



Review

Repositioning digital maturity for higher education and human resource management: evidence from a systematic review and bibliometric mapping

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Abstract: Digital maturity is increasingly recognized as an important condition for organizational transformation; however, it is still frequently assessed primarily through technological readiness, digital infrastructure, and process digitalization. This perspective provides limited guidance for higher education institutions, where digital transformation depends substantially on workforce capability, leadership readiness, organizational learning, and adaptive culture. This study examines the evolution and dimensional structure of digital maturity research and repositions digital maturity as a strategic human resource management capability for higher education. A hybrid systematic literature review and bibliometric analysis was conducted using 333 peer-reviewed journal articles indexed in Scopus and published between 2018 and November 2025. The analysis maps publication trends, thematic evolution, geographic and sectoral patterns, and the dimensional structure of 18 digital maturity models. The findings show that digital maturity research has expanded rapidly and evolved from a predominantly technology-centred orientation towards a broader capability-based perspective. Technology and Strategy are the most consistently represented dimensions, while People and Organization/Culture are essential for translating digital investments into institutional capability. Sustainability, Security, and Integration remain comparatively underrepresented. Based on the literature synthesis, the study proposes an HRM-oriented conceptual framework linking digital maturity dimensions with competency development, strategic workforce planning, digital leadership, organizational learning, and participatory change management. The framework is intended as an analytically grounded conceptual guide rather than an empirically validated causal model. The study contributes to HRM scholarship by clarifying how universities can integrate digital maturity assessment with people-centred capability development and institutional transformation.

Keywords: digital maturity; digital transformation; human resource management; higher education; systematic literature review; bibliometric analysis; organizational capability

1. Introduction

Human resource management is undergoing a fundamental shift in the digital era (Haryanto et al., 2026). The central challenge is no longer simply whether organizations adopt digital technologies, but whether their workforce, leadership, and organizational systems possess the maturity required to convert technological adoption into sustained institutional capability (Amany, 2025; Kumar & Das, 2025; Wahdaniah et al., 2023). In this regard, digital maturity should not be viewed solely as an indicator of technological readiness. It also reflects an organization's capacity to develop workforce competencies, leadership readiness, and an adaptive culture that can support continuous digital transformation (Laouar

& Boukerch, 2025; Sumirat et al., 2026). This perspective is particularly relevant to higher education institutions, where the effectiveness of digital transformation depends on how academic leaders, faculty members, administrative staff, and support personnel develop, apply, and continuously renew their digital capabilities.

In higher education, the relevance of digital maturity extends beyond the technical implementation of online learning platforms, academic information systems, or administrative technologies (Juliana et al., 2024). Universities increasingly operate in an environment shaped by Society 5.0 and Education 5.0, where institutional competitiveness depends on their capacity to align digital infrastructure with human capital development, adaptive governance, knowledge creation, and service innovation (Bisri et al., 2025; Bobro, 2025; Bravo-Jaico et al., 2025; Rodríguez-Abitia & Bribiesca-Correa, 2021). From a human resource management perspective, this means that digital transformation in universities should be understood as a process of developing people, competencies, leadership, and organizational culture, rather than merely expanding technological access (Fernández et al., 2023; Stasiuk, 2025; Teker et al., 2022).

This perspective is important because human resources represent the central mechanism through which digital strategies are translated into institutional performance. In universities, lecturers, administrative staff, academic leaders, and support personnel are the actors who enact digital transformation through daily decisions, service delivery, knowledge sharing, and innovation practices. Consequently, digital maturity is closely related to HRM concerns such as capability building, strategic alignment, continuous learning, workforce readiness, and the cultivation of organizational cultures that support adaptation and innovation (Damayanti et al., 2026; Nazarova & Rudenko, 2023; Shahiduzzaman, 2025; Srinivasan, 2025).

Recent higher education research has already shown that digital competence and digital literacy contribute to academic productivity, engagement, and employability readiness (Anderson et al., 2025; Mn et al., 2020; Zakharevych & Hryhorenko, 2024). This view is consistent with evidence from higher education research showing that students' readiness to engage with emerging socio-economic opportunities is shaped not only by knowledge exposure, but also by attitudes, behavioural orientation, and individual disposition toward action (Iskandar et al., 2026). However, much of this discussion remains focused on individual students or instructional processes, while less attention has been given to the broader institutional capability needed to sustain digital transformation at the organizational level. This leaves an important gap between micro-level digital skills and macro-level institutional readiness, especially when universities are expected to function as human capital incubators in the digital economy (Achkasova et al., 2022; Civilcharan & Maharaj, 2018; Raphel, 2025).

At the same time, the digital maturity literature itself remains fragmented. Existing models differ in their theoretical assumptions, dimensional structures, sectoral applications, and assessment approaches, making it difficult to determine which dimensions are universally important and which are context-specific (Team, 2020; Kamarul Zaman et al., 2025; Temme & Diamantopoulos, 2016; Wagner, 2021). This fragmentation has practical implications for human resource management because institutions may struggle to identify which elements of digital maturity are most relevant for workforce development, leadership capability, organizational learning, and cultural transformation. The problem is even more pronounced in higher education, where digital transformation involves multiple professional groups, layered governance arrangements, and strong dependence on knowledge-intensive work.

