A Multidimensional Framework for Assessing AI Adoption Readiness in Higher Education: A Case Study

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Abstract. Artificial intelligence (AI) is rapidly reshaping higher education institutions. Effective institution-wide AI adoption may benefit from organizational capabilities that facilitate coordination, knowledge sharing, and governance beyond technological access. This paper presents an exploratory case study assessing organizational AI readiness in a private Spanish university through a multidimensional maturity framework. The framework evaluates eight capability dimensions, People, Regulation, Organization, Market Orientation, Technological Enablement, Innovation, Social Impact, and Ethics, using a five-level maturity scale ($L0$–$L4$). The institution obtained an overall readiness index of 1.57 out of 4, revealing a clear asymmetry: moderate individual experimentation capacity and ethical awareness coexist with notably weak governance structures and regulatory integration. The findings suggest that AI adoption in this university is constrained less by technological barriers than by the absence of aligned organizational capabilities. Structured maturity assessment is proposed as a diagnostic mechanism to guide institutions from fragmented experimentation toward coordinated, responsible, and sustainable AI adoption.

1 Introduction

Artificial intelligence (AI) is rapidly transforming higher education institutions [1], reshaping teaching, learning processes, administrative operations, and institutional decision-making. The accelerated diffusion of generative AI technologies since 2023 has intensified this transformation by enabling new forms of content generation, academic assistance, process automation, and data-driven institutional analysis. Universities are increasingly incorporating AI across multiple domains, including academic support, curriculum development, student services, institutional analytics, and strategic management. As a result, AI is no longer viewed solely as an emerging technological resource, but as a strategic organizational capability capable of influencing institutional competitiveness, pedagogical innovation, and operational performance.

Despite this rapid expansion, AI adoption in higher education tends to progress through fragmented and decentralized initiatives [2,3]. In many institutions, adoption is primarily driven by individual faculty experimentation, isolated departmental projects, or short-term pilot initiatives rather than coordinated institutional strategies [4]. This frequently produces uneven capability development, inconsistent implementation practices, and weak alignment between technological experimentation and broader institutional objectives [5,6]. Consequently, universities may display significant levels of AI experimentation without achieving structured organizational readiness for coordinated institutional adoption [7].

The challenge is not exclusively technological. Access to AI tools has become increasingly widespread, substantially lowering technical barriers to experimentation. However, scaling AI adoption across the institution requires organizational capabilities extending beyond technological availability [8]. These capabilities include faculty training, governance structures, regulatory awareness, institutional coordination mechanisms, ethical oversight, and strategic alignment between experimentation and organizational priorities. Without these enabling conditions, AI adoption risks remaining confined to isolated initiatives with limited institutional impact and restricted scalability.

Existing research on AI in higher education has predominantly focused on pedagogical applications [3,9], intelligent tutoring systems, educational data mining, student modelling, and AI-supported instructional methodologies. While these contributions provide valuable insights into the educational applications of AI, they devote comparatively less attention to the organizational conditions required for coordinated institutional adoption. In particular, the literature offers limited frameworks for assessing organizational AI readiness as a multidimensional institutional capability.

This gap is especially relevant in private higher education institutions, where competitive pressures frequently accelerate experimentation with emerging technologies while institutional governance structures evolve more slowly than technological adoption. These institutions often face strong incentives to innovate rapidly in order to strengthen market positioning and educational differentiation. However, this acceleration can generate asymmetries between individual experimentation and institutional coordination, creating capability gaps that constrain sustainable organizational transformation.

To address this gap, this study applies a multidimensional organizational AI maturity assessment framework to a private higher education institution through an exploratory case study. The framework evaluates institutional readiness across eight interdependent dimensions — People, Regulation, Organization, Market Orientation, Technological Enablement, Innovation, Social Impact, and Ethics — and translates diagnostic results into prioritized capability development pathways aligned with each institution's specific maturity profile. Its core value lies not only in identifying where an institution stands, but in providing a structured, actionable route toward coordinated and sustainable AI adoption.

