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Digital Transformation and ESG Performance in Higher Education Institutions: A Systematic Literature Review

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Abstract: Digital transformation is having a significant impact on ESG indicators and sustainable development by supporting governance transparency, data-driven decision-making, educational accessibility, and social responsibility of the world's higher education institutions. However, there remains an understudied area of research examining the specific mechanisms of digital transformation and ESG alignment in transition economies, such as Mongolia. The purpose of this study is to systematically analyse how digital transformation in higher education institutions impacts ESG performance and sustainable development, based on international research. This study conducted a PRISMA-compliant Systematic Literature Review (SLR). The search was performed using combinations of keywords such as 'digital transformation,' 'ESG,' 'sustainable development,' and 'higher education,' analysing a total of 14 peer-

reviewed articles published between 2020 and 2025, which were analysed from Scopus, Web of Science, and Google Scholar databases, using a Systematic Literature Review (SLR) based on the PRISMA guidelines. Digital transformation is supported by three main mechanisms of ESG performance that increase information transparency, support green innovation, and strengthen the organisation's internal control system. Nevertheless, this impact is mediated by institutional capability, human resource potential, and digital culture. Furthermore, the lack of unified ESG performance reports hinders the achievement of sustainable results. The quality of ESG reporting in higher education institutions is inconsistent, and there is a behavioural gap between sustainability knowledge and institutional practices. This research contributes to the limited literature on DT-ESG alignment in transition economies. Due to its unique context of infrastructure limitations and rapid institutional reform, Mongolia is a theoretically and empirically important case.

Keywords: Digital transformation, ESG indicators, Higher education institutions, Sustainable development, Systematic review, Mongolia

Introduction

As digital technologies are adopted across all sectors of society worldwide, they are reshaping the entire framework of accountability, governance systems, and operational models of higher educational institutions (Schwab, 2016; Vial, 2019). This transition is not just an issue of operational efficiency. Still, it is deeply connected to how universities fulfil their social, environmental, and governance transparency obligations, in other words, ESG (Environmental, Social, Governance) performance (Gillan et al., 2021).

Although the number of academic articles that examine the relationship between digital transformation (DT) and ESG has increased noticeably since 2020 (Filho et al., 2024; Trevisan et al., 2024), there remains a lack of detailed research that examines the specific mechanisms through which digital transformation influences ESG performance at the institutional level, especially in transition and developing economies such as Mongolia.

The importance of the ESG framework is organically connected to the Sustainable Development Goals (SDGs), which were adopted by the United Nations in 2015 and came into effect in January 2016. The three pillars of ESG, environmental responsibility (E), social equity (S), and institutional transparency (G), are directly aligned with the calls for ecological responsibility, social equity, and governance responsibility articulated in the SDGs (Filho et al., 2025; United Nations, 2015). Given their unique roles as knowledge producers, social pillars, and policy influencers, aligning universities' digital transformation strategies with ESG goals is not just a governance adjustment but a strategic requirement that is directly connected to the institution's legitimacy and social impact.

Recent empirical studies demonstrate that digital transformation has a positive and measurable impact on an organisation's ESG performance. Digital transformation has been found to improve ESG performance by increasing information transparency and reducing agency conflicts (Wu et al., 2024). It has been shown that a statistically significant relationship exists between digital transformation and ESG, even in uncertain environments (Li et al., 2025). Bindeeba et al. (2025), in their meta-analysis of 59 empirical studies, confirmed this relationship and highlighted that the effect size declined between 2023 and 2024. This suggests that as the regulatory environment stabilises, the positive impact of digital transformation may gradually fade. Xie et al. (2024) explained the impact of DT on ESG through three mechanisms: improving information transparency, promoting green innovation, and strengthening the organisation's internal control system.

Mo & Wang's (2023) study analysed ESG reports from 147 leading universities in China and found significant differences in information quality and comparability, suggesting that a unified ESG framework for the higher education sector is insufficient. Tjahjono (2025) found a behavioural gap between sustainability knowledge and institutional practices in a study conducted at Indonesian universities.

These findings are consistent with the institutional theory perspectives: digital capabilities alone are insufficient, and effective outcomes result only when digital tools are aligned with organisational culture, managerial coordination, and regulatory support (Abad-Segura et al., 2020; Al-Shamsi, 2025; Elbolok et al., 2025; Ličen & Prosen, 2024; Trevisan et al., 2024).

