

INTERNATIONALIZATION STRATEGIES OF DIGITAL UNIVERSITIES: A STRATEGIC FRAMEWORK FOR UNIVERSITY 5.0

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ABSTRACT

Purpose- Higher education is experiencing a structural transformation driven by rapid digitalization, shifting macroeconomic conditions, and the growing expectations of technologically fluent student generations. This paper argues that digital universities operating within the emerging University 5.0 paradigm require a fundamentally different strategic vocabulary for internationalization: one that accounts for borderless enrolment, regulatory complexity across jurisdictions, artificial intelligence-powered pedagogies, and the simultaneous democratization of knowledge across global geographies. To address this gap, the study introduces the Digital University Internationalization Matrix (DUIM), a novel two-dimensional diagnostic tool that positions institutions along two axes: digital maturity (encompassing cloud architecture, AI capability, and platform integration) and market penetration scope (spanning domestic-centrality to transnational decentralization). Intersecting these dimensions produces four strategic stages — Digital Proximity, Borderless Infusion, Cross-Border Ecosystems, and Sovereign Decentralization — each carrying distinct technological requirements, strategic foci, and operational bottlenecks.

Methodology- Traditional internationalization frameworks, including the Uppsala process model and resource-based theoretical perspectives, were constructed around the logic of physical presence, sequential market entry, and asset-intensive expansion parameters that hold diminishing relevance for cloud-native, platform-driven educational institutions. Utilizing a conceptual framework grounded in strategic management and higher education governance, this study analyzes the evolutionary path of online higher education institutions globally. It proposes a novel "Digital University Internationalization Matrix (DUIM)" that categorizes institutions based on their digital maturity and market penetration scope.

Findings- The analysis reveals that absence of physical constraints does not guarantee frictionless international operations. Digital universities face highly complex invisible barriers — regulatory, cultural, and competitive. Successful digital internationalization is non-linear, that technological readiness must be matched by regulatory adaptation capacity, and that strategic agility supplants the brick-and-mortar asset accumulation logic of earlier internationalization eras. Technological readiness must be matched by international regulatory adaptation capability. Tech-only strategies without regulatory intelligence will fail at Stage 3–4.

Conclusion- The paper concludes that University 5.0 is a paradigm shift demanding a complete rethinking of what internationalization means from physical mobility to translocal, transtemporal borderless education delivery. The Digital University Internationalization Matrix and the 4-Stage Process Model together provide a practical map for this borderless transition combining diagnostic and prescriptive power. Global scaling depends on simultaneously combining technological maturity (cloud, AI, edge) with regulatory agility (accreditation, data sovereignty, financial compliance). Digital university (University 5.0) — foreseen to reach critical mass by the 2030s — primarily attracts Gen Z, Alpha, and Beta students. Institutions that delay this transition risk structural irrelevance.

Keywords: Digital university, internationalization of higher education, University 5.0, strategic framework, digital maturity

JEL Codes: I23, F23, O33

1. INTRODUCTION

The landscape of global higher education has shifted more dramatically in the past decade than at any comparable period in its modern history. Technological acceleration, post-pandemic institutional reconfiguration, and the emergence of generationally distinct learner cohorts have collectively rendered many of the foundational assumptions of university management and international strategy obsolete. Where internationalization once implied the physical movement of students and faculty across borders — or the capital-intensive establishment of branch campuses in foreign markets — the contemporary reality is one of cloud-based delivery, algorithmically personalized instruction, and digital enrolment pipelines that operate irrespective of geographic proximity.

This transformation has outpaced the theoretical frameworks available to institutional leaders and policymakers. The Uppsala model (Johanson & Vahlne, 1977, 2009), which remains one of the most widely cited internationalization frameworks across both business and higher education scholarship, rests on the premise that firms and institutions expand internationally through a process of incremental commitment, guided by experiential learning and modulated by psychic distance. For traditional universities entering foreign markets through partnership agreements or physical presence, this logic retains partial applicability. For digital universities — institutions whose entire operational and pedagogical infrastructure is cloud-native — the model's sequential assumptions effectively dissolve. There is no psychic distance when enrolment, instruction, assessment, and certification occur entirely on digital platforms accessible from any jurisdiction at any time.

