



From Chalkboards to Digital Dashboards: Evaluating Higher Education Institution Administrators' Readiness for Sustainable Development Goals.

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Abstract: Objective: This study is structured to empirically provide a pioneering administrator-focused, SDGs-aligned readiness profile across Northern Cyprus higher education institutions (HEIs), linking motivations to measurable strategic-planning practices, and significantly contributing to the practice and policy discourse on digital transformation (DT), SDGs, HEIs, and leadership. **Methodology:** The research primarily adopts an inductive approach to explore and generate insights directly from the lived experiences and perspectives of HEI administrators, recruiting 15 HEI administrators in Northern Cyprus using purposive sampling. Face-to-face interviews were scheduled and conducted individually for 7 participants; 5 and 3 opted for virtual interviews via Google Meet and email interviews, respectively. Thematic content analysis aided by NVivo was used for data analysis. **Key Findings:** Findings reveal five thematic roles of digital education: enhancing equity and access, fostering pedagogical innovation and evidence-based decision-making, advancing employability and digital competence, ensuring resilience in crises, and enabling global exposure and lifelong learning. Levels of institutional preparedness varied across cases, influenced by push factors such as pandemic-driven mandates, policy compliance, innovation ambitions, market expansion, and operational efficiency. Administrators' motivations reflected both reactive and proactive drivers, but their realization depends on effective governance, staff capacity, ethical data use, and equity-focused implementation. Analysis of action and strategic plans showed that the most robust approaches integrate mission-rooted alignment, people-centered capacity building, long-term sustainability, stakeholder partnerships, and curriculum-level policy integration. **Conclusion:** While DT strategies in HEIs are advancing and multifaceted, they remain uneven, with critical gaps such as business continuity, risk management, monitoring, and evaluation mechanisms that must be addressed to ensure sustainable, inclusive, and impactful DT. **Recommendation:** HE practitioners and policymakers should develop policies mandating continuity frameworks that include online platforms, digital libraries, remote assessments, and flexible delivery models, and align with national or state accreditation standards to ensure compliance.

Keywords: digitalization, digital transformation, digital education, managers, sustainable development goals, strategic planning

من السبورة إلى لوحات المعلومات الرقمية: تقييم جاهزية مسؤولي مؤسسات التعليم العالي لتحقيق أهداف التنمية المستدامة

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الملخص: الهدف: تهدف هذه الدراسة إلى تقديم ملف تجريبي يركز على الإداريين ويتوافق مع أهداف التنمية المستدامة لتقييم جاهزية مؤسسات التعليم العالي في شمال قبرص للتحويل الرقمي وربط دوافعه بممارسات التخطيط الاستراتيجي، بما يساهم في تطوير السياسات والممارسات المؤسسية. **المنهجية:** اعتمدت الدراسة المنهج الاستقرائي، واستخدمت العينة الهادفة لاختيار 15 وثلاث مقابلات عبر البريد الإلكتروني. وُحلت البيانات باستخدام Google Meet، وُجِّدَ من مؤسسات التعليم العالي في شمال قبرص. أجريت سبع مقابلات حضورية، وخمس مقابلات عبر النتائج: أظهرت النتائج خمسة أدوار رئيسية للتعليم الرقمي، هي: تعزيز الإنصاف وتكافؤ الفرص، ودعم الابتكار التربوي واتخاذ NVivo التحليل الموضوعي للمحتوى بمساعدة برنامج القرارات المبني على الأدلة، وتنمية الكفاءة الرقمية وفرص العمل، وتعزيز القدرة على الصمود في الأزمات، ودعم الانفتاح العالمي والتعلم مدى الحياة. كما بينت تفاوت مستويات الجاهزية المؤسسية تبعاً لعوامل مثل متطلبات الجائحة، والامتثال للسياسات، والابتكار، والتوسع المؤسسي، والكفاءة التشغيلية. وأوضحت النتائج أن نجاح التحويل الرقمي يعتمد على الحوكمة الفاعلة وتنمية قدرات العاملين، والاستخدام الأخلاقي للبيانات، وتبني ممارسات تركز على الإنصاف. كما أظهرت مراجعة الخطط الاستراتيجية أن أكثر النماذج فاعلية هي التي تجمع بين مواومة الرسالة المؤسسية، وبناء القدرات، والاستدامة، والشراكات، وتكامل السياسات عبر المناهج. **الخلاصة:** تشير النتائج إلى أن استراتيجيات التحويل الرقمي في مؤسسات التعليم العالي ما تزال متفاوتة، مع استمرار وجود فجوات في استمرارية الأعمال، وإدارة المخاطر، والمتابعة، والتقييم، مما يستدعي معالجة لضمان تحول رقمي مستدام وشامل. **التوصية:** توصي الدراسة بتطوير سياسات تلزم مؤسسات التعليم العالي بأطر شاملة لاستمرارية الأعمال تتضمن منصات تعليم إلكتروني، ومكتبات رقمية، وتقييمات عن بُعد، ونماذج تعليم مرنة، مع مواءمتها مع معايير الاعتماد الوطنية لضمان الجودة والامتثال.

الكلمات المفتاحية: الرقمنة، التحويل الرقمي، التعليم الرقمي، المدراء، أهداف التنمية المستدامة، التخطيط الاستراتيجي

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Background

The rapidly advancing digital transformation (DT) process has brought technological innovations and created a comprehensive paradigm shift in higher education (HE). Digitalization, along with the globalization of education and the increase in individuals' access to information, has necessitated the development of new strategies and operations by HE institutions (HEIs). HEIs are being forced to reconsider their contributions to sustainable development due to the quick advancements in digital technologies, which are changing the face of education. All facets of society are impacted by digitalization (Schallmo & Tidd, 2021), and it is not only an innovation but also a strong factor in the success and sustainability of institutions (Brynjolfsson & McAfee, 2014) because business landscapes are evolving due to digital practices (Reis et al., 2020). The DT process has led HEIs not only to increase their use of technology but also to develop more interactive, flexible, and accessible education methods (Pelletier et al., 2021).

