab for Digital Humanities: large language models in historical and cultural research
University of Pretoria	AfriDSAI research institute developing local-language NLP technologies and Africa-centerd AI frameworks
University of Washington	Top-level AI strategy, dedicated compute resources, for research and student innovation

Organisation Transformation and Resource Integration

University	Initiative
Cairo University	Expanded Faculty of Computers and AI, restructured disciplines, built high-level think-tank linking research and government
ETH Zurich-Swiss Federal Institute of Technology	ETH AI Center strengthening autonomous AI research and cross-disciplinary coordination
Imperial College London	School of Human and Artificial Intelligence under Schools of Convergence Science
Johns Hopkins University	Data Science and AI Institute (DSAI) coordinating interdisciplinary AI research clusters
Ludwig Maximilian University of Munich	Munich Center for Machine Learning (MCML) joint platform
Paris-Saclay University	Entente CordIAle AI Initiative with Oxford and Cambridge
Sorbonne University	PostGenAI@Paris consortium with 16 academic and 60+ industry partners
Technical University of Munich	Munich Center for Machine Learning (MCML) joint platform
The University of Hong Kong	School of Computing and Data Science integrating education and research resources
The University of Melbourne	Center for Artificial Intelligence and Digital Ethics (CAIDE)
University of Cambridge	Entente CordIAle AI Initiative
University of Lagos	AI UniPod innovation hub supported by UNDP for AI entrepreneurship, technology transfer and industrial empowerment
University of Oxford	Entente CordIAle AI Initiative with Paris-Saclay and Cambridge
University of Pretoria	African Institute for Data Science and Artificial Intelligence (AfriDSAI)
University of São Paulo	Applied Research Center for 5G and Generative AI with Claro and FAPESP
University of the Witwatersrand	Cross-continental collaboration networks and international lab systems reducing R&D cost and building Africa-centered innovation ecosystem

Education Governance and Ethical Guidelines

University	Initiative
Australian National University	Indigenous Data Sovereignty principles guiding responsible AI use of Indigenous data
Cornell University	Prohibited-Allowed with Attribution-Encouraged framework for generative AI use
Duke University	DukeGPT privacy-centerd AI governance framework
Heidelberg University	AI Commission supporting university-wide AI principles and risk assessment
National University of Singapore	Formal AI use framework clarifying instructor responsibilities and student AI-use disclosure in teaching and learning
Shanghai Jiao Tong University	Four-category AI-use framework: prohibited, limited, encouraged, and open use
Technical University of Munich	Institute for Ethics in Artificial Intelligence (IEAI)
Technical University of Munich	Responsible Leadership in the Age of Disruptive Technologies programme aligned with AI governance and compliance
The University of Tokyo	AI governance research and policy advice linked to government-facing AI governance work; direct policy report source not identified in this excerpt
University College London	Differentiated AI governance for students and staff, including assessment fairness guidance
University of Amsterdam	AI Vision framework and responsible generative AI implementation roadmap
University of British Columbia	Restrictions and risk assessment of external AI models including DeepSeek
University of California, Berkeley	Important Guidance on AI Tools: P1-P3 data classification and restrictions on sensitive data
University of Cambridge	AI Policy Framework and AI disclosure templates for assessment
University of Cape Town	Issued AI guidance emphasizing fairness and trust, developed African-context ethical framework
University of Malaya	Responsible AI-use guidance for teaching and research
University of Oxford	AI-use disclosure requirements and academic integrity guidance