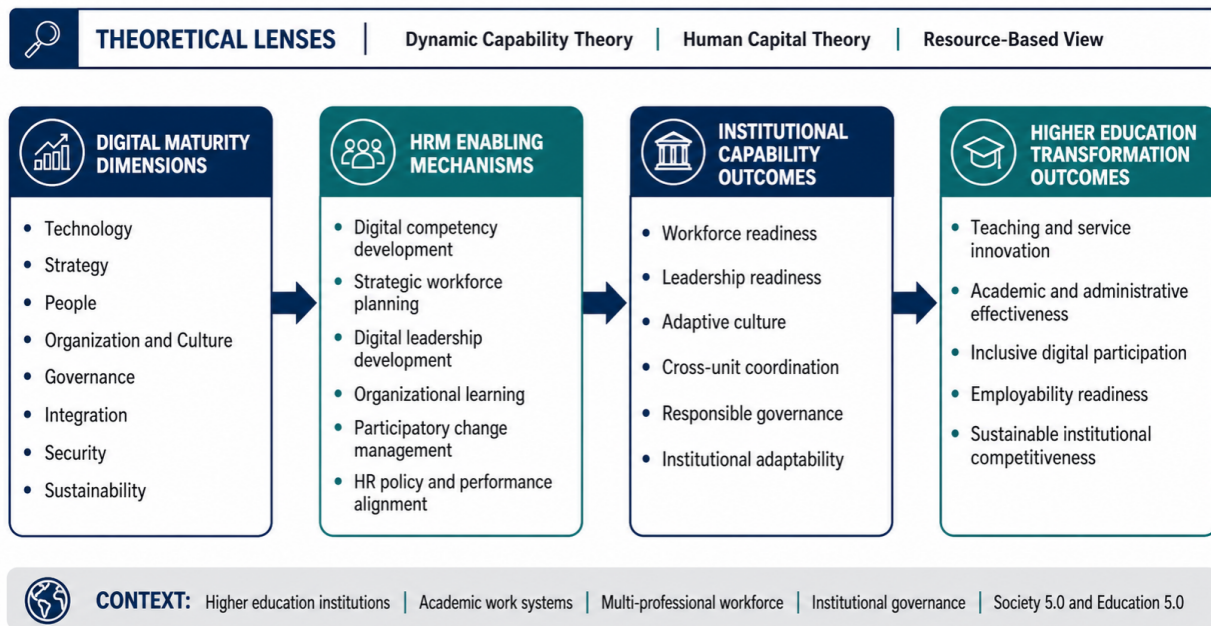
Another important limitation is that the current body of digital maturity

research is concentrated largely in Europe and North America and focuses heavily on sectors such as manufacturing, healthcare, and SMEs, while higher education remains comparatively underrepresented (Laouar & Boukerch, 2025; Ostrovska, 2024; Thordsen & Bick, 2023). This imbalance raises questions about whether existing digital maturity frameworks adequately capture the human resource realities of universities, particularly in developing and emerging contexts where institutional constraints, leadership structures, and workforce development needs may differ substantially. For HRM scholarship, this suggests the need to reinterpret digital maturity not only as a technological or organizational construct, but also as a strategic human resource issue related to people development, institutional resilience, and long-term capability formation.

To address these gaps, this study adopts a hybrid approach that combines a systematic literature review and bibliometric analysis to examine the development of digital maturity research from 2018 to November 2025. Specifically, the study maps the temporal evolution of the field, identifies its thematic and structural characteristics, and synthesizes the core dimensions that constitute digital maturity. More importantly, the study interprets these findings through a human resource management lens in order to clarify how digital maturity can inform workforce capability development, strategic leadership, organizational culture, and institutional transformation in higher education.

Accordingly, the study approaches digital maturity as an HRM relevant institutional capability, rather than treating HRM merely as a downstream application area of digital transformation. This framing enables the analysis to examine how the core dimensions of digital maturity relate to human capital development, digital leadership, organizational learning, workforce readiness, and culture change in higher education.

By doing so, this article aims to contribute to the growing intersection between digital transformation and human resource management. The study positions digital maturity as a multidimensional institutional capability with direct relevance to human capital development and HR strategy in universities, thereby extending the discussion beyond technological readiness toward the management of people, competencies, and organizational adaptation in the era of Society 5.0 (Bisri et al., 2025; Bobro, 2025; Bravo-Jaico, Alarcón, et al., 2025; Rodríguez-Abitia & Bribiesca-Correa, 2021).



Arrows indicate conceptually proposed relationships derived from the literature synthesis; they do not represent empirically tested causal effects.

Figure 1. Conceptual and interpretive framework repositioning digital maturity as a strategic HRM capability in higher education.

Figure 1 presents a conceptual and interpretive framework that repositions digital maturity as a strategic HRM capability in higher education. The framework begins with the multidimensional nature of digital maturity, encompassing Technology, Strategy, People, Organization and Culture, Governance, Integration, Security, and Sustainability. These dimensions are interpreted through HRM enabling mechanisms, including digital competency development, strategic workforce planning, digital leadership development, organizational learning, participatory change management, and the alignment of HR policies with institutional digital priorities.

Through these mechanisms, digital maturity may contribute to institutional capabilities such as workforce readiness, leadership readiness, adaptive culture, cross unit coordination, responsible governance, and institutional adaptability. These capabilities may, in turn, support higher education transformation outcomes, including teaching and service innovation, academic and administrative effectiveness, inclusive digital participation, employability readiness, and sustainable institutional competitiveness. The framework is informed by Dynamic Capability Theory, Human Capital Theory, and the Resource Based View, which together explain how digital resources become strategically valuable when they are combined with human capability, leadership, and organizational learning (Hudoyo & Hendayana, 2025; Sun et al., 2024).

The arrows in the framework represent conceptually proposed relationships derived from the literature synthesis. They should not be interpreted as empirically tested causal effects. Rather, the framework provides a structured basis for future research to examine how digital maturity dimensions and HRM mechanisms interact across different higher education contexts.

To clarify the conceptual novelty of the proposed framework, **Table 1** compares the prevailing orientation of generic digital maturity models with the HRM-oriented framework proposed for higher education.

Table 1. Comparison between generic digital maturity models and the proposed HRM-oriented framework for higher education

Aspect	Generic digital maturity models	Proposed HRM oriented framework for higher education
Primary focus	Technological readiness, process digitalization, and operational efficiency	The development of human and organizational capabilities required to sustain digital transformation
Core dimensions	Technology and strategy are commonly emphasized	Technology, strategy, people, and organization or culture are treated as interdependent core dimensions
Unit of analysis	Organizations or firms, often in manufacturing, SME, or technology intensive settings	Higher education institutions involving faculty members, administrative staff, academic leaders, and support personnel
Expected outcomes	Process efficiency, productivity, and technological adoption	Workforce capability, digital leadership, organizational learning, academic innovation, and institutional adaptability
Theoretical basis	Often implicit or weakly specified	Dynamic Capability Theory, Human Capital Theory, and the Resource Based View
Practical implication	Assessment of general digital readiness	HRM informed diagnosis and development of people centred digital transformation capacity

The novelty of this study lies not only in mapping the digital maturity literature, but also in repositioning digital maturity as a strategic HRM capability framework for higher education. Existing digital maturity models commonly assess technological readiness, strategic alignment, and operational processes. However, many models treat people related factors as one component among several dimensions and do not adequately explain how human capabilities enable or constrain digital transformation. The framework proposed in this study addresses this limitation by positioning People and Organization or Culture as the interpretive lens through which Technology, Strategy, Security, Sustainability, and Integration are assessed in relation to HRM outcomes. This approach highlights the role of workforce capability, digital leadership, organizational learning, and adaptive culture in enabling universities to transform digital investments into sustainable institutional value. The framework therefore offers both a theoretical contribution, by connecting digital maturity with established HRM and capability based perspectives, and a practical contribution, by guiding higher education institutions in designing people centred digital transformation strategies.