Parallel theoretical challenges apply to the resource-based view (Barney, 1991), which ties competitive advantage to the ownership of rare, inimitable, and non-substitutable physical and human resources. In a digital university operating across dozens of national markets simultaneously, the relevant resources are not campuses, libraries, or physical laboratories. They are AI-driven learning management systems, cloud architectures, data analytics capabilities, and the institutional capacity to navigate fragmented regulatory and accreditation environments across jurisdictions. Static asset logic, in short, is insufficient for understanding the competitive positioning of digitally-delivered higher education.

The present study responds to these theoretical gaps by proposing a new strategic framework tailored specifically to digital universities in the University 5.0 era — a term increasingly used in the academic literature to describe the next phase of higher education, characterized by the synthesis of high-velocity automation, hyper-personalized learning, and the treatment of the global student population as a single unified market (Dong, 2024; Zhao & Rong, 2025). The framework, termed the Digital University Internationalization Matrix (DUIM), is designed to serve both as a diagnostic instrument for institutional self-assessment and as a prescriptive map for navigating the complexity of digital internationalization at scale.

The paper proceeds as follows. Section 2 reviews the relevant theoretical and empirical literature. Section 3 articulates methodology and findings presenting the DUIM and the associated four-stage process model with key findings. Section 4 concludes with reflections on the future trajectory of University 5.0 internationalization.

2. LITERATURE REVIEW

Scholarship on the internationalization of higher education has grown substantially over the past three decades, yet its core frameworks remain anchored in assumptions derived from campus-bound, mobility-centric institutional models. Knight (2003) provided the canonical definition — internationalization as "the process of integrating an international, intercultural, or global dimension into the purpose, functions and delivery of post-secondary education" — a definition broad enough to encompass digital delivery in principle, but rarely operationalized in that way within the literature that followed. De Wit and Altbach (2021, 2023) have consistently noted that internationalization theory lags behind institutional practice, with the post-pandemic period accelerating a divergence that the field has yet to fully address conceptually.

The Uppsala internationalization model (Johanson & Vahlne, 1977) described a staged progression from domestic operations through indirect exports to the eventual establishment of foreign subsidiaries, driven by the gradual accumulation of market knowledge that reduces perceived risk. The 2009 revision (Johanson & Vahlne, 2009) shifted emphasis toward network relationships and the liability of outsidership — the disadvantage of not belonging to relevant business networks in foreign markets. Vahlne and Johanson (2017) subsequently extended the model to incorporate dynamic capabilities, yet, as multiple scholars have observed, the revised model remains largely silent on the implications of digital context (Hult et al., 2020). Born-digital firms, and by extension born-digital universities, routinely leapfrog the sequential stages the Uppsala model describes; their internationalization is simultaneous rather than staged, and their liability is not physical outsidership but regulatory and accreditation outsidership — a fundamentally different challenge.

The resource-based view (Barney, 1991) offers complementary but similarly bounded insight. Its focus on VRIN resources — valuable, rare, inimitable, and non-substitutable — provides a useful lens for understanding competitive differentiation, but its application to digital universities requires reconceptualization. Cloud infrastructure, AI-driven learning engines, and proprietary student data analytics constitute the VRIN resources of digital higher education institutions; none of these fit comfortably within the physical asset categories the original theory privileged.