"DT as strategy" has replaced "digitalization as convenience" in HE during the last decade. HEIs are redesigning their teaching, research, governance, and external engagement around virtual platforms, artificial intelligence (AI), and data, and the sector's contribution to the UN Sustainable Development Goals (SDGs) will be directly impacted by these changes. A recent study (Ferk Savec & Jedrinović, 2024) has associated DT in HE with expanded access, operational effectiveness, personalised learning, and evidence-based decision-making to hasten the achievement of several SDGs when risks are systematically managed (OECD, 2023).

Educating the next generation about workplace practices and careers that do not yet exist remains a universal challenge (Arstorp &

Røkenes, 2022). Thus, HEIs must cease to be institutions that only grant degrees and become structures that support lifelong learning and encourage individuals to adapt to a rapidly changing world. However, the successful realization of this transformation depends on the leadership competencies and readiness levels of HEI managers in the digitalization process. For HEIs to be successful in the DT process, there exists a need to prepare strategic plans, consider internal and external dynamics in these plans, and continuously improve the digital competence of their leaders (Kabakus et al., 2023). Based on Goal 4 of the UN SDGs, HEIs are being asked to support sustainable practices through leadership and policy in addition to incorporating digital innovation into teaching and learning. Institutional leadership is at the center of this shift. HEI administrators are crucial in guiding the digital transition by making strategic choices that affect how much digital tools and systems are used to improve academic quality, operational effectiveness, and long-term impact. The ability of these administrators to embrace, modify, and apply digital technologies in line with the SDGs is still a major concern, particularly in developing nations where capacity and infrastructure issues continue to exist.

The stakes are unique in the Northern part of Cyprus. Although the system has grown quickly and now serves a sizable and globally diverse group of students, institutions function within a framework influenced by limited international integration and political non-recognition. The need for strong digital strategies to guarantee educational quality and show societal impact with the SDGs is increased by these structural characteristics. This duality of growth and constraint is highlighted in Hoch and Heinz (2024) analyses of the HE landscapes in Northern Cyprus, highlighting the need for administrator-led DT to be resilient, purposeful, and outward-facing.

Globally, research has started to outline the characteristics of DT maturity in HEIs, emphasizing the interconnected pillars of operations, data governance, infrastructure, strategy, leadership, and culture (Bravo-Jaico et al., 2025; González-Pérez et al., 2025). These studies indicate that organizations make more progress when DT is incorporated into official strategic plans and when executives use data-driven, evidence-based evaluations of digital readiness instead of depending solely on subjective opinions or impromptu self-evaluations. However, some of the available instruments rely heavily on self-reporting and only partially integrate administrative data streams that could be used to objectively track readiness and outcomes that are relevant to the SDGs. Similarly, inclusive and flexible access, less inequality through assistive and adaptive technologies, greener operations through dematerialization and smart campuses, and innovation capabilities that support local development and partnerships are also clear SDG links found in how digital education shapes HEIs (OECD, 2023). When properly managed, AI-enabled analytics and learning platforms can increase these contributions across up to 11 SDGs and dozens of targets, as long as HEIs take ethics, equity, privacy, and digital divides into consideration (Ferk Savec et al., 2024).

The readiness of HEIs' senior administrators to plan, finance, govern, and evaluate DT explicitly against SDG targets is not the focus of much of the post-pandemic research in and about Northern Cyprus; instead, it focuses on teacher competencies (Yildiz, 2022), student experience, or website/learning management systems (LMS) features (Güntem & Kılıç, 2025), with no established concepts or regional standards of "administrator readiness" that connect digital capability to SDG contributions. Thus, administrator readiness for SDG-aligned DT is under-specified. Although

recent reviews outside of the Northern Cyprus context identify barriers such as skills gaps, infrastructure, cybersecurity, culture (Singun, 2025), etc., and emerging drivers such as quality enhancement, competitiveness, generative-AI pressure (Gering et al., 2025), etc., there is limited empirical research on the specific incentives that drive HEI leaders in Northern Cyprus to support DT.

In light of accomplishing the SDGs and responding to the above research gaps, this study aims to assess how prepared HEIs are for digitalization, clarify the current readiness levels, pinpoint the roles of digital education in the future of HE, and offer insight into the institutional DT action and strategic plans for enhancing digital education in HE by evaluating administrators' perceptions and institutional support materials, such as action and strategic plans. This study is structured to empirically provide a pioneering administrator-focused, SDG-aligned readiness profile across Northern Cyprus HEIs, linking motivations to measurable strategic-planning practices, and significantly contributing to the practice and policy discourse on DT, SDGs, HEIs, and leadership. The following research questions were raised to actualize the study aims;

1. What role does digital education play in shaping the future of HEIs, and to what extent are HEIs currently prepared for digitalization?
2. What factors motivate HEI administrators to pursue DT in their institutions?
3. What are the components of the institutional action plan guiding their DT process?
4. What are the components of the institutional strategic plan guiding their DT process?

Theoretical Framework

To frame the study inquiry, the study draws on a multidisciplinary set of theories and

contemporary conceptual models that together explain the roles digital education plays in shaping the future of HEIs, how HEIs are currently prepared for digitalization, factors that motivate HEI administrators to pursue DT in their institutions, and how institutional action and strategic plans' key components guide their DT process.

The following subsections summarise the key theoretical lenses and justify their selection for this study.

Technology-Organization-Environment (TOE) perspective: Contextual Drivers and Constraints.

By taking into account these three interrelated contexts, the TOE framework (Tornatzky & Fleischer, 1990) offers an all-inclusive lens for viewing technology adoption. It suggests that the interaction of these three contexts and their impact on the organization's behavior determines a firm's decision to implement new technology. Based on this framework, the technology context captures infrastructure, interoperability, and data; the organizational context focuses on strategy, resources, culture, and leadership; and the environmental context addresses regulatory pressures, market competition, and stakeholder expectations, all of which influence adoption decisions. For instance, when internal capacity is combined with external pressures, such as international student markets, accreditation, and SDG reporting, TOE remains a strong explanatory lens for organizational digitalization decisions in HE. A study on DT in HE underscores TOE-like mechanisms when recognizing success factors and barriers, highlighting the usefulness of TOE in explaining why administrators pursue DT and how institutional constraints, such as limited budgets or political non-recognition, influence decisions (Singun, 2025). Thus, this study is guided by the TOE framework to uncover the

role of digital education in shaping the future of HE via technological strengths and weaknesses in each HEI's organizational strategy and governance documents.