It is important to note that the framework is conceptual and interpretive in nature. It was developed by synthesizing patterns identified across the reviewed literature and is intended to clarify the potential relationships between digital maturity dimensions, HRM capabilities, and higher education outcomes. The present study does not empirically test, validate, or establish causal relationships among these constructs. Rather, the framework provides an analytically grounded basis for future empirical research to examine its applicability, relationships, and contextual relevance across different higher education systems.

The proposed framework distinguishes between four analytically connected levels. The first level comprises the core dimensions of digital maturity, including Technology, Strategy, People, Organization and Culture, Governance, Integration, Security, and Sustainability. These dimensions represent the institutional conditions through which universities prepare for and manage digital transformation. However, their presence alone does not ensure that digital investments will produce meaningful institutional change.

The second level concerns HRM enabling mechanisms that translate digital maturity into actionable organizational capability. These mechanisms include digital competency development, strategic workforce planning, digital leadership development, organizational learning, participatory change management, and the alignment of HR policies with institutional digital priorities. Through these mechanisms, digital maturity may support intermediate institutional

capabilities, including workforce readiness, leadership readiness, adaptive culture, cross unit coordination, responsible governance, and institutional adaptability. These capabilities may subsequently support higher education transformation outcomes, such as teaching and service innovation, academic and administrative effectiveness, inclusive digital participation, employability readiness, and sustainable institutional competitiveness. The framework should therefore be understood as an interpretive structure derived from the reviewed literature rather than as an empirically validated causal model.

1.1 Theoretical foundation

This study draws on three complementary theoretical perspectives to explain why digital maturity should be understood as a strategic HRM capability in higher education. First, Dynamic Capability Theory emphasizes that sustained organizational performance depends not only on the possession of resources, but also on the ability to sense emerging opportunities and threats, seize appropriate opportunities, and reconfigure organizational resources in response to environmental change (Teece et al., 1997). Within higher education, digital maturity may therefore be interpreted as an institutional capability that enables universities to renew workforce competencies, leadership arrangements, work processes, and knowledge systems in response to digital disruption.

Second, Human Capital Theory conceptualizes employees' knowledge, skills, and capabilities as productive assets that contribute to organizational performance and long term development (Becker, 1964). This perspective is particularly relevant in universities because lecturers, administrative staff, academic leaders, and technical personnel are the principal actors through whom digital strategies are translated into teaching innovation, research productivity, service improvement, and institutional learning. Consequently, the People and Organization or Culture dimensions of digital maturity should be regarded as central components of institutional transformation rather than as supplementary elements.

Third, the Resource Based View explains that sustained advantage emerges from resources and capabilities that are valuable, rare, difficult to imitate, and not easily substitutable (Barney, 1991). Digital infrastructure alone is unlikely to generate such an advantage because technological assets can often be acquired or replicated. By contrast, the ability to integrate digital technologies with human capital development, leadership capability, collaborative culture, and organizational learning can create a more distinctive and enduring institutional capability. Taken together, these theoretical perspectives support the central argument of this study: digital maturity should be repositioned from a predominantly technology oriented construct to a strategic HRM capability that supports human capital development and institutional adaptability in higher education.

2. Materials and methods

The fragmented nature of digital maturity research requires a methodological approach capable of capturing both the breadth of the literature and the conceptual variation embedded in existing models and frameworks (Barry et al., 2023; Laouar & Boukerch, 2025; Thordsen & Bick, 2023). Because this study aims not only to map publication trends but also to interpret the relevance of digital maturity for human resource management in higher education, a hybrid review design was considered the most appropriate approach ('Alam, 2025; Çoban Kumbalı, 2024). In line with the writing style commonly found in HRMS articles, the methodological structure of this study emphasizes research design, source selection, screening procedures, and analytical steps in a clear and practice-oriented manner (Bainbridge et al., 2016; Hauff et al., 2025).

A. Research design

This study employed a hybrid design integrating a systematic literature review and bibliometric analysis to examine the development of digital maturity research and its implications for human resource management in higher education (Aras & Büyüközkan, 2023; Nazarova & Rudenko, 2023; Shahiduzzaman, 2025). The systematic literature review was used to identify, evaluate, and synthesize the conceptualizations and dimensional structures of digital maturity across prior studies, while the bibliometric analysis was applied to map publication growth, thematic evolution, geographic distribution, and research collaboration patterns (Baihaqy & Subriadi, 2023; Marlina et al., 2024; Huda et al., 2025; Vavura & Matei, 2024; Wahdaniyah et al., 2025; Marlina et al., 2026).

This approach was selected because digital maturity is a rapidly developing and interdisciplinary construct that cannot be adequately captured through narrative review alone (Aras & Büyüközkan, 2023; Baihaqy & Subriadi, 2023; Ostrovska, 2024). This approach is also consistent with recent review studies in the digital HR field that combine systematic literature review and bibliometric analysis to map conceptual structures, thematic evolution, and future research directions (Damayanti et al., 2026). Bibliometric analysis offers quantitative evidence regarding the structure and evolution of the field, whereas systematic review provides the conceptual depth needed to interpret how digital maturity relates to organizational capability, people development, leadership, and strategic HR alignment in higher education ('Alam, 2025; Exarchou et al., 2023; Lalitha Kavya et al., 2023). Therefore, the integration of both approaches enabled a more comprehensive interpretation of digital maturity as an institutional and human-capital-related capability rather than a purely technological condition.

B. Data source and search strategy

The Scopus database was used as the primary data source because it provides broad coverage of peer-reviewed international publications across disciplines relevant to digital maturity, including management, organizational studies, information systems, engineering, healthcare, and education (Gupta et al., 2022; Jalil et al., 2025). This interdisciplinary coverage is important because the concept of digital maturity has been developed in multiple domains and often draws on diverse terminologies and analytical traditions.