More directly relevant to the present study, a growing body of empirical and conceptual work has examined the digitalization of higher education internationalization in recent years. The core values and missions of universities have lasted for centuries. However, they are not immune to the changes of digital transformation era (Eskinat&Teker, 2026). Higher education institutions have been recently forced to deliver education services in new ways and operate in a global marketplace. Therefore, universities must rethink and redesign how they provide access to their courses anywhere and at any time. (Eskinat&Teker,2023). Lazari and Matsoukas (2025), writing in *Frontiers in Education*, documented the role of MOOCs and virtual exchange programs in enabling institutions to reach genuinely global audiences irrespective of physical and geopolitical barriers, characterizing this as a new era of borderless university development. The International Association of Universities (IAU) 6th Global Survey (2024), drawing on responses from 722 institutions across 110 countries, found that digital delivery has become a primary vector for internationalization while simultaneously identifying regulatory fragmentation as the single most significant structural barrier to its expansion., Tang Huang, and Yan (2025) proposed a conceptual model of digital transformation in higher education grounded in SECI-based knowledge sharing and cloud-native pedagogical delivery. Castañeda et al. (2023) linked digital maturity directly to academic quality and progress toward the United Nations Sustainable Development Goals.

On the market scale dimension, Grand View Research (2025) projected that the global digital education market will grow from approximately USD 26 billion in 2024 to USD 133 billion by 2030, representing a compound annual growth rate of 31.5%, with Asia-Pacific growing fastest at 33%. Coursera alone reported 191 million total global learners in 2025, reflecting the genuinely transnational scope that leading digital platforms have already achieved. These figures underscore the strategic urgency of developing internationalization frameworks

commensurate with the scale and pace of the market. The IAU (2024) survey and the broader digital transformation literature reviewed here together point toward a common conclusion: existing frameworks require substantial rethinking rather than incremental adaptation.

3. METHODOLOGY AND FINDINGS

This study adopts a conceptual-analytical methodology rooted in strategic management theory and grounded in a systematic review of the digital higher education literature. Rather than generating primary empirical data through surveys or case studies, the research synthesizes theoretical frameworks, market intelligence, and institutional evolution patterns to construct a novel analytical model applicable across institutional contexts. This approach is consistent with established practice in strategic management scholarship where original frameworks are introduced through conceptual reasoning and theoretical synthesis (Barney, 1991; Teece, 2007).

The analytical process unfolded in three stages. First, dominant internationalization frameworks — principally the Uppsala model and the resource-based view — were reviewed to identify their structural assumptions and the specific ways in which these assumptions are violated by cloud-native educational institutions. Second, the digital higher education literature was surveyed to identify the empirical phenomena that any new framework would need to accommodate: simultaneous global reach, AI-driven personalization, regulatory heterogeneity, blockchain credentialing, and the non-linear progression of institutional digital capability. Third, these inputs were synthesized into the Digital University Internationalization Matrix (DUIM) and its accompanying four-stage process model, which together constitute the primary theoretical contribution of the paper.

3.1. The Digital University Internationalization Matrix (DUIM)

The DUIM positions institutions within a two-dimensional space. The vertical axis — digital maturity — captures an institution's technological capability and infrastructure integration, ranging from low maturity (standard learning management systems operating as siloed, content-export vehicles) to high maturity (cloud-native architectures incorporating AI-driven instruction, automated compliance monitoring, and edge computing for distributed credential verification). The horizontal axis — market penetration scope — reflects the geographic and demographic breadth of an institution's reach, ranging from centralized domestic dominance to transnational boundlessness characterized by decentralized, locally-compliant operational nodes across multiple jurisdictions simultaneously.