This study addresses the following research questions: *How can organizational AI readiness be assessed in higher education institutions to support coordinated*

institutional AI adoption? What capability gaps constrain the transition from fragmented AI experimentation toward coordinated institutional adoption in private universities? And *how can maturity assessment results be translated into prioritized action plans and development roadmaps aligned with each institution's specific maturity profile?*

This paper makes three contributions. First, it extends the discussion of AI in higher education beyond pedagogical applications by positioning organizational readiness as a critical condition for effective institutional adoption. Second, it provides exploratory empirical evidence on institutional AI maturity through a real-world case study in a private Spanish university. Third, it demonstrates how the framework moves beyond diagnosis to generate institution-specific action plans and development roadmaps, supporting higher education institutions in advancing from fragmented experimentation toward coordinated organizational transformation.

The remainder of the paper is organized as follows. Section 2 reviews the literature on AI adoption in higher education and the organizational challenges associated with institutional readiness. Section 3 describes the case study methodology. Section 4 presents the multidimensional assessment framework and its application through the case study. Section 5 discusses the findings and their practical implications. Section 6 presents the conclusions.

2 Literature Review

Artificial intelligence has emerged as a major driver of transformation in higher education, influencing teaching practices, learning processes, administrative operations, and institutional decision-making [3,2]. Recent advances in generative AI have accelerated this transformation by enabling new applications in automated content generation, personalized academic support, assessment design, process automation, and institutional analytics [1].

Existing research has predominantly focused on pedagogical and technical applications of AI in educational contexts. Studies have examined intelligent tutoring systems, adaptive learning environments, educational data mining, student modelling, and AI-supported instructional design as mechanisms to improve learning outcomes and personalize educational experiences [3,9]. While these contributions provide valuable insights into the educational potential of AI, they devote comparatively less attention to the organizational conditions required for coordinated institutional adoption.

Beyond technological access, scaling AI adoption across institutions requires organizational capabilities such as governance, regulation, and strategic alignment [8,6]. Universities frequently display decentralized experimentation patterns in which faculty members, departments, and administrative units adopt AI tools independently according to local needs and capabilities [2,4]. Although this decentralized experimentation can stimulate innovation, it often produces fragmented implementation trajectories characterized by duplicated efforts, inconsistent prac-

tices, uneven capability development, and weak alignment with institutional strategy [3].

This challenge is especially relevant in private higher education institutions, where competitive pressures frequently accelerate experimentation with emerging technologies while institutional governance structures evolve more slowly than technological adoption. Under these conditions, institutions may display significant levels of individual engagement with AI while lacking the organizational capability alignment necessary for scalable and sustainable transformation.

Several organizational conditions have been identified as critical for effective institutional AI adoption. These include human capability development, governance structures, regulatory awareness, technological enablement, ethical oversight, and strategic coordination mechanisms [4]. Together, these dimensions suggest that AI adoption should be understood not as a purely technological implementation process, but as a multidimensional organizational capability challenge. The growing regulatory landscape, exemplified by the EU AI Act [10], reinforces the urgency of developing formal compliance mechanisms at the institutional level [11].

Despite growing institutional interest in AI adoption, existing research offers limited tools for systematically assessing organizational readiness across these interdependent dimensions. Most available approaches focus on technological readiness, digital infrastructure maturity, or pedagogical implementation effectiveness, while underrepresenting governance, regulatory integration, institutional coordination, and ethical capability development. This limitation highlights the need for structured assessment mechanisms capable of diagnosing institutional readiness, identifying capability gaps, and supporting coordinated organizational development [7]. Table 1 summarizes the main research gaps identified in the literature, mapping each focus area to the specific organizational capability dimension that remains underrepresented in existing work.

Table 1. Research gaps in AI adoption in higher education

Focus area	Gap identified	Key references
Pedagogical applications (tutoring, adaptive learning, data mining)	Limited attention to organizational conditions for adoption	Zawacki-Richter et al. (2019) [3]; Crompton & Burke (2023) [2]
Technological readiness and digital infrastructure	Governance, coordination, and regulatory integration underrepresented	Tornatzky & Fleischer (1990) [6]; EU AI Act (2024) [10]
Individual faculty experimentation	Absence of frameworks for institutional-level coordination	Azevedo et al. (2025) [4]; Rogers (2003) [5]
Ethical principles and guidelines	Lack of operationalization into formal governance mechanisms	Jobin et al. (2019) [12]; UNESCO (2021) [13]
AI tools and access	Organizational capabilities beyond technological availability neglected	Sánchez et al. (2025) [8]; Digital Education Council (2025) [7]

3 Methodology

This study adopts an exploratory qualitative case study design [14] to assess organizational AI readiness in a private higher education institution. The case study approach was selected because it enables in-depth examination of institutional capability configurations within their real organizational context, allowing analysis of the organizational interdependencies that shape AI adoption trajectories.