Social Partnerships and Community Empowerment

University	Initiative
Chulalongkorn University	Chula MOOC and public platforms offering AI literacy, digital competence and legal technology courses to open learners
École Polytechnique Fédérale de Lausanne	Geneva AI Initiative providing AI training, mentoring, expert support and project funding to international organisations and NGOs
Fudan University	Hosted the China event of the Robotics for Good Youth Challenge, encouraging students aged 10-18 to use robotics and AI for food security and sustainability
Indira Gandhi National Open University	Inclusive AI micro-credential systems, competition platforms and AI-enabled translation with international partners including GIZ, Cisco and IBM
Massachusetts Institute of Technology	MIT RAISE Day of AI free global K-12 AI literacy platform with curricula, teacher guides, classroom activities and open resources
New York University Shanghai	AI Summer Program for high school students aged 15-18, offering a two-week immersive introduction to AI, data science and application development
The University of Queensland	AI tools for remote and disabled communities, including eye screening, real-time sign language translation and sporting talent identification
The University of Sydney	Partnerships with Indigenous Elders and local governments for digital protection of cultural resources
The University of Tokyo	Matsuo-Iwasawa Laboratory AI talent-development initiative for Africa, aiming to support AI capacity building for 30,000 people
Tsinghua University	Developed AI-powered eldercare services, community-based smart aging model, for retired faculty
University of Birmingham	Demystifying AI public engagement activity using robots, VR and interactive experiences to explain AI principles and risks to families and citizens
University of Chicago	AI for Climate Initiative supporting AI-driven weather forecasting capacity and agricultural weather services in low- and middle-income countries
University of Edinburgh	Established the UK AI Factory Antenna, AI skills and support ecosystem, public-sector organisations

University	Initiative
University of Indonesia	Workshop on AI, data science and women's leadership, providing training in coding, data science and leadership for women across Indonesian provinces
University of South Africa	One day workshop with Women in Tech South Africa and AWS, empowering women's tech and AI skills
University of Southern California	AI for Social Good project using natural language processing to analyse homelessness outreach records and support nonprofit service evaluation
University of Toronto	Partnered with Palette Skills, upskilling ecosystem, for community organisations
University of Zurich	Simplify! social-technology project exploring AI-supported simplification of complex welfare documents for vulnerable groups
Vanderbilt University	Generative AI courses and specialisations on Coursera, opening university-level AI teaching resources to global learners
Washington University in St. Louis	Global AI and law collaboration network promoting AI and legal knowledge exchange among law schools and legal-technology partners

■ Fund Mobilisation and Enterprise Incubation

University	Initiative
Federal University of Rio de Janeiro	Science Park and COPPE/UFRJ industry collaboration in digital health, biotechnology, artificial intelligence, embedded intelligence and data science
Harvard University	Kempner Institute for the Study of Natural and Artificial Intelligence, emphasizing fundamental mechanisms of natural and artificial intelligence and AI for the benefit of humanity
Katholieke Universiteit Leuven	AIaaS fees are based on personnel costs. Current rates are €12,500 per person-month or €700 per day
Kyoto University	Society and AI-related initiatives reflecting on AI from humanities and social science perspectives, emphasizing human dignity, social harmony and sustainable futures
Mahidol University	Mahidol x Siam AI Venture Lab 2025 using mentoring, acceleration and fund-matching mechanisms to commercialize AI research outcomes in healthcare and social-impact contexts
McGill University	Pathy Fellowship-supported Two-Eyed Seeing Indigenous Network / Michif Stories project combining Michif language data, historical images and AI-generated art
Princeton University	Modeling Culture project at the Center for Digital Humanities, exploring generative AI in humanistic traditions, cultural interpretation and teaching practice
Technical University of Munich	TUM Venture Labs supporting AI and deep-tech venture incubation
The University of Manchester	UNESCO AI competency seminar, advancing inclusive and equitable AI education
The University of Queensland	Three-year strategic partnership with Cisco supporting AI cybersecurity innovation and translation
University College London	Computer Science Venturer Programme supporting AI and deep-tech researchers with entrepreneurship training, mentoring, investor engagement and co-founder networks
University of Costa Rica	AI image-recognition model for FIFCO's De Vuelta a Casa marine ecosystem restoration project, classifying seashell origins to support ecological return
University of Lagos	2025 International Week foregrounding equitable partnerships and the future of AI in Africa