Institutional Theory: Norms, Isomorphism, and Legitimacy as Motivators.

The study of the norms, structures, and practices that affect societies and organizations is known as institutional theory, and it emphasizes how formal and informal institutions influence organizational behavior and decision-making and act as catalysts for institutional change (Rawat & Hussain, 2024). According to institutional theory, normative, coercive, and mimetic pressures explain organizational change. Institutions adopt practices that provide legitimacy, adhere to regulations, or emulate their successful peers. Even with modest material incentives, HEI administrators operating in geopolitically complex environments, like Northern Cyprus, may be strongly motivated by legitimacy-seeking behavior, such as aligning with international standards or SDGs.

According to a recent study on HE transformations and SDG adoption, institutional pressures like rankings, international partnerships, and sustainability benchmarks are important drivers of strategic change (Hoch et al., 2024). This theory helps interpret rhetorical commitments in formal action and strategic plans against actual practice and raises questions about the motivations of administrators, such as reputation, accreditation, and internationalization.

DT Maturity Models and Readiness

Constructs: Measurement and Comparability.

DT maturity frameworks provide constructs and stages for evaluating institutional advancement. HEI administrators' readiness can be specifically measured by adapting operational dimensions like leadership and

strategy, pedagogy and curriculum, infrastructure, digital governance, research and innovation, and stakeholder engagement found in recent instruments and a validation study (Bravo-Jaico et al., 2025), including measures created for Education 4.0 (González-Pérez et al., 2025).

Administrators' perceptions and comments on documentary evidence are combined to create an interpretative profile of digitalization readiness.

Transformational Leadership and Sense-Making: The Human Axis of Readiness

From all the theories of leadership, Weick's sense-making and transformational leadership particularly aid in explaining how administrators decipher digital signals, organize stakeholders, and put strategy into action. According to Obied (2025) on digital leadership in HE, leaders who communicate a clear digital vision, engage in sense-making, and encourage participatory governance speed up DT progress and establish favourable environments for integrating SDG goals into institutional agendas. Leadership serves as both an intervening mechanism and a correlational predictor, since it can influence the organizational and cultural affordances that determine whether digital investments promote sustainability goals.

These two theories influenced interview protocols to probe leadership narratives, communication practices, and how leaders interpret SDG relevance, to observe their readiness behaviours.

SDG Mainstreaming and Program Logic: The Nexus Between DT Actions and Sustainable Outcomes.

HEIs and policymakers are becoming increasingly interested in the DT of HE. The adoption of digital technologies in teaching, learning, research, and administration is known as "digitalization" in HE (Selwyn, 2022). It

consists of resources such as data analytics, digital libraries, virtual classrooms, AI, and LMS. The COVID-19 pandemic brought to light the advantages and disadvantages of digital platforms for preserving academic continuity (Matsieli & Mutula, 2024).

Achieving the SDGs, particularly SDGs 4 (Ferguson & Roofe, 2020), 9 (Velazquez, 2024), and 17 (Leal Filho et al., 2023), depends heavily on HEIs (Filho et al., 2024). As centers of innovation, policy influence and knowledge producers, HEIs are expected to set the standard for digital sustainability. Digitalization can increase the reach of underprivileged communities (Rydzewski, 2025). Similar to organizational DT, where factors such as management capability, corporate culture, human and management capacity, business process, and technological infrastructure are prominent for companies' readiness, the availability of digital infrastructure, employee skills, funding, an innovative culture, etc., are all components of HEIs' readiness for DT (Michelotto & Joia, 2024).

To evaluate digital readiness, frameworks and maturity models such as Educause's DT Signals (Brown et al., 2020) and the Digital Capability Framework (McGill, 2023) have been developed. Institutional readiness can vary, particularly between developed and developing nations, and leadership and organizational culture cannot be exempt from the readiness discourse.

Method

Study Design: This research was conducted using a qualitative research approach to evaluate the strategic planning of HE administrators in the digital age and their readiness for digitalization. The research primarily adopts an inductive approach, as it explores and generates insights directly from the lived experiences and perspectives of HEI

administrators. At the same time, it incorporates deductive elements by using existing theoretical frameworks to interpret and situate the emergent findings.

Study Sample: This study applied purposive, maximum-variation sampling to recruit 15 HE administrators in Northern Cyprus. The sample size was guided by recent empirical syntheses of saturation (Hennink & Kaiser, 2022) and the information power principle (Malterud et al., 2016). The study's $n = 15$ falls right within that acceptable threshold of Hennink et al. (2022) empirical saturation tests. 12 of the participants are from private HEIs, and 3 are from public HEIs, to reflect the sector's composition and capture potential governance/resource contrasts relevant to DT. For roles, 5 participants are Vice Rectors, 6 Deans, and 4 Directors of IT, which indicates a leadership mix positioned to speak on strategy, academic implementation, and technical governance. To participate in the study, participants are expected to have a minimum of 7 years of HE sector experience and have spent a minimum of 2 years in their current post, which reflects mid-career to senior targets.

The decision to have senior administrators and managers of HEIs share their perspectives on the underlying issues surrounding DT as a pointer to sustainability was premised on their crucial roles in the DT process, and the gender distribution of 3 males and 12 female participants reflects the accessible leadership cohort at the time of recruitment.

Data Collection Tool: This study applied a survey form containing 5 open-ended questions prepared based on the study objectives and in consultation with experts in the HE research and policy domain to gather relevant data from HEI administrators. See the appendix for the interview questions.

Data Collection Process: First contact with the study participants was established using

their official email addresses by providing adequate information about the study, confirmation of their willingness to participate, and their availability for face-to-face, virtual, or email interviews.

Face-to-face interviews were scheduled and conducted individually for 7 participants; 5 opted for virtual interviews via Google Meet, and the remaining 3 preferred email interviews due to their busy schedules. The Face-to-face and virtual interviews were recorded and transcribed, and the responses from the email interviews were merged for data analysis. For anonymity, each participant was code-named Y1, Y2, Y3, etc.