The selected institution is a private higher education organization located in Spain that has recently intensified its experimentation with artificial intelligence across academic and administrative functions. During the period of analysis, the institution had initiated multiple AI-related exploratory activities, including faculty experimentation with generative AI tools, early-stage administrative automation initiatives, and internal discussions regarding the institutional implications of AI integration. However, no formal institution-wide AI governance framework had yet been fully implemented.

Data collection was conducted through a two-stage assessment process combining a structured organizational readiness questionnaire and a complementary semi-structured interview. The questionnaire served as a structured assessment instrument to support the qualitative evaluation of the eight capability dimensions, while the interview enabled contextual interpretation of responses, clarification of scoring criteria, and deeper exploration of institutional practices, governance mechanisms, and organizational constraints influencing AI adoption. Numerical

scores were used as descriptive indicators to summarize the institutional maturity profile rather than for statistical analysis.

The assessment involved two institutional stakeholders with direct visibility over academic innovation, digital transformation, and institutional decision-making processes. This dual-perspective participation enabled cross-validation of responses and allowed a broader institutional view of current AI-related practices and capability conditions. Scores were refined through triangulation with qualitative evidence obtained during the interview process, improving consistency in indicator interpretation and reducing subjective ambiguity by allowing participants to contextualize institutional practices and provide supporting operational examples.

Dimension-level scores were summarized to construct the institutional maturity profile and provide an overall descriptive AI readiness profile. The objective of the analysis was not comparative benchmarking or statistical inference, but structured institutional diagnosis, enabling identification of capability asymmetries, structural bottlenecks, and priority development pathways.

4 Framework and Results

4.1 Organizational AI Readiness Assessment Framework

This study applies a multidimensional organizational maturity assessment framework designed to evaluate the capability conditions required for coordinated institutional AI adoption. The framework conceptualizes organizational AI readiness as the degree to which an institution possesses the human, organizational, technological, regulatory, and ethical capabilities necessary to adopt, scale, and govern AI initiatives effectively.

The framework is grounded in the assumption that institutional AI adoption depends on alignment across interdependent organizational domains [6]. Progress in one capability area cannot compensate for critical weaknesses in others. Strong technological infrastructure, for example, cannot generate sustainable institutional transformation in the absence of governance mechanisms, regulatory awareness, faculty capability development, and strategic coordination.

Institutional readiness is assessed across eight capability dimensions: People, Regulation, Organization, Market Orientation, Technological Enablement, Innovation, Social Impact, and Ethics. Together, these dimensions provide a comprehensive representation of the institutional conditions shaping AI adoption trajectories [5], consistent with recent proposals in the field such as the Ten Dimension AI Readiness Framework developed for higher education by the Digital Education Council [7].

The **People** dimension evaluates faculty capability development, knowledge-sharing practices, and institutional support for AI-related competencies. **Regulation** assesses compliance awareness, accountability mechanisms, and institutional adaptation to emerging regulatory requirements. **Organization** examines governance structures, coordination mechanisms, and alignment between experimentation and institutional strategy. **Market Orientation** evaluates the institution's

capacity to align AI initiatives with strategic positioning and stakeholder value creation. **Technological Enablement** measures infrastructure readiness, interoperability, deployment capability, and scalability conditions. **Innovation** assesses institutional experimentation capacity and the ability to operationalize emerging practices. **Social Impact** evaluates stakeholder participation, accessibility, and broader institutional inclusion. Finally, **Ethics** examines transparency practices, human oversight, bias awareness, and responsible AI governance [12,13].