The search was conducted on 11 November 2025 using a Boolean search strategy that combined the terms “digital” and “maturity” across article titles, abstracts, and author keywords. This strategy was designed to retrieve publications explicitly addressing digital maturity while retaining relevant conceptual variants used across disciplinary contexts. This formulation was chosen to balance comprehensiveness and relevance by capturing publications that explicitly addressed digital maturity and related conceptual variants, while avoiding an excessively broad retrieval dominated by general digital transformation studies (Huda et al., 2025; Riski et al., 2025; Vavura & Matei, 2024). The search initially yielded 6,182 documents across multiple document types, publication years, and subject areas.

The temporal scope was limited to publications from 2018 to November 2025 because this period represents the most intensive and coherent phase of growth in digital maturity research. This range also captures three important phases in the field's development: early conceptual formation, pandemic-driven acceleration, and post-pandemic thematic consolidation. In line with the orientation of this article, the dataset was later interpreted not only for general trend mapping but also for its relevance to human resource capability development and organizational transformation in higher education.

C. Inclusion and exclusion criteria

To To ensure methodological consistency and analytical relevance, explicit inclusion and exclusion criteria were applied through a multi-stage screening process in accordance with PRISMA principles (Page et al., 2021). The inclusion criteria covered: (1) peer-reviewed journal articles; (2) publications written in English; (3) publication years between 2018 and November 2025; and (4) studies addressing digital maturity as a primary or substantial secondary topic based on titles, abstracts, and keywords. These criteria were intended to ensure that the final corpus represented validated scholarly contributions directly relevant to the study objectives.

The exclusion criteria removed document types that were considered less suitable for systematic synthesis, including conference papers, book chapters, review articles, conference reviews, notes, editorials, errata, retractions, data papers, books, and non-English publications. Publications from 2026 were also excluded because the search was finalized in November 2025, meaning that later records would not yet be indexed consistently or accumulate adequate bibliographic information for analysis. After screening and eligibility assessment, the final corpus comprised 333 peer-reviewed journal articles, which formed the analytical basis of this study. The complete identification, screening, eligibility assessment, and final inclusion process is presented in **Figure 2**, providing a visual overview of how the initial records were progressively refined into the final analytical corpus.

For the HRMS-oriented framing of this article, the screening process also paid interpretive attention to whether the identified studies contained dimensions relevant to people development, organizational culture, capability formation, leadership, governance, and strategic alignment, as these aspects are central to human resource management in higher education (John Jason M, 2024; Jr et al., 2019; Painoli, 2023).

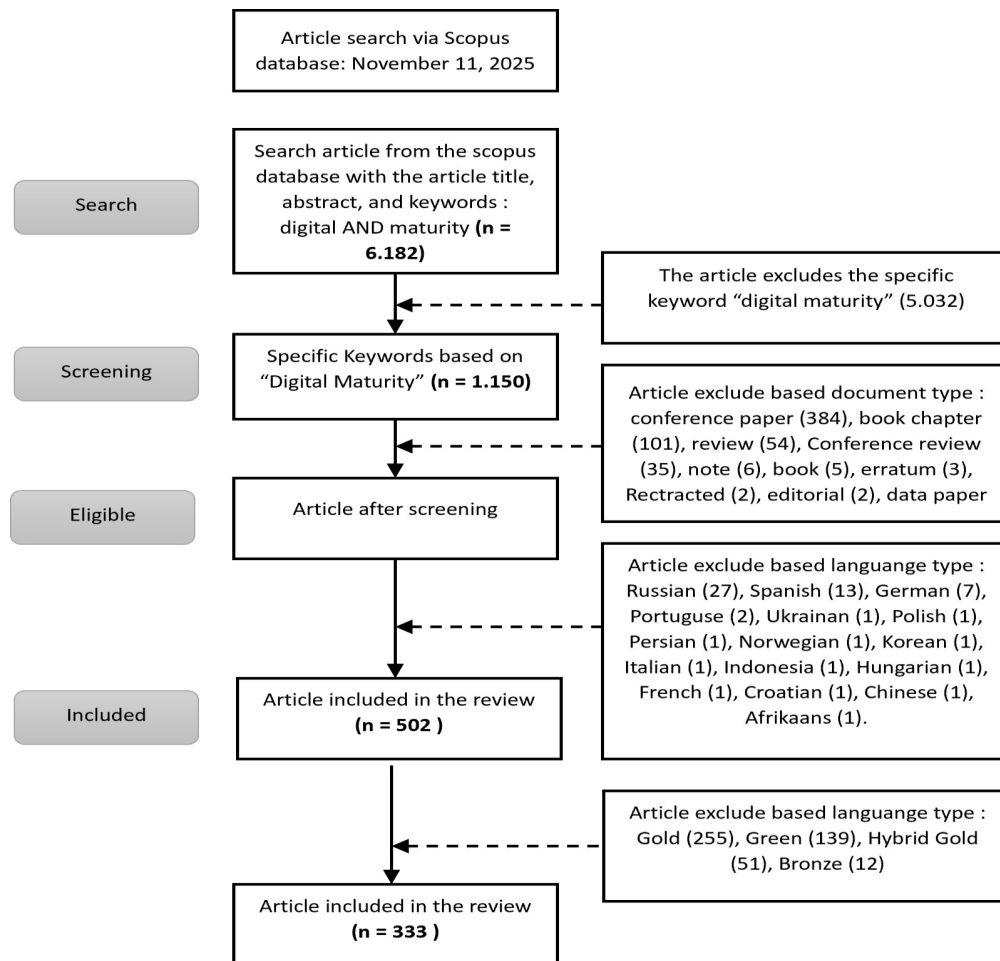


Figure 2. PRISMA flow diagram of article selection

D. Data extraction and analysis procedures

For each included article, bibliographic and descriptive information was extracted systematically, including authors, institutional affiliations, publication year, journal source, article title, abstract, keywords, citation count, and country of the corresponding author. These metadata enabled analysis of annual publication growth, geographic concentration, institutional contribution, collaboration patterns, and thematic emphasis across the literature.