Data Analysis: This study used thematic content analysis because one of the main goals of qualitative research is to understand specific social issues deeply (Vaismoradi & Snelgrove, 2019). This analysis aims to summarize and interpret the data by identifying themes based on Anderson's (2007) guidelines, with the help of qualitative data analysis software called NVivo. Codes were developed from responses, and related codes were combined to form sub-themes and themes.

Trustworthiness and Rigor: Several methodological techniques were used to guarantee the rigor and validity of this qualitative study. In addition to incorporating more recent discussions on reflexive thematic analysis (Braun & Clarke, 2021) and coder collaboration (Campbell et al., 2013), the study draws on Lincoln and Guba's (1985) widely cited framework for establishing trustworthiness in qualitative research. Prolonged engagement with the data, perspective triangulation, and member validation all contributed to credibility because administrators from both public and private HEIs were interviewed, and their stories were rich and varied. An audit trail comprising interview guides, reflexive notes, and coding

decisions was used to address dependability. Throughout the study, researchers' reflexivity was maintained to achieve confirmability.

Using a jointly created coding framework, two coders independently examined a subset of transcripts with the aid of NVivo. The codebook was revised to include accepted definitions and examples after differing interpretations were debated and resolved. Throughout the analysis, cross-checking was done at regular intervals.

Limitations of Subjectivity: There is no doubt that subjectivity and coding are inextricably linked. Institutional experiences and disciplinary backgrounds shaped coders' interpretive lenses, and consensus discussions ran the risk of elevating dominant viewpoints. Additionally, codes changed over time as knowledge of the data increased, highlighting the fluidity of meaning-making. Reflective journaling, recording disagreements, and being transparent about the interpretive nature of the creation of qualitative knowledge helped to lessen these constraints (Braun et al., 2021).

Results

The following subsections are the result of the qualitative data analysis;

The Roles of Digital Education in Shaping the Future of HEIs: One interview question was raised to ascertain participants' perspectives on the roles of digital education in shaping the future of HEIs, and the themes that emerged from their responses are presented in Table 1.

Table (1): The Roles of Digital Education in Shaping the Future of HEIs

Codes	Sub-themes	Themes
Accessibility; equity; widening participation; independence from barriers	Accessibility & Inclusion	Digital Education as a Driver of Equity and Access
Innovation; gamification;	Pedagogical Innovation	Transforming Teaching and

adaptive learning; teaching enhancement		Learning through Innovation
Learning analytics; evidence-based decisions; data-driven education	Data-Driven Decision-Making	Transforming Teaching and Learning through Innovation
Open educational resources (OER); cost reduction; affordability	Accessibility & Inclusion	Digital Education as a Driver of Equity and Access
Digital competence; employability; workforce readiness	Employability & Skills Development	Shaping Future-Ready Graduates
Crisis preparedness; resilience; continuity of learning; infrastructure robustness	Resilience & Continuity	Ensuring System Resilience in Uncertain Times
Internationalization; global learning; collaborative research; virtual mobility	Internationalization & Global Reach	Expanding Global and Lifelong Learning Horizons
Micro-credentials; lifelong learning; continuous professional development	Lifelong Learning Pathways	Expanding Global and Lifelong Learning Horizons

Excerpts supporting the above roles of digital education in shaping the future of HEIs are presented in Appendix A.

Current HEIs' Preparation Level for Digitalization: HEI administrators were asked to what extent their institution is currently prepared for digitalization to determine the current preparation levels of their institutions. Their responses were coded under low, medium, and high readiness levels, and the results are in Table 2.

Table (2): Current HEIs' Preparation Level for Digitalization.

Readiness Levels	Frequency	Percentage
Medium	5	33.3
High	6	40.0

Readiness Levels	Frequency	Percentage
Low	4	26.7

Excerpts supporting the above readiness levels are presented in Appendix A.

Factors that Motivate HEI

Administrators to Pursue DT: HEI

administrators were asked about the factors that encourage them to be interested in the DT of their institutions, and the themes that emerged from their responses are presented in Table 3.

Table (3): Factors that Motivate HEI Administrators to Pursue DT

Codes	Sub-themes	Themes
Pandemic-driven adaptation; Future crisis preparedness; State mandates & accreditation compliance	Pandemic as catalyst; Regulatory benchmarks	External Pressures & Policy Drivers
Innovative pedagogy; Learning analytics use	Enhancing teaching; Data-driven education	Pedagogical Innovation & Academic Quality
Gen-Z expectations; Demand for flexibility; Seamless communication	Digital-native engagement; Flexible access	Student-Centered Demands
Online program delivery; International recruitment; Non-traditional learners; Global collaborations	Expanding markets; Partnerships	Market Expansion & Global Reach
Digital coordination; Staff development; Institutional growth	Operational efficiency; Capacity building	Institutional Efficiency & Growth

Excerpts supporting the above factors that motivate HEI administrators to pursue DT are presented in Appendix A.

Components of HEIs' Formal Action Plans for Digitalization: To understand the components of the HEI action plans for digitalization, HEI administrators were first

asked if their institutions have an action plan for digitalization, with a follow-up question asking about the components of the action plan if the answer to the first question is yes, and the themes that emerged from their responses are presented in Table 4.

Table (4): Components of HEIs' Formal Action Plans for Digitalization.

Codes	Sub-themes	Themes
Aligning with vision & mission; Goal of full digitization	Strategic mission integration; Long-term roadmap	Strategic Alignment & Vision
Faculty & student development; Capacity building; Inclusion provisions	Human capital development; Digital equity	Capacity Building & Inclusion
Sustainability embedded; Support for educational data analytics	Sustainable ecosystems; Analytics	Sustainability & Data-Driven Systems
Engagement strategies; Partnerships	Internal engagement; External collaboration	Stakeholder Engagement & Partnerships
Digital instructional materials; Electronic environment; Digital education policy framework	Digital content development; Policy alignment	Digital Curriculum & Content Integration

Excerpts supporting the above components of HEIs' formal action plans for digitalization are presented in Appendix A.