The intersection of these two dimensions produces four quadrants, each corresponding to a distinct strategic stage. Stage 1, Digital Proximity, describes institutions of low digital maturity operating in centralized, culturally-proximate markets. These institutions extend legacy platforms to regional audiences, rely on content-export mindsets, and face language barriers and brand recognition deficits as their primary operational constraints. Stage 2, Borderless Infusion, captures high-digitally-mature institutions operating in centralized mode: they achieve rapid global student acquisition through cloud-native AI-translated content delivery without requiring localized physical bodies, but face challenges related to currency conversion complexity and home-country regulatory dependencies. Stage 3, Cross-Border Ecosystems, describes institutions of lower digital maturity that have nonetheless achieved transnational reach through joint degree alliances, public-private partnerships, and shared digital credit systems. Their primary constraint is fragmented technological stacks and complex partner alignment across jurisdictions. Stage 4, Sovereign Decentralization, represents the University 5.0 ideal: fully digitally-mature institutions operating as globally decentralized networks of locally-compliant, autonomous institutional nodes underpinned by edge computing, blockchain-verified micro-credentials, and multi-node regional micro-campus. The principal bottlenecks at this stage are data sovereignty legislation (including instruments such as GDPR and equivalent national frameworks) and the absence of harmonized international accreditation standards.

3.2. The Four-Stage Process Model

Unlike the Uppsala model's assumption of linear, experience-driven progression, the DUIM-based four-stage model is explicitly non-linear. Institutions may enter at any quadrant depending on their founding architecture and market positioning, may leapfrog stages as technological infrastructure improves, or may regress under regulatory pressure. An institution born as a fully cloud-native platform — analogous to a born-global firm in international business — may begin operations already positioned at Stage 2 or Stage 4, without passing through the Stage 1 experience of gradual regional market extension. Conversely, a well-established online institution with a strong transnational student base but fragmented legacy technology stacks may occupy Stage 3 until a deliberate technology investment program moves it toward Stage 4.

The model also identifies three categories of resource requirements that shift across the four stages. Technological requirements escalate from basic LMS infrastructure to cloud architecture, AI-based translation, API-driven institutional middleware, and ultimately edge computing and distributed ledger technology for credential verification. Regulatory requirements shift from managing language and brand localization constraints at Stage 1 to navigating complex multi-jurisdictional data sovereignty frameworks at Stage 4. Strategic competency requirements move from content adaptation at Stage 1 to the management of global public-private ecosystem partnerships and autonomous legal entity governance at Stage 4. The implication is that each stage transition demands not simply more of the same capability but qualitatively different institutional capacities — a point that existing internationalization frameworks, focused predominantly on market knowledge accumulation, do not adequately capture.

Figure 1 presents the Digital University Internationalization Matrix (DUIM), the central analytical tool introduced in this study. The matrix positions higher education institutions within a two-dimensional space defined by digital maturity on the vertical axis and market penetration scope on the horizontal axis. Digital maturity spans the range from low-integration legacy learning management systems operating in content-export mode to high-integration cloud-native architectures supported by AI-driven instruction, automated compliance management, and edge computing infrastructure. Market penetration scope ranges from centralized domestic dominance — in which an institution's operational and regulatory logic remains anchored in its home jurisdiction — to transnational decentralization, whereby

autonomous, locally-compliant institutional nodes operate across multiple jurisdictions simultaneously as part of a coherent global network. The intersection of these two dimensions produces four quadrants, each representing a distinct internationalization stage: Stage 1 (Digital Proximity), Stage 2 (Borderless Infusion), Stage 3 (Cross-Border Ecosystems), and Stage 4 (Sovereign Decentralization). The dashed diagonal arrow traversing the matrix from Stage 1 toward Stage 4 denotes the non-linear leapfrog trajectory available to born-digital institutions — a key departure from the sequential logic of the Uppsala model. Each quadrant identifies the primary strategic focus, core technology lever, and principal operational bottleneck characterizing that stage, enabling institutional leaders to conduct a structured self-assessment of their current positioning and to identify the capability investments required for stage transition.