The bibliometric analysis was conducted using VOSviewer version 1.6.20 to perform keyword co-occurrence analysis, thematic clustering, and temporal overlay mapping. Bibliographic records were exported from Scopus in RIS format and divided into three periods, namely 2018–2020, 2021–2022, and 2023–2025, to examine the temporal development of digital maturity research. The keyword data available in the exported records comprised author and index keywords. Prior to mapping, the keyword fields were screened to identify obvious formatting inconsistencies, including variations in capitalization, singular and plural forms, and closely related expressions. Because the original VOSviewer project file and thesaurus file were no longer available, the study does not claim a fully reproducible record of every term-level consolidation or exclusion decision. The keyword maps should therefore be interpreted as transparent descriptive representations of the exported Scopus metadata, complemented by qualitative reading of the included studies.

The minimum occurrence threshold was calibrated to the size of the corpus in each period. For 2018–2020, a threshold of two occurrences retained 23 terms, which were grouped into four clusters. For 2021–2022, a threshold of three occurrences retained 128 terms across 12 clusters. For 2023–2025, a

threshold of five occurrences retained 150 terms across 11 clusters. These settings enabled the analysis to retain recurrent concepts while reducing the visual noise associated with infrequently occurring terms. The available VOSviewer item and network exports verify the occurrence thresholds, retained terms, and cluster memberships. However, they do not preserve the original counting method or network-normalization setting. Accordingly, no claim is made regarding the use of full counting, binary counting, association-strength normalization, or other unverified technical settings.

The systematic review component focused on the qualitative synthesis of digital maturity definitions, model structures, and recurring dimensions. The identification of 18 digital maturity models was based on a structured full-text assessment of the final corpus. A study was included in this synthesis when it explicitly proposed, adapted, operationalized, or systematically reviewed a digital maturity model, framework, assessment instrument, or dimensional structure. Studies that merely referred to digital maturity as a contextual variable without specifying its dimensions or assessment logic were not included in the model-level synthesis. Particular attention was given to dimensions that appeared consistently across models, such as Technology, Strategy, People, and Organization/Culture, as well as dimensions that remained underdeveloped, such as Sustainability, Security, and Integration. This synthesis made it possible to distinguish between widely recognized components of digital maturity and emerging dimensions with strategic implications for HRM and institutional capability development in higher education.

E. Analytical focus

The analysis was guided by three interrelated objectives derived from the broader study design. First, the study examined how digital maturity research evolved over the 2018–2025 period through publication trends and thematic development. Second, it mapped the structural characteristics of the research landscape, including geographic concentration, institutional productivity, thematic distribution, and collaboration patterns. Third, it synthesized the core dimensions that constitute the digital maturity construct and interpreted their relevance for human resource management in higher education. For a more comprehensive overview of the analytical framework and the interrelationships among these objectives, the overall research focus and analytical structure are presented in **Figure 3**.

Although the dataset covered multiple sectors, the interpretation in this article is intentionally directed toward higher education because universities are increasingly required to manage digital transformation through people-centered institutional strategies rather than through technological deployment alone (Baijun, 2024; Limanovskaja & Davidavičienė, 2025; Rughani et al., 2025). From this perspective, digital maturity is treated as an institutional capability that intersects with HRM concerns such as human capital development, organizational learning, leadership readiness, culture change, and workforce adaptability in the era of Society 5.0.

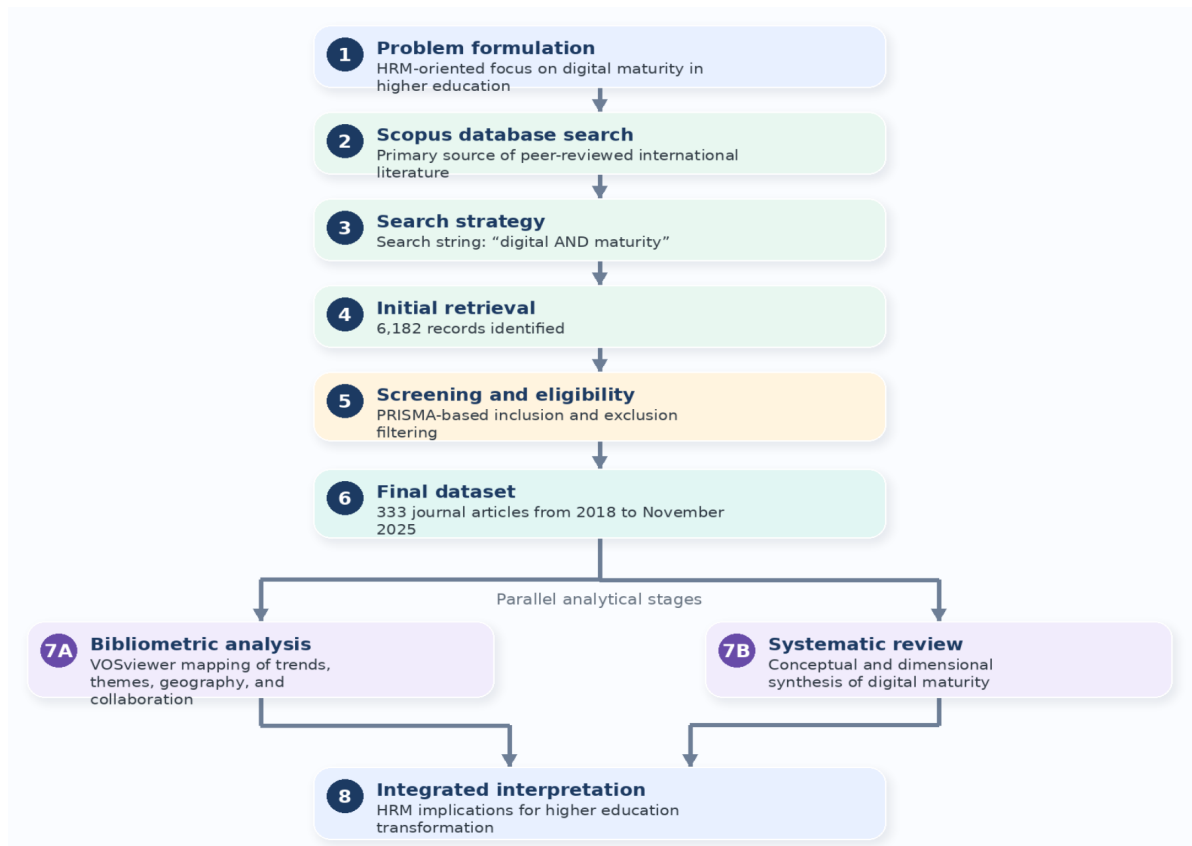


Figure 3. Research methodology flowchart

3. Results and discussion

This section presents the findings of the hybrid systematic literature review and bibliometric analysis of 333 peer-reviewed journal articles on digital maturity published between 2018 and November 2025. The results are organized into four analytical themes, namely publication trends and thematic evolution, research landscape characteristics, synthesis of digital maturity dimensions, and implications for human resource management in higher education.