Components of HEIs' Strategic Plans for DT: To understand the components of the HEI strategic plans for digitalization, HEI administrators were first asked if their institutions have a strategic plan for digitalization, with a follow-up question asking about the components of the strategic plan, and the themes that emerged from their responses are presented in Table 5.

Table (5): Components of HEIs' Strategic Plans for DT.

Codes	Sub-themes	Themes
Reliance on third-party platforms;	Formal/informal plans, structured	Existence and

Codes	Sub-themes	Themes
Goals/objectives /implementation	approaches	Coherence of Strategic Plans
Mission & vision foundation	Strategic alignment	Vision and Mission Integration
Procurement; Funding sources; Realistic scope	Financial sustainability, resource allocation, risk management	Resource Planning and Sustainability
Gap analysis; Partnerships	Needs assessment, stakeholder analysis, and collaboration	Assessment and Partnerships

Excerpts supporting the above components of HEIs' strategic plans for digitalization are presented in Appendix A.

Discussion

The Roles of Digital Education in Shaping the Future of HEIs: Participants' responses on the roles of digital education in shaping the future of HEIs indicated that students from a wide range of socioeconomic and geographic backgrounds can now access high-quality education via digital platforms, and it offers more flexible learning options by removing constraints on time, place, and mobility.

Participants' responses on digital education enhancing digital access and equity, which sit squarely in SDG 4.3/4.5, also support the positions of Anghelo Josué et al. (2023) and Panggabean et al. (2024), where these scholars concluded that digital tools have completely changed the teaching and learning process by promoting easy access and inclusive education. For administrators, readiness means investing beyond platforms, but into connectivity, devices, and student support because "access" is not merely enrolment but actual participation. Williamson and Kizilcec (2022) also confirm that digitalization can accelerate SDG4 if institutions tackle persistent digital

divides; otherwise, benefits accrue to already-advantaged learners.

While some HEI administrators opined that digital education can foster innovation in the teaching and learning process through gamification and adaptive systems to make learning more engaging and responsive, some stated that it can promote data-informed governance through the value of real-time analytics for course and program decisions. The teaching and learning innovation agenda aligns with SDG 4.1/4.7. Evidence has shown that gamification often lifts motivation and sometimes achievement, but effects vary by design (Li et al., 2023). Adaptive learning can individualize pathways, yet adoption depends on staff capacity and fit to pedagogy (Simon & Zeng, 2024) and readiness; therefore, it includes instructional design support and governance for efficacy (Tan et al., 2025).

The use of dashboards to monitor participation, progression, and equity gaps can help target interventions tied to SDG 4.1 and 4.5. Faculty can also enhance educational outcomes and the efficacy of their instruction by utilizing data analytics, AI tools, and multimedia. Technology encourages students to take charge of their education by promoting self-directed learning and critical thinking through interactive content, digital tools, and adaptive learning platforms (Hardianti et al., 2024). Yangambi (2025) added that instructional strategies such as adaptive learning and universal design learning improve teaching and learning in communities that are digitally marginalized and give students who are technologically marginalized the tools they need to succeed in the digital age.

HEI administrators listed global collaboration and internationalization as part of the significant impacts of digital education on

the future of HEIs because they believed that digital education platforms provide opportunities for virtual exchange programs, collaborative research, and cross-border partnerships among HEIs. Virtual mobility and collaborative online international learning (COIL) advance SDG 4.7 and SDG 17 while reducing cost, visa, and carbon emission barriers. Ngalomba et al. (2025) recorded rapid growth and clear intercultural learning gains as benefits of virtual mobility, but also warned about uneven benefits where bandwidth, language support, or equitable collaboration are lacking.

For HEIs to maximize the benefits of virtual mobility, their investment in digital education should include partnership templates, staff development, and inclusive design. HEIs improve educational experiences and prepare students for a world that is becoming more interconnected as they adjust to changes brought by the integration of digital technologies into education (Ait Mama, 2024). Lifelong learning opportunities are supported by digital education, making HEIs continually meet workforce demands by providing services to students outside of the conventional degree structures through MOOCs, micro-credentials, online part-time courses, etc., that also serve as “by-products” enabling flexible upskilling. Stackable, targeted credentials operationalize SDG 4.3 and 4.4 by widening participation and updating workforce skills. Ngoc Ha et al. (2025) suggest micro-credentials’ strong potential for employability and pathways, but stress the need for quality frameworks, credit recognition, and employer alignment.

For resilience and continuity in education, robust digital infrastructure and staff capability underpin SDG 4’s “inclusive, equitable, continuous learning” promise during shocks, and the messiah role of emergency remote

teaching (Matsieli et al., 2024) offered by HEIs by leveraging digital tools and platforms during the COVID-19 pandemic and post-pandemic period has cemented the significant impacts of digital education on the future of HE. A recent working paper introduces “e-resilience” in HE (van de Laar et al., 2024), stating that resilience depends on infrastructure and people’s digital capacity, and HEIs that codify crisis playbooks, interoperability, and low-tech fallbacks are better positioned.

Current HEIs’ Preparation Level for Digitalization: The current levels of preparation for digitalization vary among HEIs under investigation; some administrators rated their institutions high, medium, and low, highlighting several factors responsible for their current levels, such as the push factor, digital migration methods, etc. According to participants’ responses, the major push factor is the pandemic, and their institutions adopted several digital migration methods.

Adedoyin et al. (2023) highlighted two digital migration methods during the pandemic as external-integrated migration and external-assisted migration. Irrespective of the migration method adopted by some HEIs, the varying preparation levels indicated that while some have capitalized on the crisis migration method as a stepping stone to higher grounds by developing their systems, some are still struggling to build their digital platforms, rather than continuing to devote financial commitment to third-party entities for digital platforms.

Factors that Motivate HEI Administrators to Pursue DT: This study explored the push factors responsible for motivating HEI administrators to pursue the DT of their institutions, and they listed external pressures and policy, pedagogical innovation and academic quality, student-centered demands, market expansion and global reach,

and institutional efficiency and growth as their push factors.