Figure 1: Digital University Internationalization Matrix (DUIM)

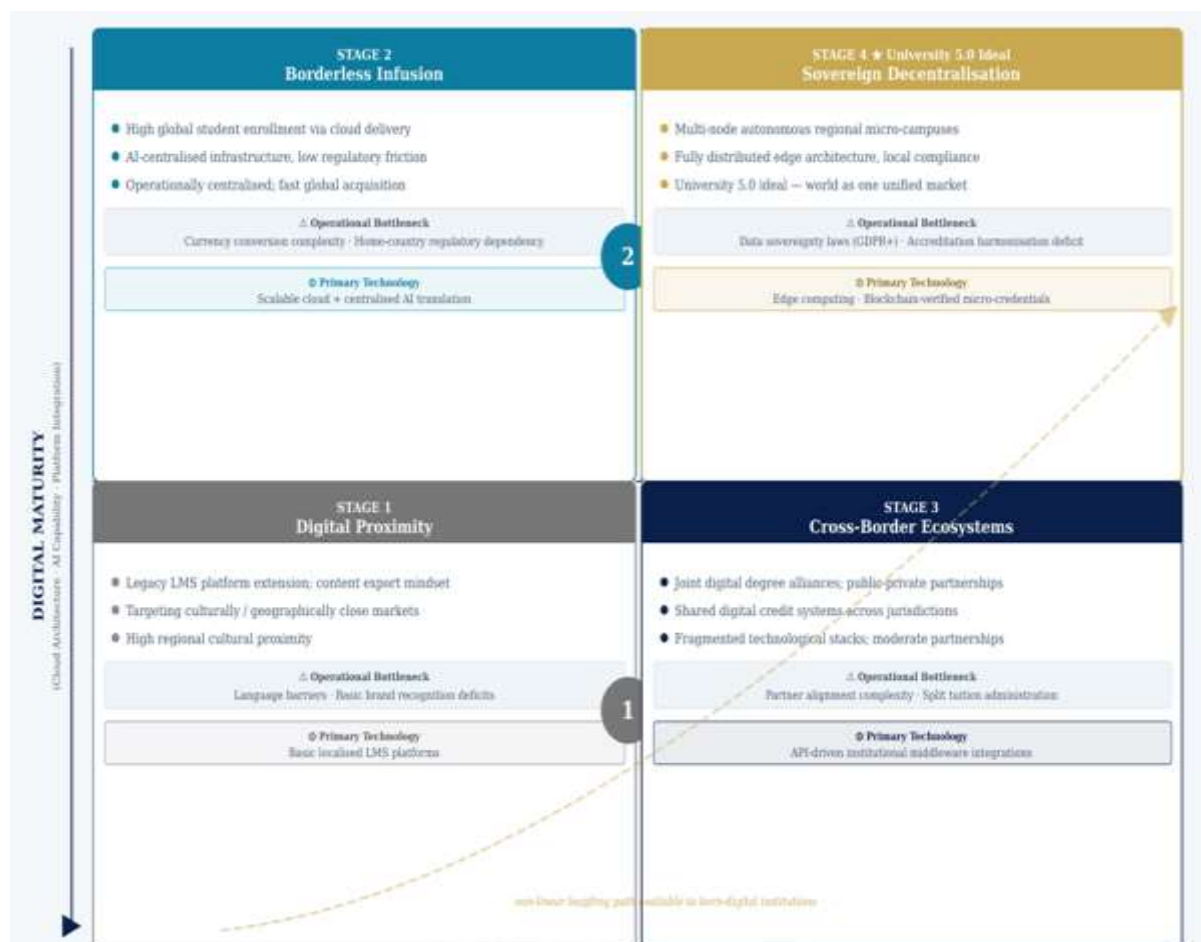
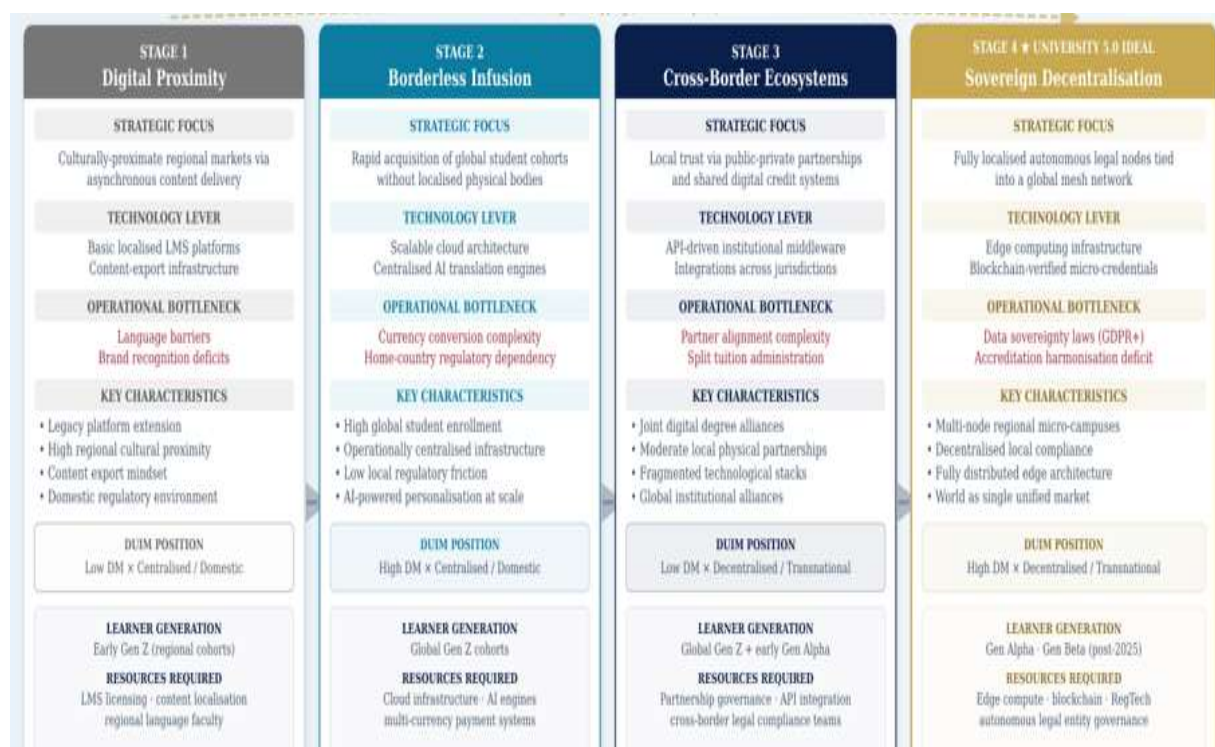