University	Initiative
University of Minnesota Twin Cities	AI-LEAF Institute supported by a five-year US$20 million NSF and USDA award to advance AI applications in agriculture, forestry and climate adaptation
University of North Carolina at Chapel Hill	AI Acceleration Program providing funding, guidance and cloud-based resources to support generative AI prototype development across research, teaching and university operations
University of Science and Technology of China	AGI for Science partnership, collaborative research and talent development, with the Shanghai AI Laboratory
University of Technology Malaysia	Malaysia's first national Artificial Intelligence Learning Center, supported by RM20 million allocated in Malaysia's 2024 budget
University of Technology Malaysia	Government-supported national AI learning and institutional capacity-building, including Malaysia's first national AI learning center
University of Texas at Austin	Emerson $8.5M investment, AI/semiconductor research and master's program support, for UT Austin students and innovation
University of the Witwatersrand	Wits MIND Institute receiving Google.org core funding to support African-led AI research, interdisciplinary projects and capacity building
Vanderbilt University	Dare to Grow fundraising campaign and Ignite Tech Development Grants supporting educational technology development, AI ethics, mathematics learning and innovation incubation

Cultural Inheritance and Sustainable Development

University	Initiative
Australian National University	Human-Scale AI project in the School of Cybernetics Cybernetic Studio, using installations, sculptures and public workshops to make computation tangible and culturally discussable
Australian National University	Contribution to Indigenous data governance and global AI governance discussions
Monash University	Renewable-energy-powered AI infrastructure linking frontier AI research with green and low-carbon development
National University of Singapore	SEA-LION and SEALD multilingual initiatives through AI Singapore, building open language models and data resources for Southeast Asian languages and cultural contexts
University of Amsterdam	Cultural AI Lab and human-centerd AI initiatives under ethical and cultural-sensitivity principles

Overview of Research Reports from Prominent Institutions (2023-2026)

Report	Organisation	Year	Scenarios	Key Insights
Transforming Higher Education: Global Collaboration on Visioning and Action	UNESCO	2026	Equity and pluralism; Freedom to learn, teach and research; Inquiry, critical thinking, and creativity; Human-centered digital technologies and AI; Global collaboration and solidarity; Sustainability, stewardship and regeneration; Quality assurance and social impact.	Higher education must be learner-centered, inclusive, and globally connected; AI and digital technologies should enhance, not replace, human agency in learning and research; Cross-border collaboration is essential for knowledge sharing, innovation, and equitable access; Institutions need to adapt curricula, pedagogy, and assessment to prepare graduates for rapidly changing societies; Ethical governance frameworks for AI and digital tools are critical to protect rights, privacy, and fairness.
Higher Education Global Trends Report: Towards Inclusive, Equitable and Quality Higher Education in an Internationally Mobile Landscape	UNESCO IESALC	2026	Expansion of higher education systems; Equity and inclusion; International student mobility; Digital transformation and AI integration; Quality assurance and accreditation; Governance and policy reform; Financing of higher education; Academic workforce development; Recognition of qualifications and micro-credentials; Global cooperation and data-driven governance.	Higher education is becoming increasingly globalized and interconnected; International mobility enhances knowledge exchange and institutional collaboration; AI and digital technologies are reshaping higher education systems but require robust governance frameworks ; Persistent inequalities remain despite continued expansion of access; Qualification recognition and policy harmonization support global education ecosystems; Cross-border collaboration is essential for future higher education development and resilience.

Report	Organisation	Year	Scenarios	Key Insights
AI for Good Impact Report	International Telecommunication Union	2024	AI applications for social impact and development; Responsible and ethical AI deployment; Digital inclusion and accessibility improvement; AI solutions for education and public services; Sustainable development-oriented AI systems; Global cooperation in AI for social good.	AI should serve social good; AI applications improve digital inclusion in marginalised populations; Global collaboration enhances AI impact on social development.
Policies for the digital transformation of school education	OECD, 2025	2025	Strategic Visions and Policy Co-ordination; Digital Infrastructure; Teacher Professional Development; Curriculum Reform; Assessment Transformation; Digital Inclusion; Governance and Regulation; Data Systems; Stakeholder Engagement; Innovation Ecosystems.	Successful digital transformation requires coherent national strategies; Infrastructure investments alone do not improve learning outcomes; Teacher readiness is the most critical enabling factor; Curriculum and assessment reforms must accompany technological change; Equity considerations should be integrated into policy design; Data governance frameworks are increasingly important; Cross-sector collaboration strengthens innovation capacity.
AI Revolution in Higher Education	World Bank	2025	Human capital development through AI integration; Digital infrastructure gaps in higher education systems; Equity and access challenges in AI-enabled education; Workforce skill alignment with AI-driven economies; Institutional capacity constraints in developing countries; Education system modernization pathways.	Key bottlenecks are skills and infrastructure gaps; AI integration supports modernization of higher education; Equitable access is critical for AI-driven education transformation.