Institutional efficiency and growth, market expansion, and global reach as push factors corroborated the significance of enterprise DT of Feng and Ali (2024), where these scholars noted that organizations can significantly increase their operational efficiency by automating processes and increase their competitive advantage by better meeting customer needs and improving the customer experience through DT. Considering the competitive nature, complexity, diversity, and range of operational activities in the HE industry, it is understandable why HEI administrators view DT as a means to achieve operational efficiency and a competitive advantage. The position of Joseph et al. (2024) on the significant potential demonstrated by the integration of digital tools in promoting inclusive education, improving student engagement, and developing dynamic and customized learning environments also buttresses the participants' responses on improved educational outcomes and student expectations and engagement.

Administrators portray the COVID-19 shock and accompanying state and accreditation mandates as an urgent external pressure that shifted DT from aspirational to mandatory. This pressure produced compliance and strategic acceleration where institutions moved quickly to scale platforms, standardize online delivery, and embed contingency planning so learning could continue under future shocks.

Crisis preparedness and regulatory benchmark as push factors are not surprising considering the major shake-up caused by the COVID-19 pandemic, not only to education but to all spheres that resulted in the global closure

of educational institutions, businesses, sports arenas, etc. Most educational institutions without digital education platforms adopted crisis response digital migration methods against the good-to-have perspective of digital education to ensure the continuous delivery of instructional activities and assessments (Adedoyin et al., 2023).

Administrators linked digital tools to new instructional designs, such as flipped, blended, simulations, etc., and to actionable learning analytics that enable targeted interventions. Pedagogical innovation and academic quality as push factors are not merely technological but epistemic, based on the notion that technology can improve learning processes and outcomes when analytics are meaningful and embedded in pedagogy. A study has shown that learning analytics add value via personalization, early warning systems, etc., but warned that benefits depend on model validity, ethical governance, and staff capacity to interpret and act on data (Nartgün & Kennedy, 2025). Administrators viewed DT as a route to diversify and expand markets by offering fully online programs to international and non-traditional learners and enabling partnerships and research collaborations. Ngalomba et al. (2025) position on virtual mobility and internationalization-at-a-distance supports virtual modalities to lower mobility, cost, and carbon barriers while enabling intercultural learning, though equitable access and pedagogical design remain critical for meaningful outcomes.

Components of HEIs' Formal Action Plans for Digitalization: An action plan refers to a document that outlines the necessary measures to accomplish a certain goal by dividing the objective into manageable phases that are simple to follow and monitor. Sustainability and data-driven systems as key components of the HE digitalization action plan

based on participants' responses, focused on institutional budgetary allocation for digital initiatives, maintenance, and development, energy-efficient digital solutions, and obtaining grants and external financial support from the state, partners, or donors. HEIs are embedding system sustainability and learning analytics into their formal action plans, indicating their intentions for long-term maintenance, interoperability, and evidence-informed governance.

Amir et al. (2024) noted that sustainability (financial, technical, and organizational) and clear analytics governance (ethics, data quality, action pathways) are necessary to convert dashboard metrics into meaningful institutional improvement. For DT initiatives to be successful in the long run, institutional culture and precise strategic planning, which include budgetary and sustainability considerations, are essential (Rustamovna, 2025). Both strategic vision and objectives cannot be exempted from institutional culture; the latter depend on the former.

Another significant component listed by HEI administrators is capacity building and inclusion through programs that teach staff and faculty about online pedagogy, e-learning tools, and digital literacy, as well as teams of technical support specialists that can help users and keep systems in good working condition, while not neglecting rewards and acknowledgment for employees who innovate digitally. This implies that the institutional reward and acknowledgment policy captured under capacity building and staff development is a significant component.

Adedoyin et al. (2025) also supported the institutional reward system, which is also a key element of governance and policy framework, as a core faculty motivational factor in

motivating students to create OER. Parts of the evident factors hindering digitalization include a lack of professional development opportunities, unclear strategies, poor allocation of human resources, and inadequate knowledge of digital education (Caneva & Pulfrey, 2023). Institutional action plans that prioritize capacity building via staff training, pedagogical support, and student skill development reflect recognition that technology alone does not produce transformation. Thus, institutional action plans that explicitly allocate resources for professional development and equitable access (devices, support, low-bandwidth options, etc.) are more likely to translate strategy into classroom change. Participants frame digitalization action plans as integral parts of institutional strategy rather than ad-hoc projects. Embedding digital goals in mission and vision statements and committing to multi-year roadmaps help institutions coordinate investments, governance, and accountability across units. The findings of Onan (2024)'s review show that formal strategic alignment and leadership commitment, which can be achieved through institutional action plans in this case, are consistent predictors of coherent DT in HEIs and support sustained implementation beyond crisis periods.

Digital curriculum and content integration as part of the institutional action plan addressed the transformation of traditional educational materials into digital forms through courses designed for hybrid or fully online delivery, interactive modules, e-books, recorded lectures, and the utilization of OER to lower expenses and increase accessibility as components of their digitalization action plan. Evidence suggests that learning outcomes, assessment design, and quality assurance for OER and digital content as curriculum-level actions are crucial. Without explicit curriculum

integration, platforms remain underused and pedagogical change is patchy. Another component listed is stakeholder engagement and partnerships, and the findings of Hoblos et al. (2024) corroborated this component by emphasizing stakeholder alignment that includes clear framing, shared goals, and partnership governance as a critical enabler that reduces resistance and widens resource bases for scaling digital initiatives. Action plans that specify stakeholder engagement mechanisms and partnership pathways with industry, other universities, government, etc., are designed to secure resources, legitimacy, and co-creation opportunities.

Components of HEIs' Strategic Plans for DT: The fundamental building blocks of an HEI's digitalization strategic plan are the ones that direct long-term transformation. A strategic plan emphasizes "why, what, and where to go" over a more extended period, while an action plan concentrates on "what to do and how". In this study, the strategic plan for HEI digitalization refers to a formal document developed to assist HEIs in identifying and maintaining ideal alignment with the most significant elements of DT. Thus, the dominant target for having a strategic plan for HEI digitalization is to assist HEIs in aligning their mission, vision, objectives, goals, etc., with their dynamic technological environment, where new devices and innovations are introduced daily. Findings reveal that institutions sit on a spectrum from no formal strategic plan by relying on third-party platforms to clearly articulated strategies with goals and implementation approaches. Where formal plans exist, they provide a structured roadmap that makes digital initiatives more coherent and easier to govern, and where they are absent, institutions risk piecemeal adoption, vendor dependence, and limited institutional control over quality and sustainability. While

ad hoc reliance on external platforms frequently results in long-term governance and dependency risks, strategic alignment (formal plans, enterprise architectures) is linked to greater coherence in DT outcomes (Purwanto et al., 2024).