Institutional maturity is assessed through a five-level staged scale ranging from $L0$ to $L4$. At $L0$, capabilities are largely absent or highly fragmented. $L1$ reflects initial experimentation with limited coordination. $L2$ indicates basic structured practices enabling partial institutional coordination. $L3$ represents integrated and strategically aligned capability development, while $L4$ reflects optimized institutional maturity characterized by continuous improvement and full strategic integration. The framework operationalizes assessment through a structured indicator-based questionnaire in which each capability indicator is scored on a scale from 0 to 4. Dimension-level scores are subsequently summarized to support the qualitative interpretation of the overall institutional maturity profile.

4.2 Application: Case Study Results

The framework is applied here through an exploratory case study in a private higher education institution located in Spain that had recently intensified its experimentation with AI across academic and administrative functions, without yet having implemented a formal institution-wide governance framework. Data collection combined a structured organizational readiness questionnaire with a complementary semi-structured interview, supporting the structured assessment of the eight dimensions together with the contextual interpretation of institutional practices. The assessment involved stakeholders with direct visibility over academic innovation, digital transformation, and institutional decision-making. Scores were subsequently refined through triangulation with qualitative evidence, improving consistency and reducing interpretive ambiguity [14].

The qualitative assessment, supported by the maturity scoring instrument, yielded an overall descriptive readiness index of 1.57 on a four-point scale, indicating an emerging institutional maturity level situated between initial experimentation (L1) and early structured adoption (L2). Table 2 presents the maturity scores across the eight capability dimensions.

Table 2. Institutional AI readiness assessment results

Capability Dimension	**Score (0–4)**
People	1.90
Regulation	1.00
Organization	1.20
Market Orientation	1.30
Technological Enablement	1.60
Innovation	1.50
Social Impact	1.80
Ethics	2.25
Overall Readiness Index	**1.57**

The results indicate substantial asymmetry across capability domains. The **People** dimension obtained a moderate score of 1.9, reflecting growing faculty awareness and active experimentation with AI tools, though with limited structured training pathways and uneven capability development across academic units. The **Regulation** dimension recorded the lowest score (1.0), revealing weak institutional integration of compliance and regulatory readiness mechanisms — a particularly concerning finding given the progressive enforcement of the EU AI Act [10], which classifies several AI applications common in universities as high-risk systems subject to formal compliance obligations. The **Organization** dimension scored 1.2, indicating limited institutional coordination capacity, with formal governance structures for prioritization and cross-functional oversight remaining underdeveloped. **Market Orientation** (1.3) suggests that AI initiatives are only weakly connected to institutional strategic positioning. **Technological Enablement** (1.6) reflects basic digital infrastructure sufficient for pilot-level experimentation but insufficient for large-scale integration. **Innovation** (1.5) indicates moderate exploratory capacity, though activities remain fragmented and weakly institutionalized. **Social Impact** (1.8) suggests moderate awareness of stakeholder implications, with formal engagement mechanisms still limited. The highest score was observed in the **Ethics** dimension (2.25), reflecting relatively strong awareness of transparency, human oversight, and responsible academic use, though not yet consistently translated into formal governance structures.

Taken together, the findings suggest a pattern of bottom-up experimentation that is not yet accompanied by institution-wide governance and coordination mechanisms. The institution exhibits growing individual engagement with AI and moderate ethical awareness, but lacks the governance, regulatory integration, and organizational coordination required for coordinated and scalable institutional adoption. Figure 1 illustrates the maturity distribution across the eight assessed dimensions.

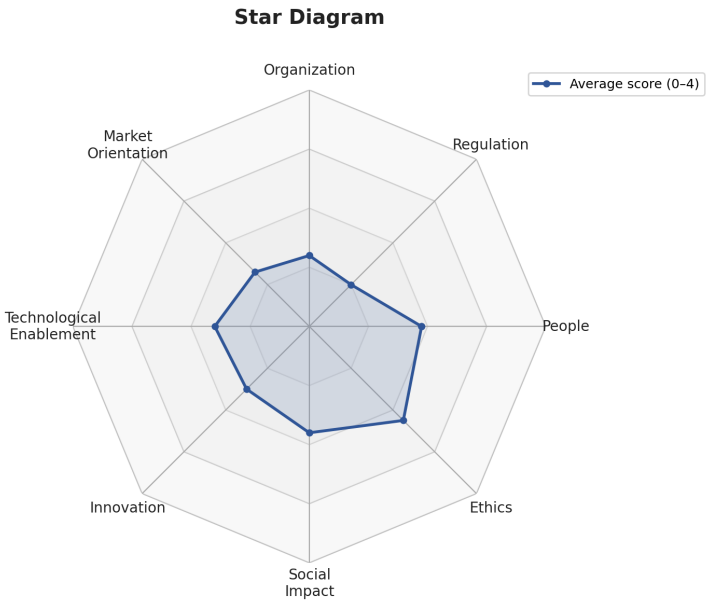


Fig. 1. Organizational AI Readiness Profile of the Case Study Institution.