Importantly, However, they do not preserve the original he findings reported in this section should not be read only as a descriptive overview of publication trends, thematic patterns, and dimensional frequencies. Together with the qualitative synthesis of the reviewed studies, they provide the analytical basis for the conceptual repositioning of digital maturity from a broad cross-sector construct into a strategic HRM capability framework for higher education. This means that the discussion emphasizes how the identified dimensions, gaps, and research patterns can inform workforce capability development, leadership support, organizational learning, and institutional adaptability within universities.

A. Publication trends and thematic evolution

The analysis indicates that research on digital maturity increased markedly during the 2018–2025 period, with the COVID-19 pandemic serving as an important inflection point that accelerated both scholarly and practical interest in digital capability assessment. This growth suggests that organizations increasingly require frameworks that assess not only technology adoption, but also strategic alignment, organizational adaptability, and readiness for continuous transformation.

Temporal mapping further shows a shift from earlier technology-centered discussions toward broader themes such as resilience, sustainability, artificial intelligence integration, and human-centric transformation. This development implies that digital maturity is now being understood as a multidimensional

organizational capability rather than a narrow indicator of digital infrastructure alone.

For higher education, this shift is especially relevant because universities face digital transformation pressures that extend beyond classroom technology to include governance, service redesign, capability development, and institutional competitiveness. In this context, digital maturity provides a useful lens for understanding how higher education institutions build long-term human capital capacity in the Society 5.0 era.

B. Geographic, sectoral, and collaboration patterns

The bibliometric results reveal a clear geographic concentration of digital maturity research in Europe and North America, indicating that the current evidence base is still shaped largely by Western institutional contexts. This concentration raises questions about the transferability of existing models to developing countries and emerging higher education systems, where infrastructure conditions, regulatory environments, and organizational constraints may differ substantially.

In thematic terms, the literature remains strongly concentrated in manufacturing and SME contexts, while sectors such as education, public administration, and services receive comparatively less focused attention. Although higher education appears within the broader corpus, it has not yet become a dominant context for digital maturity theorization or model development.

This imbalance carries important implications for HRM-oriented research because universities require maturity frameworks that account for academic work systems, faculty capabilities, student development, digital governance, and institutional learning processes. Accordingly, the present findings support the need to reinterpret digital maturity through a higher education HRM lens rather than adopting industry-based models without contextual adaptation.

C. Synthesis of digital maturity dimensions

The systematic synthesis of 18 digital maturity models identified 14 main dimensions that collectively shape the construct of digital maturity across sectors and contexts. Among these, Technology and Strategy emerged as the most consistently represented dimensions. Technology appeared in all 18 models, whereas Strategy was represented in 17 models (94.4%). These findings confirm that digital maturity is grounded in both technical capability and strategic direction. However, the synthesis also shows that People and Organization/Culture remain essential dimensions because digital transformation depends on skills, leadership, coordination, and institutional readiness rather than on technological deployment alone. At the same time, several dimensions remain markedly underexplored, particularly Sustainability, Security, and Integration, which appeared in only 6, 11, and 17 of the synthesized models, respectively. The limited presence of these dimensions suggests that much of the existing literature still underestimates the need to align digital maturity with long-term resilience, responsible data governance, and cross-functional institutional integration.

From an HRMS perspective, this pattern is highly significant because neglecting people-related and integrative dimensions may cause organizations to overemphasize technical readiness while overlooking capability development, role redesign, and cultural transformation. In higher education, such omissions may weaken the ability of universities to connect digital transformation with talent development, employability readiness, and sustainable institutional performance.

D. Implications for human resource management in higher education

The combined findings indicate that digital maturity should be treated as a strategic institutional capability that intersects directly with human resource

management in higher education. Rather than functioning solely as a technology assessment framework, digital maturity can help universities evaluate how effectively they develop digital competencies, align strategy with people systems, and support continuous learning across academic and administrative functions.

The comparatively limited representation of people related dimensions in existing digital maturity models warrants closer attention. A plausible explanation is that many early maturity instruments emerged from manufacturing, information systems, and technology intensive settings, where the assessment of digital infrastructure, process automation, and technology adoption was prioritized. This historical orientation has encouraged a view of digital maturity that privileges technical benchmarking over the diagnosis of workforce capability, leadership readiness, and organizational learning. As a result, the human conditions required to sustain digital transformation may be insufficiently captured in widely used maturity assessments.

This imbalance creates a potential structural blind spot for higher education institutions. A university may demonstrate relatively strong performance in technology deployment and strategic planning while remaining inadequately prepared in terms of staff capability, digital leadership, or cultural readiness for change. Such a mismatch can lead to fragmented implementation, limited adoption of digital systems, and resistance among academic or administrative personnel. It may also create a gap between formal digital strategies and the everyday practices through which faculty members and staff actually enact transformation.

From an HRM perspective, these findings indicate that digital maturity assessment should be complemented by explicit people centred indicators. These indicators may include the availability of competency mapping, access to role specific professional development, leadership capacity to coordinate digital change, opportunities for peer learning, and mechanisms that recognize and reward digital innovation. Integrating such indicators would enable universities to identify whether their investments in technology are supported by the human capabilities necessary for effective and sustainable use.

The findings also have implications for organizational learning and HR policy. Universities should move beyond isolated training initiatives and establish continuous capability development systems that connect institutional digital priorities with individual roles, career development, and performance expectations. HR policies can support this process by embedding digital competencies in recruitment, onboarding, appraisal, promotion, and leadership development practices. In this way, digital maturity becomes not only an assessment of institutional readiness but also a framework for aligning HRM systems with the long term transformation objectives of higher education institutions.

This HRM-oriented interpretation is in line with recent evidence showing that digital workforce transformation increasingly connects digital HR practices, workflow automation, and broader innovation capabilities rather than isolated technology adoption alone (Damayanti et al., 2026).