Vision and mission alignment is the topmost component listed by participants, where HEIs are to unambiguously communicate via their strategic plan how the HEI's comprehensive mission, vision, and strategic priorities are supported by digitization and outline a future-oriented idea of what an institution that has undergone a DT should look like. Strategic goals, objectives, and pillars or focus areas are expected to be core components of a strategic plan because the latter is expected to align those components since HEIs are to set lofty objectives that can improve online instruction and learning, digitally revolutionize their administrative system, and expand their remote and global access by breaking their goals into specific, measurable, achievable, relevant, and time-bound objectives. Extant studies (Flores & Leal, 2023; Habeeb & Eyupoglu, 2024) have corroborated the relevance of strategic plans to HEIs' strategic goals, objectives, and pillars or focus by stating that HEIs can accomplish their strategic vision and monitor goals with the aid of strategic plans. Participants emphasised that successful strategic plans nest digital ambitions within the institution's vision and mission, ensuring that digitalization is mission-serving rather than technology-led. Embedding DT goals into mission and vision promotes cross-unit buy-in and positions digital change as part of institutional identity.

Participants reported that robust strategic plans include gap analyses and deliberate partnership strategies to fill capacity or technological shortfalls under the assessment and partnership's theme. Needs assessment can

enable targeted interventions on where to invest, who needs training, etc., while partnerships with industry, other HEIs, and government can provide technical resources, legitimacy, and co-funding. Stakeholder analysis and engagement were listed as part of the components by HEI administrators because of the need to not only pinpoint and involve vital stakeholders such as faculty, students, admin staff, alumni, ICT personnel, and external partners, but also include their roles, expectations, and needs in the HEIs' DT process. Gillen (2024) recognized the necessity for effective stakeholder engagement as a requirement for HEIs' strategic plans, especially as institutions deal with issues like changing student expectations, demography, and technological advancements.

Allen et al. (2024) added that stakeholder analysis is effective in improving collaboration and the effect of community-engaged programs and strengthening partnerships. Assessment of the current digital readiness (Rados, 2024) through existing digital infrastructure, competencies, policies, systems, etc., and gap analysis (Shabdin et al., 2024) can assist HEIs' DT journey by providing a clear and comprehensive understanding of the existing gaps that can serve as bottlenecks to digitalization goals.

The resource planning and sustainability theme consists of the procurement of digital resources, funding sources, risk management, and realistic scopes. Institutional strategic plans that explicitly address procurement, financing, and realistic scoping reflect administrators' awareness that digitalization requires sustained investment and careful prioritisation. The "don't bite off more than you can chew" code captures an important governance logic to limit their scope to what can be funded and

supported operationally to avoid failed initiatives.

Despite all the components emphasized by participants in their responses, it is essential to point out that they were silent on some, such as business continuity, which can address risk management, operational resilience, stakeholder confidence, regulatory compliance, and other related issues, monitoring and evaluation mechanisms, and key performance indicators. HE is not immune to natural disasters, global crises, and technological failures, and business continuity as a component of HE's (Awashreh, 2025) digitalization action and or strategic plan can protect these institutions from such disruptions without compromising the quality of education.

Business continuity as a component of a strategic plan can guarantee an organization's capability to operate during or after disruptions, which is essential for future success. It boosts stakeholders' confidence because they feel safer understanding that the university can handle disruption based on the plan. While a strategic plan details the long-term vision, the inclusion of business continuity makes certain that risks (cyberattacks, supply chain disruptions, natural disasters, etc.) do not interfere with this plan.

Conclusion

The rapidly advancing DT process has brought technological innovations and created a comprehensive paradigm shift in HE, necessitating the development of new strategies and operations by HEIs to cope with the evolving HE landscape. This study aims to assess how prepared HEIs are for digitalization. This study clarifies the current readiness levels, pinpoints the roles of digital education in the future of HE, and offers insight into the institutional DT action and strategic plans for

enhancing digital education in HE by evaluating administrators' perceptions and institutional support materials. According to the findings of this study, administrators conceptualize the role of digital education in shaping the future of HEIs along five thematic pathways: as a tool for equity and access, a catalyst for pedagogical innovation and evidence-based decisions, a mechanism for employability and digital competence, infrastructure for resilience in crises, and an enabler of global exposure and lifelong learning. The current preparation levels for the digitalization of HEIs under investigation vary; some administrators rated their institutional preparation as high, medium, and low, highlighting diverse factors responsible for their current levels, such as the push factor, digital migration methods, etc.

Administrators' motivations combine reactive drivers such as pandemic and mandates, innovation and analytics as proactive pedagogical ambitions, market incentives, and efficiency and capacity building as organizational goals. Although realizing these motivations depends on governance, staff capability, ethical data practices, and equitable access, otherwise, digital investments risk being superficial or exclusionary. In addition, HEI action plans are most robust when they combine strategic alignment and leadership, people-centered capacity building and equity measures, long-term sustainability and analytics governance, stakeholder alignment through partnerships, and curriculum-level integration tied to policy.

The components of the strategic plans guiding the DT process of HEIs under investigation combined formalized strategy and governance to avoid vendor-led fragmentation, mission-rooted goals to secure buy-in, realistic financing and procurement approaches to

sustain systems, and gap-based assessments plus partnerships to target capacity and resources. However, components such as business continuity, which can adequately address risk management and other related issues, monitoring and evaluation mechanisms, and key performance indicators were not mentioned by the participants.