Report	Organisation	Year	Scenarios	Key Insights
AI Preparedness Index	International Monetary Fund	2023	Digital infrastructure; Human capital and labor market policies; Innovation and economic integration; Regulation and ethics.	AI preparedness differs substantially across countries, with advanced economies generally better positioned for AI adoption; Digital infrastructure and workforce capabilities are critical determinants of AI readiness; Innovation capacity and economic integration facilitate AI diffusion; Regulatory and ethical frameworks lag behind technological development in many countries; Comprehensive preparedness is necessary to maximize AI benefits while mitigating inequality and labor-market risks.
Artificial Intelligence Act	European Union	2024	Risk-based classification of AI systems; Transparency and explainability requirements; Compliance and regulatory enforcement mechanisms; Data governance and protection standards; Accountability for high-risk AI applications; Institutional adaptation to legal AI constraints.	AI governance is becoming legally enforceable; Compliance with transparency and accountability standards ensures safer AI deployment; Legal frameworks drive institutional adaptation to AI.
White Paper on China's Smart Education (2025)	Ministry of Education (China)	2025	Smart education ecosystem construction; AI-enabled teaching innovation systems; Digital infrastructure modernization in education; Data-driven education governance systems; Platform-based education service delivery; Institutional reform through AI integration.	China is building a full-stack AI education system; Integrated digital infrastructure supports smarter teaching and learning; Data-driven governance improves education system efficiency.

Report	Organisation	Year	Scenarios	Key Insights
The 2025 AI Index Report	Stanford HAI	2025	AI research publication and development trends; AI education and workforce skill indicators; Industry adoption of AI technologies; AI governance and regulatory developments; Global AI competitiveness and investment patterns; Societal impact metrics of AI deployment.	AI development shows exponential growth and diffusion; AI adoption varies by region and industry, affecting workforce skill needs; Investments in AI research drive global competitiveness.
MIT AI & Education Summit	MIT	2025	Human-centered AI learning system design; Learning science integration with AI technologies; Adaptive learning environments and personalisation; AI-enhanced feedback and assessment systems; Student learning behavior analytics; Cognitive and pedagogical impacts of AI tools.	AI improves learning outcomes via human-centered systems ; Adaptive learning systems require integration with cognitive science ; AI-enhanced feedback supports individualized student progress.
Global Digital Education Brief (2024-2025)	Smart Learning Institute of Beijing Normal University	2025	Digital education system development; Infrastructure expansion in education; Platform-based learning ecosystems; Policy coordination in digital education; Technology adoption trends; System-level digital transformation.	Digital infrastructure is rapidly expanding; Platform-based learning ecosystems enhance access and scalability; Policy coordination ensures sustainable digital transformation.

Report	Organisation	Year	Scenarios	Key Insights
IAU Horizons: Universities and the Interplay of Human Intelligence and Generative AI	International Association of Universities	2024	Human-AI collaboration in academic environments; Transformation of university missions; AI integration in teaching and research; Institutional adaptation to AI systems; Academic identity and role evolution; Ethical governance of AI in universities.	Universities enter human-AI co-production era; Human-AI collaboration is reshaping teaching and research practices; Universities should redefine academic roles and governance structures for AI integration.
2025Horizon Report teaching and learning	EDUCAUSE	2025	Generative AI Integration; Personalized Learning; Learning Analytics; Student Success; Assessment Innovation; Hybrid Learning Models; Faculty Development; Digital Equity; Ethical AI Use; Future Skills Development.	Generative AI is rapidly transforming teaching and learning practices; Traditional assessment methods are becoming increasingly inadequate; Personalized learning pathways will become mainstream in higher education; Faculty require substantial support to redesign courses for AI-enhanced learning; AI-assisted learning analytics can improve student retention and success; Ethical and equitable AI implementation remains a major concern; Future graduates need AI-related competencies regardless of discipline.
2026 AI-DMI Global White paper	Times Higher Education	2026	Digital Infrastructure and Cloud Ecosystems; Data Governance and Data Readiness; AI Governance and Risk Management; Leadership and Organizational Change; Teaching and Learning Transformation; Research and Innovation Capacity.	World-class universities are moving beyond isolated AI pilot projects toward institution-wide AI integration across teaching, research, and administration; Institutional leadership plays a decisive role in shaping AI strategy, organizational alignment, and long-term transformation outcomes; AI is increasingly transforming university operations through automation, predictive analytics, and data-driven decision-making; Developing AI competencies among faculty, professional staff, and students has become a strategic priority for future-ready institutions.