From an HRM standpoint, one of the clearest implications of these findings concerns competency development and workforce readiness. The prominence of Technology and Strategy, together with the continuing relevance of People and Organization/Culture, suggests that digital maturity in higher education cannot be achieved without systematic investment in the skills base of academic and non-academic staff. Universities therefore need HRM mechanisms that go beyond ad hoc training and instead establish competency mapping, role-based upskilling pathways, and continuous professional development systems aligned with institutional digital goals. In this sense, digital maturity provides a useful

framework for linking workforce capability development to broader institutional transformation rather than treating staff training as a peripheral support activity.

This interpretation is consistent with the human capital perspective established earlier in the article, which positions digital capability as a determinant of workforce readiness, institutional adaptability, and competitive performance. Universities with stronger digital maturity are more likely to integrate technological resources with leadership support, organizational learning, and capability-building mechanisms that strengthen both academic performance and employability outcomes.

A second implication relates to digital leadership and organizational learning. The findings indicate that digital maturity is not only determined by the availability of technologies, but also by the extent to which leadership structures support strategic alignment, cross-unit coordination, and adaptive decision-making. In higher education institutions, this means that leaders at rectorate, faculty, and departmental levels must be able to translate digital strategy into shared learning processes, resource prioritization, and organizational routines that encourage experimentation and collaboration. From this perspective, digital maturity becomes closely connected with HRM efforts to cultivate leadership readiness, learning-oriented cultures, and institutional environments in which digital transformation is collectively enacted rather than administratively imposed.

Practically, these results suggest that higher education institutions should adopt HRM-based digital maturity frameworks that include competency mapping, continuous upskilling, digital leadership development, performance monitoring, and evidence-based support systems. Targeted interventions should also address uneven digital readiness among institutional actors, because digital transformation may generate new inequalities when access, confidence, training, and support are distributed unevenly.

A third implication concerns culture change and the management of uneven readiness across institutional actors. Universities are complex organizations in which lecturers, administrators, managers, and support staff may differ substantially in digital confidence, motivation, and access to developmental opportunities. If digital maturity is interpreted only in technical terms, such differences may remain hidden and produce fragmented implementation, resistance, or symbolic compliance. For this reason, HRM-based digital maturity strategies should include culture-building interventions such as participatory change management, inclusive communication, incentive alignment, peer learning support, and recognition systems that reinforce collaborative adaptation. Such measures are essential if digital transformation is to become embedded in everyday institutional practice rather than remaining limited to infrastructure expansion or short-term policy initiatives.

The framework also clarifies the role of HRM as an enabling mechanism rather than a peripheral support function. Digital technologies and strategic intent may create the conditions for transformation, but their institutional value depends on whether HRM systems develop the competencies, leadership capacity, learning processes, and change readiness required for their effective use. In higher education, this means that investments in digital infrastructure should be accompanied by workforce planning, targeted capability development, and inclusive change processes that allow academic and administrative personnel to participate meaningfully in institutional transformation.

The findings further imply that future digital maturity models for universities should explicitly incorporate dimensions related to people development, organizational culture, governance, security, sustainability, and integration. Such an expanded framework would better reflect the realities of higher education

institutions, where transformation success depends on the interaction between digital systems and the human capacities that activate them.

Methodologically, the hybrid SLR-bibliometric approach strengthened this study by combining systematic conceptual synthesis with objective pattern mapping across a large international literature corpus. The use of PRISMA-based screening and VOSviewer analysis strengthened procedural transparency and analytical breadth by enabling the study to identify dominant dimensions and underexplored areas within the digital maturity literature. For HRM research, this approach provides an evidence base for developing more context-sensitive digital maturity frameworks for higher education institutions.

E. Managerial and practical implications

The findings offer several practical implications for university leaders, HR departments, and higher education policymakers. These implications are consistent with the literature on digital transformation in higher education, which emphasizes the importance of coordinated capability development, leadership support, and organisational alignment in sustaining technology-enabled change. First, university leaders should incorporate digital maturity assessment into strategic planning and governance processes. Rather than evaluating digital readiness solely through infrastructure availability or system adoption, institutional leaders should assess whether digital investments are supported by adequate workforce capability, leadership readiness, cross unit coordination, and organizational learning. This broader assessment can assist universities in identifying the gap between the formal adoption of digital systems and the human capacity required to use them effectively.

Second, HR departments should develop competency mapping systems that connect institutional digital priorities with the role specific requirements of academic and non academic personnel. Such systems can identify gaps in digital knowledge, confidence, and practice across faculty members, administrative staff, managers, and technical support personnel. Based on these assessments, universities can design differentiated professional development pathways rather than relying on uniform training programmes that may not address the needs of diverse employee groups.

Third, digital leadership development should be treated as a strategic priority. Leaders at rectorate, faculty, departmental, and unit levels require capabilities that extend beyond technical knowledge. They must be able to communicate a coherent digital vision, coordinate resources across organizational boundaries, support experimentation, address resistance constructively, and create conditions for collaborative learning. HR departments can support this process by incorporating digital leadership competencies into leadership selection, succession planning, performance appraisal, and executive development programmes.

Fourth, universities should integrate digital capability considerations into workforce planning and talent management. Recruitment, onboarding, career development, promotion, and performance management processes can be aligned with institutional digital transformation goals. This alignment would enable universities to treat digital capability as an evolving organizational requirement rather than as an isolated technical skill. It may also help institutions anticipate emerging role changes, identify future skill requirements, and design reskilling strategies for staff whose work is likely to be reshaped by automation, artificial intelligence, and data driven processes.

Fifth, HR policies should foster inclusive and sustainable digital transformation. Uneven access to technology, training, and institutional support may intensify disparities among staff groups and create resistance to change. Universities should therefore provide accessible learning opportunities,

peer support mechanisms, transparent communication, recognition for digital innovation, and appropriate safeguards for employee wellbeing and data privacy. These measures can strengthen trust, participation, and shared ownership of digital transformation.

Finally, higher education policymakers can support more systematic and people centred approaches to digital maturity. National agencies, accreditation bodies, and university governing boards may consider developing guidance that encourages institutions to assess digital maturity across technological, strategic, human, cultural, and governance dimensions. Such guidance should avoid a one size fits all approach and instead recognize differences in institutional mission, resource availability, regulatory conditions, and local workforce characteristics. A context sensitive approach would be particularly important for institutions in developing and emerging economies, where technology access and organizational capability may develop at different rates.