Implications for Policy and Practice: HE practitioners and policymakers should develop policies mandating continuity frameworks that include online platforms, digital libraries, remote assessments, and flexible delivery models, and align with national or state accreditation standards to ensure compliance. HEIs should embed data literacy programs for staff to effectively interpret and act on learning analytics, establish guidelines for ethical data use, privacy, and transparency, and institutionalize student feedback loops to continuously refine digital learning environments. HEIs should foster virtual mobility agreements with global universities to support internationalization-at-a-distance, make DT their core pillar of strategic planning, not a side project, and align digital goals with SDGs. Curriculum developers should redesign curricula to integrate blended, personalized, and experiential models (e.g., simulations, gamification, AI tutors).

Administrators should design holistic readiness frameworks that integrate infrastructure, pedagogy, governance, partnerships, and resilience, instead of treating digitalization as isolated technology projects. This qualitative evidence positions HE DT as a critical mediator of SDG attainment in HE, broadening the theoretical lens from “digital tools” to “digital ecosystems”. HEIs should include business continuity plans to ensure their operations run smoothly when incorporating DT.

Limitations: While the study offers valuable insights into the readiness of HEI administrators for DT and their alignment with the SDGs in Northern Cyprus, several methodological limitations, including sample size and distribution, as well as self-reported accounts from administrators, should be acknowledged. The sample size of 15 participants, though appropriate for in-depth qualitative exploration (Guest et al., 2020), limits generalizability to the wider population of HEI administrators. Findings should therefore be interpreted as context-specific rather than universally representative. The sample distribution with 12 participants from private HEIs and only 3 from public HEIs may introduce institutional imbalance, potentially foregrounding private-sector perspectives. Although this reflects the demographic realities of HEI distribution in Northern Cyprus, it nonetheless restricts the comparative depth of analysis across institutional types. This study relied on self-reported accounts from administrators. While interviews allowed for rich, reflective narratives, they may also be subject to social desirability bias, particularly given the politically sensitive nature of DT and sustainability agendas in HE. Participants may have overemphasized institutional readiness or downplayed structural challenges. Although reflexive thematic analysis and coder consensus discussions were used to enhance rigor, subjectivity in coding and interpretation remains a limitation. As Braun et al. (2021) caution, qualitative meaning-making is inherently shaped by researchers' positionalities. While reflexivity and audit trails helped mitigate this influence, findings must be read as interpretive rather than definitive.

Further Research Agenda: Administrators correctly emphasize access and inclusion, and this study emphasized the need to reframe

“access” not as mere enrolment but as meaningful participation that requires connectivity, devices, and student support. This pushes the conversation from a “digital divide” to a participation divide (Williamson & Kizilcec, 2022). HEIs must therefore shift from infrastructure provision to ecosystem design that includes digital literacy, affordability schemes, and culturally relevant pedagogy. Thus, further research can explore how administrators conceptualize and operationalize “meaningful access”, not just device counts. Beyond tools, readiness is about capacity for instructional redesign and governance for pedagogical innovation. Gamification, adaptive learning, and analytics are not transformative in themselves; their success hinges on fit-for-purpose pedagogy and institutional support (Tan et al., 2025). This moves the debate from “technology as enhancer” to “technology as governance and pedagogy transformer”, highlighting that HEIs must institutionalize instructional design units and data governance frameworks. Scholars can investigate how HEIs balance data-driven decision-making with academic freedom, ethics, and cultural learning traditions. The findings on virtual mobility (COIL, cross-border collaboration) show digital education’s potential to democratize internationalization while cutting costs and emissions. Theoretically, this reframes internationalization from physical privilege to digital citizenship. However, risks of inequitable bandwidth, language divides, and uneven benefits highlight a digital colonialism problem (Ngalomba et al., 2025). Scholars should probe how virtual mobility can avoid reproducing North–South hierarchies and how HEIs can co-create equitable international partnerships. HEI administrators identified MOOCs and micro-credentials as enablers of flexible upskilling. Theoretically, this indicates a shift in the HEI value proposition from

degree-centric institutions to platforms for lifelong learning ecosystems. But quality assurance and recognition challenges (Ngoc Ha et al., 2025) suggest that without governance, micro-credentials risk becoming “second-tier” education. Future research can examine how HEIs balance revenue generation with maintaining academic integrity and equitable recognition in the labor market. Researchers can explore how HEIs institutionalize “crisis playbooks” and whether resilience investments align with long-term SDG goals or short-term emergency responses.

Administrators saw DT as a way to achieve efficiency gains, automate processes, and boost institutional competitiveness. Research should move beyond classroom-focused DT to examine administrative and operational layers of transformation (finance, HR, research management), bridging the gap between enterprise DT studies and HE transformation literature. The push factor of pedagogy shows DT is not just about “digitizing” existing methods but reimagining teaching and learning through flipped classrooms, blended learning, simulations, and learning analytics. Future scholarship should interrogate how DT shapes knowledge production, disciplinary methods, and epistemologies by asking how digital learning reconfigures what counts as “quality education” and how faculty conceptualize teaching excellence. Administrators linked DT to improved student engagement and meeting rising expectations. Future research can deepen our understanding of student digital agency by exploring how learners co-create their educational experiences through adaptive platforms, micro-credentials, and personalized analytics.

Disclosure Statement

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper

- **Ethical approval and consent to participate:** Ethical approvals were obtained from the Scientific Research Ethics Committee of Near East University. Informed consent in English has been fulfilled, as participation in this study was voluntary. Information about the aim of this study was provided to the participants. They have also been informed that they could withdraw from a study at any time without any punishment.
- **Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.
- **Author contribution:** All authors listed have contributed to the work and approved it for publication. The authors have worked in an organized manner. F.A., G.D., Z.A. & R.S. supervised the work. K.A. & O.B.A. designed the study, communicated with the key people, and wrote the manuscript. K.A. & O.B.A. collected the data and did the qualitative analysis. F.A., G.D., Z.A., R.S., K.A. & O.B.A. have reviewed the data and the final manuscript for approval. The author(s) read and approved the final manuscript.
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List of Abbreviations

DT: Digital Transformation

COVID -19: Coronavirus

SDGs: Sustainable Development Goals

HE: Higher Education

HEIs: Higher Education Institutions

HCWs: health care workforces

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