5 Discussion and Practical Implications

The findings reveal a clear pattern of institutional AI adoption characterized by growing experimentation capacity combined with limited formal organizational orchestration, consistent with broader observations on the tension between bottom-up faculty experimentation and top-down institutional coordination in higher education [4,2].

Individual readiness vs. institutional coordination. The relatively moderate maturity observed in the People dimension indicates that faculty awareness and willingness to experiment with AI tools are evolving positively. Informal learning, peer exchange, and exploratory use of generative AI appear to be contributing to localized capability development. However, the comparatively low scores in the Organization dimension reveal that these individual initiatives are not yet supported by sufficiently developed institutional coordination mechanisms. This misalignment creates a structural bottleneck: while bottom-up experimentation can stimulate innovation, its long-term organizational impact remains limited without formal governance structures capable of consolidating dispersed practices into coordinated institutional learning.

Regulatory gap. The particularly low maturity in the Regulation dimension is a critical finding. As AI regulatory frameworks continue to mature — including the phased enforcement of the EU AI Act [10] — the absence of structured compliance mechanisms introduces institutional risk and limits the capacity to scale AI adoption responsibly. Higher education institutions in Europe are

under increasing pressure to demonstrate compliance with provisions classifying AI-assisted admissions systems and student performance analytics as high-risk applications.

Ethical awareness without governance. The comparatively stronger performance in the Ethics dimension reveals an interesting institutional dynamic. Ethical awareness appears to be emerging primarily as a normative and professional concern among institutional actors, consistent with the convergence around shared ethical principles documented in global AI ethics literature [12,13]. However, unless this awareness is translated into formal governance protocols and operational guidelines, its capacity to shape coordinated institutional practice remains constrained.

Technology is not the bottleneck. The results indicate that basic technological conditions for experimentation are already present. Instead, the principal limitations are organizational: coordination, governance, regulatory integration, and strategic alignment. This reinforces the argument, grounded in organizational innovation theory, that institutional AI adoption should not be conceptualized primarily as a technological implementation challenge, but as a multidimensional organizational capability development process requiring alignment across interdependent institutional domains [6,5].

Practical implications. Based on the findings, five institutional priorities emerge. First, institutions should formalize AI governance structures involving academic leadership, digital transformation units, compliance specialists, and faculty representatives. Second, regulatory capability development should be treated as an immediate priority, developing formal compliance assessment procedures and traceability mechanisms [10]. Third, informal faculty experimentation should be progressively transformed into structured capability development through coordinated training programs and knowledge-sharing mechanisms. Fourth, ethical awareness should be operationalized through formal governance protocols rather than remaining at the level of individual professional concern [12]. Fifth, maturity assessment itself should be understood as a recurring strategic practice — not a one-time diagnostic exercise — enabling continuous capability monitoring and coordinated development as AI adoption evolves.

More broadly, the findings illustrate the value of structured organizational readiness assessment as a recurring strategic practice. Periodic institutional assessment can support continuous capability monitoring, reveal emerging bottlenecks, and guide coordinated capability development as AI adoption evolves. Taken together, these results suggest that effective institutional AI adoption depends less on isolated technological investment and more on the coordinated development of organizational capabilities across all eight assessed dimensions.

6 Conclusions

This study examined organizational AI readiness in a private higher education institution through an exploratory case study [14] using a multidimensional maturity assessment framework across eight capability dimensions.

The findings reveal an early-stage institutional maturity profile characterized by moderate individual experimentation capacity combined with weak formal governance, limited regulatory integration, and insufficient organizational coordination. A central finding is the identification of a recurring institutional asymmetry between individual experimentation and institution-wide governance mechanisms: while faculty experimentation and ethical awareness are evolving positively, these developments are not yet supported by formal governance structures capable of transforming dispersed initiatives into coordinated institutional capability development.