Figure 2 elaborates the four-stage trajectory described by the DUIM through a process-oriented visualization that maps the specific operational characteristics, technology requirements, and strategic resources associated with each stage. Stage 1, Digital Proximity, is characterized by culturally proximate market targeting via asynchronous content delivery on basic localized cohorts, with language barriers and brand recognition deficits as the principal constraints; it serves primarily early Generation Z student cohorts and requires modest LMS licensing and content localization investment. Stage 2, Borderless Infusion, scales global student acquisition through centralized cloud architecture and AI-driven translation without requiring localized physical presence; its operational bottlenecks are currency conversion complexity and home-country regulatory dependency, and it targets global Generation Z populations at the cost of significant cloud and AI infrastructure investment. Stage 3, Cross-Border Ecosystems, trades some technological sophistication for transnational reach through joint degree alliances and public-private digital partnerships; partner alignment and split tuition administration constitute its primary operational friction, and it begins to address Generation Alpha learner expectations. Stage 4, Sovereign Decentralization — the University 5.0 ideal — establishes fully autonomous, locally-compliant legal nodes tied into a global mesh network underpinned by edge computing and blockchain-verified micro-credentials; it confronts data sovereignty legislation and the current absence of harmonized international accreditation standards, and it is calibrated for Generation Alpha and Generation Beta learners for whom geographically fixed campuses will carry only historical significance. The dashed arc spanning the top of the figure represents the non-linear leapfrog path by which a born-digital institution may enter directly at Stage 2 or Stage 4 without passing through the preceding stages, reflecting the collapse of the sequential commitment logic that the Uppsala model assumes.