4. Conclusion

This study examined the evolution and dimensional structure of digital maturity research through a hybrid systematic literature review and bibliometric analysis of 333 peer-reviewed journal articles published between 2018 and November 2025. The findings show that digital maturity research has expanded rapidly, especially after the COVID-19 pandemic, and has evolved from a predominantly technology-centered discourse toward a broader capability-based perspective encompassing strategy, organizational adaptation, and human-centered transformation.

The synthesis confirms that digital maturity is a multidimensional construct shaped most consistently by Technology and Strategy, while also requiring strong attention to People and Organization or Culture as enabling dimensions of transformation. At the same time, the literature still underrepresents several strategically important dimensions, particularly Sustainability, Security, and Integration, indicating that many existing models remain incomplete in addressing contemporary organizational challenges.

From the perspective of human resource management in higher education, these findings suggest that digital maturity should not be understood merely as a measure of technological readiness, but as a strategic institutional capability closely linked to human capital development, workforce readiness, organizational learning, and long-term competitiveness. In universities, the relevance of digital maturity lies in its capacity to connect digital transformation with competency development, leadership support, academic adaptability, and employability-oriented talent formation.

This study therefore contributes to the HRMS-oriented literature in three ways. First, it provides an evidence-based synthesis that clarifies the main dimensions forming the digital maturity construct across existing models. Second, it identifies major geographic, sectoral, and thematic gaps in the current research landscape, especially the limited representation of higher education and non-Western contexts. Third, it repositions digital maturity as an analytically useful framework for interpreting digital transformation through an HRM lens in higher education institutions.

Practically, the findings indicate that universities should adopt digital maturity frameworks that move beyond infrastructure assessment and explicitly incorporate people development, organizational culture, governance, security, sustainability, and cross-functional integration. Such an approach can support more inclusive and evidence-based strategies for strengthening digital competencies among students, lecturers, and administrative staff while improving institutional responsiveness to the demands of Society 5.0.

For practice, the study indicates that digital maturity should be integrated into HRM and institutional governance rather than assessed as a purely technical condition. University leaders and HR professionals can use the proposed framework to identify capability gaps, guide competency development, strengthen digital leadership, support workforce planning, and design inclusive change interventions. By linking digital investments with people centred HRM systems, universities may be better positioned to translate technological adoption into long term institutional adaptability and sustainable educational value.

Overall, this study highlights that the future relevance of digital maturity in higher education depends on its ability to function as a bridge between digital transformation and human resource development. Accordingly, a more HRM-oriented understanding of digital maturity is needed to ensure that universities do not only become digitally equipped, but also digitally capable, adaptive, and sustainable institutions.

5. Limitation and future research

Several limitations should be acknowledged when interpreting the findings of this study. First, the analysis relied exclusively on peer-reviewed journal articles indexed in Scopus and published in English between 2018 and November 2025, which strengthens consistency and quality control but may exclude relevant insights from other databases, non-English publications, conference proceedings, and grey literature. As a result, the present synthesis should be read as a robust but bounded representation of the digital maturity research landscape rather than an exhaustive account of all existing knowledge.

Second, although the hybrid SLR-bibliometric design enabled comprehensive mapping of trends, dimensions, and research gaps, bibliometric patterns such as keyword co-occurrence and citation frequency remain indirect indicators of conceptual importance. These indicators are useful for identifying dominant themes and structural tendencies, yet they cannot fully capture nuanced theoretical debates, contextual subtleties, or differences in how digital maturity is operationalized across institutional settings.

A further methodological limitation concerns the reproducibility of the keyword co-occurrence procedure. Although the retained terms, occurrence thresholds, network relationships, and cluster memberships were preserved in the available VOSviewer output files, the original VOSviewer project file and thesaurus file were not retained. Consequently, the study can report the verified thresholds and final network structures, but it cannot retrospectively document each keyword-cleaning decision or confirm the original counting and normalization options. This limitation does not invalidate the descriptive mapping results; however, it requires cautious interpretation and limits the exact replication of the map-generation procedure. Future bibliometric studies should archive the raw database export, thesaurus file, VOSviewer project file, parameter screenshots, and item/network exports in an accessible repository to strengthen auditability and reproducibility.

Third, the current literature base itself is unevenly distributed across geographic and sectoral contexts. Because the evidence is concentrated in Europe and North America and is heavily oriented toward manufacturing and SME settings, the generalizability of dominant digital maturity frameworks to higher education institutions, especially in developing countries, remains limited. This limitation is particularly relevant to HRM research, where institutional conditions, workforce structures, governance arrangements, and capacity-building priorities vary substantially across higher education systems.

Future research should therefore move in several directions. First, more studies are needed in underrepresented regions and emerging economies to

determine whether current digital maturity dimensions are universally applicable or require contextual adaptation for different educational, cultural, and regulatory environments. Comparative cross-country and cross-institutional studies would be especially valuable for clarifying which dimensions are stable across contexts and which are context sensitive.

Second, future studies should give greater attention to underexplored dimensions, particularly Sustainability, Security, and Integration, which remain weakly represented despite their growing strategic importance. For higher education, these dimensions are central because digital transformation increasingly involves data protection, responsible governance, inter-unit coordination, and long-term institutional resilience rather than technology adoption alone.

Third, there is a need for more sector-specific research focused explicitly on higher education institutions. Future studies should examine how digital maturity intersects with HRM variables such as competency development, digital leadership, organizational learning, workforce readiness, academic role transformation, and employability formation. Such work would help build a more contextually grounded framework for assessing digital maturity as a human capital capability within universities.

Fourth, future research should adopt longitudinal and mixed-method designs to move beyond cross-sectional snapshots of digital maturity. Longitudinal studies would be especially important for tracing how digital maturity develops over time, how institutions progress across maturity stages, and how HRM interventions such as training, leadership development, and capability-building programs influence transformation outcomes.

Because the proposed framework is derived from a systematic synthesis rather than primary empirical testing, its proposed relationships should be interpreted as theoretically informed propositions that require subsequent empirical examination and validation.

Finally, future scholarship should work toward developing and validating HRM-oriented digital maturity frameworks for higher education. Such frameworks should integrate technological readiness with people development, organizational culture, governance quality, and strategic adaptability so that digital maturity can be assessed not only as a technical condition, but also as an institutional capability that supports sustainable human capital development in the Society 5.0 era.

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