Report	Organisation	Year	Scenarios	Key Insights
10 dimensions of AI readiness	Digital Education Council	2025	AI Strategy and Leadership; Institutional Governance; Data and Digital Infrastructure; Faculty AI Competencies; Student AI Literacy; Curriculum Integration; Research Capacity; Ethics and Responsible AI; Change Management; External Partnerships.	AI readiness extends beyond technology adoption and requires institution-wide transformation; Leadership commitment is the strongest predictor of successful AI implementation; Digital maturity forms the foundation for AI maturity; Faculty capability development remains the largest implementation challenge globally; Institutions need comprehensive governance frameworks to manage AI risks; Student AI literacy should become a graduate attribute across disciplines; Cross-sector partnerships accelerate AI innovation and organizational learning.
Shaping the Future of Learning: The Role of AI in Education 4.0	World Economic Forum	2024	AI-Enhanced Personalized Learning; Future Skills and Employability; Human-Centered AI; Curriculum Innovation and Flexibility; Lifelong Learning Ecosystems; Teacher Capacity and Professional Development; Equity, Inclusion and Accessibility.	AI has the potential to accelerate the transition toward Education 4.0 by enabling more personalized, adaptive, and learner-centered educational experiences; Lifelong learning is becoming an essential component of workforce resilience, requiring education institutions to provide flexible and continuous learning opportunities throughout individuals' careers; AI can support more inclusive learning environments by improving accessibility, reducing learning barriers, and expanding educational opportunities for underserved populations; Teachers remain central to successful educational transformation, and significant investment in AI-related professional development is necessary to help educators redesign learning experiences.

Report	Organisation	Year	Scenarios	Key Insights
AI for Science 2025	Nature Research Intelligence	2025	AI-assisted scientific discovery processes; AI-driven hypothesis generation and validation; Automation of research workflows using AI; Open science and data-sharing ecosystems; AI in computational modeling and simulation; Transformation of scientific research paradigms.	AI reshapes scientific discovery and research paradigms; Automation of research workflows accelerates hypothesis testing; Open science platforms enhance collaborative AI-driven research.
Higher Education Artificial Intelligence Development Report 2.0	China Education and Research Network	2026	AI governance systems in universities; Education innovation ecosystems; Institutional digital transformation; Teaching and research integration with AI; Administrative automation systems; Higher education reform pathways.	AI drives governance restructuring; Institutional transformation is necessary for AI adoption; Integration of AI in teaching and research improves efficiency.
The State of AI in 2025: Agents, Innovation, and Transformation	McKinsey & Company	2025	Global AI adoption across industries; Productivity transformation through AI; Organisational restructuring driven by AI; Workforce skill transformation; AI investment and economic impact; Scaling AI systems in enterprises.	AI is becoming a core productivity driver; Adoption of AI requires workforce skill transformation; Investments in AI technologies drive organisational restructuring.

Pacesetting Global Educational Transformation Report

AI-Driven Innovations from 100 Selected Top Universities

United Nations' International Decade of Sciences for Sustainable Development (2024-2033)

The Decade is a global movement to unlock the potential of science to drive meaningful change. Led by UNESCO, it promotes science as a common good fuelling innovation, inclusion and collaboration across borders. Declared by the UN General Assembly on 25 August 2023, the Decade aims to promote global collaboration through sciences to achieve a sustainable future. It offers a unique opportunity for humanity to fully harness the power of science in advancing sustainable development and securing a safe and prosperous future for everyone.

2024 • 2033
International Decade of Sciences for Sustainable Development

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