Figure 2: Four-Stage Process Model of Digital University Internationalization



3.3. Key Findings

Four principal findings emerge from the analysis. First, digitization does not automatically produce frictionless internationalization. Digital universities encounter a distinct topology of invisible borders — regulatory, cultural, accreditation-based, and competitive — that conventional internationalization frameworks were not designed to map. Second, digital university internationalization follows a non-linear evolutionary logic that is better modelled as a strategic positioning problem than as a sequential stage progression. Third, strategic agility — the institutional capacity to reconfigure resources, partnerships, and technological architectures rapidly in response to shifting market and regulatory conditions — replaces physical asset accumulation as the core source of competitive advantage in digital higher education markets. Fourth, technological readiness and regulatory adaptation capacity must develop in tandem; institutions that invest exclusively in AI and cloud infrastructure without building commensurate expertise in multi-jurisdictional compliance, accreditation navigation, and data sovereignty management are likely to encounter severe operational constraints at Stage 3 and Stage 4.

4. CONCLUSION

University 5.0 represents not merely a further technological iteration of higher education delivery but a fundamental paradigm shift in the meaning and practice of internationalization. The assumption that universities expand internationally by moving people, credentials, and physical assets across borders has been progressively invalidated by the emergence of cloud-native educational platforms capable of simultaneous global reach. What remains underdeveloped — and what the present paper has sought to address — is the strategic framework adequate to this new reality.

The Digital University Internationalization Matrix offers a practical diagnostic and prescriptive tool that accommodates the non-linear, multi-dimensional character of digital higher education expansion. By mapping institutions along digital maturity and market penetration scope dimensions, the DUIM enables institutional leaders to identify their current strategic position, diagnose the specific capability gaps and regulatory bottlenecks they face, and chart investment priorities appropriate to the stage transition they aspire to achieve. The four-stage process model provides a conceptual map for this journey without imposing the false linearity of earlier internationalization frameworks.

Successful global scaling for digital universities depends on simultaneously combining technological maturity (cloud, AI, edge) with regulatory agility (accreditation, data sovereignty, financial compliance). A dynamic alignment between technological capabilities and international regulatory adaptation is emerging rather than conventional physical resource deployment strategies.

The generational dimension of this transition should not be underestimated. Generation Z students — already the primary market for higher education worldwide — are digital natives whose educational expectations were formed in environments of continuous connectivity, algorithmic personalization, and peer-to-peer global interaction. Generation Alpha, currently approaching university age, will have grown up with AI tutors and immersive digital learning as baseline experiences. Generation Beta will likely regard the notion of a geographically fixed campus as historically curious. Digital universities that delay the structural and strategic transitions the DUIM describes risk not marginal competitive disadvantage but structural irrelevance within a decade.

Several limitations of this study warrant acknowledgement. The DUIM is a conceptual model without empirical validation across a representative sample of digital higher education institutions. Future research should test the model's stage classifications and transition pathways through large-N comparative institutional analysis and longitudinal case study research focusing on institutions that have successfully navigated Stage 3-to-Stage 4 transitions. Additionally, the model's current formulation does not fully address equity and access dimensions — the extent to which sovereign decentralization strategies serve or exclude students in low-bandwidth, low-regulatory-capacity national contexts is a question that demands sustained scholarly attention. Notwithstanding these limitations, the DUIM and its accompanying four-stage model represent a contribution to the strategic management of digital higher education that the field has lacked: a framework built specifically for the institutional realities of University 5.0 rather than retrospectively adapted from frameworks designed for a campus-bound world.

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