The study contributes to the emerging literature on AI adoption in higher education [3,2] by extending the discussion beyond pedagogical applications and emphasizing organizational readiness as a critical condition for sustainable institutional transformation. The results suggest that the future of AI in higher education will depend not only on technological innovation, but on the capacity of institutions to develop the organizational structures required to govern, coordinate, and sustain responsible adoption in accordance with emerging international standards [10].

Several limitations should be acknowledged. First, this study is based on a single exploratory case conducted in one private higher education institution, which limits the generalizability of the findings to other organizational contexts, institutional types, or national higher education systems. Second, the assessment involved a small number of stakeholders with strategic visibility over AI-related activities. Although the use of structured indicators, semi-structured interviews, and evidence triangulation helped improve the consistency of the assessment, the resulting maturity profile should be interpreted as an institutional diagnosis rather than a statistically representative measurement. Consequently, the findings are intended to provide analytical insights into organizational AI readiness rather than support broad empirical generalizations.

Future research should extend the application of the framework across multiple higher education institutions, enabling comparative analyses of organizational AI readiness profiles and identifying recurring capability patterns across different institutional settings. Longitudinal studies would also be valuable to examine how readiness evolves over time as AI adoption becomes more deeply integrated into academic, administrative, and governance processes.

References

1. Enkelejda Kasneci, Kathrin Seßler, Stefan Küchemann, Maria Bannert, Daryna Dementieva, Frank Fischer, Urs Gasser, Georg Groh, Stephan Günnemann, Eyke Hüllermeier, et al. Chatgpt for good? on opportunities and challenges of large language models for education. *Learning and individual differences*, 103:102274, 2023.
2. Helen Crompton and Diane Burke. Artificial intelligence in higher education: the state of the field. *International journal of educational technology in higher education*, 20(1):1–22, 2023.

3. Olaf Zawacki-Richter, Victoria I. Marín, Melissa Bond, and Franziska Gouverneur. Systematic review of research on artificial intelligence applications in higher education: where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1):39, 2019.
4. Lauren Azevedo, Pedro Robles, Eric Best, and Daniel J. Mallinson. Institutional policies on artificial intelligence in higher education: Frameworks and best practices for faculty. *New Directions for Adult and Continuing Education*, 2025(188):70–78, 2025.
5. Everett M. Rogers. *Diffusion of Innovations*. Free Press, New York, 5th edition, 2003.
6. Louis G. Tornatzky and Mitchell Fleischer. *The Processes of Technological Innovation*. Lexington Books, Lexington, MA, 1990.
7. Digital Education Council AI Working Group. Ten dimension AI readiness framework. Technical report, Digital Education Council, 2025.
8. Esther Sánchez, Reyes Calderón, and Francisco Herrera. Artificial intelligence adoption in SMEs: Survey based on TOE–DOI framework, primary methodology and challenges. *Applied Sciences*, 15(12):6465, 2025.
9. Olaf Zawacki-Richter. A meta systematic review of artificial intelligence in higher education: a call for increased ethics, collaboration, and rigour. *International Journal of Educational Technology in Higher Education*, 21:4, 2024.
10. European Parliament and Council of the European Union. Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). Official Journal of the European Union, OJ L 2024/1689, 2024. Published 12 July 2024; entered into force 1 August 2024.
11. Wayne Holmes, Kaśka Porayska-Pomsta, Kenneth Holstein, Tobias Kutstein, Rohit Kumar, Eva Magnusson, et al. Ethics of AI in education: Towards a community-wide agenda. *International Journal of Artificial Intelligence in Education*, 32(3):504–526, 2022.
12. Anna Jobin, Marcello Ienca, and Effy Vayena. The global landscape of AI ethics guidelines. *Nature Machine Intelligence*, 1(9):389–399, 2019.
13. UNESCO. Recommendation on the ethics of artificial intelligence. Technical report, United Nations Educational, Scientific and Cultural Organization, Paris, 2021.
14. Robert K. Yin. *Case Study Research and Applications: Design and Methods*. SAGE Publications, Thousand Oaks, CA, 6th edition, 2018.