As a transition economy, Mongolia is actively implementing digital governance reforms and also developing national policies aligned with the SDGs. Mongolian higher education institutions function not only as implementers of sustainable development practices, but also as “incubators” for testing and developing them. However, empirical studies examining the DT–ESG–SD nexuses in Mongolian higher education institutions remain scarce in international research. This is explained not only by geographical factors but also by the unique characteristics of transition economies, such as infrastructure constraints and rapid institutional reforms, and is presented as a theoretically and empirically important case.

The COVID-19 pandemic period (2020–2021) rapidly accelerated the adoption of digital technologies and led to a surge in academic publications on the DT–ESG–SD nexus (Trevisan et al., 2024). This is why the period of this study starts in 2020.

Research Problem

Despite a growing body of literature on digital transformation (DT) in higher education and an expanding interest in ESG performance measurement, there remains a significant gap in research that systematically examines the specific mechanisms through which DT influences ESG outcomes at the institutional level, particularly in transition economies such as Mongolia. Existing studies tend to examine DT and ESG in isolation, focus predominantly on corporate rather than educational contexts, or rely on single-country empirical data from developed nations. This fragmented state of knowledge makes it difficult for policymakers and institutional leaders to design evidence-based strategies that align investments in digital transformation with sustainable development goals. The present study addresses this gap by synthesising international peer-reviewed evidence through a systematic literature review.

Research Focus

This study focuses on the intersection of digital transformation, ESG performance, and sustainable development within higher education institutions, with particular attention to contextual variations between developed and developing country settings. The review focuses on the period 2020–2025, during which the COVID-19 pandemic accelerated global digital adoption and generated a substantial wave of relevant empirical and conceptual scholarship. By drawing on 14 peer-reviewed articles indexed in Scopus, Web of Science, and Google Scholar, the study maps the enabling factors, barriers, and mediating mechanisms that shape the DT–ESG relationship and situates these findings within the specific institutional context of Mongolian higher education, a case representative of transition economies.

Research Aim and Questions

This study aims to answer the following research questions following a PRISMA-compliant SLR methodology based on 14 articles from 2020 to 2025 indexed in Scopus and Web of Science:

1. Through what mechanisms does the digital transition of higher education institutions impact ESG performance?

2. What is the role of governance in digital transformation to impact ESG indicators?
3. What are the strengthening or weakening factors in the digital transformation impacts of higher education institutions on ESG indicators?
4. What are the future research topics for studying the relations between digital transition, ESG, and sustainable development in Mongolian higher education institutions?

Literature Review

Several theoretical frameworks play important roles in understanding the alignment between digital transformation and the ESG performance of higher education institutions. Specifically, three theoretical lenses recur throughout this review and anchor the Discussion: Resource-Based View (RBV), which treats digital capabilities as strategic VRIN resources (Barney, 1991); institutional theory, which emphasises that digital tools must align with organisational culture and regulatory norms to produce sustainable outcomes; and agency theory, which explains how digital platforms reduce information asymmetry and strengthen governance accountability between management and stakeholders. This section defines the main concepts of sustainable development (SDG, CSR, ESG) and the evolution and theoretical framework of digital technologies.

Sustainable Development Concepts: SDG, CSR, ESG

SDG (Sustainable Development Goals): The UN General Assembly of the 70th session adopted the Sustainable Development Goals- 2030 in 2015, which is a global long-term policy document, consisting of 17 goals and 169 targets, aiming to ensure balanced development of society, economy, and the environment (United Nations, 2015). Implementing the SDGs with multistakeholder participation requires coordination among governments, international organisations, higher education institutions, and civil society organisations (Sachs et al., 2019). Vinuesa et al. (2020) found that artificial intelligence could have a positive impact on 134 targets across all 17 SDGs, theoretically demonstrating the alignment of digital transformation and sustainable development.

Corporate social responsibility (CSR): Corporate social responsibility (CSR) is a concept that, when the organisation communicates with stakeholders or operates a business, considers social, economic, and environmental concerns in a balanced way (Carroll, 1991). According to Carroll's (1991) pyramid model, corporate responsibility is expressed at four levels: economic, legal, ethical, and philanthropic. Dahlsrud (2008) analysed 37 definitions of CSR and identified five core dimensions: environmental, social, economic, stakeholder, and voluntary. In the digital environment, CSR has taken on new dimensions, including cybersecurity, data privacy, and algorithmic ethics (Stahl et al., 2022).

Environmental, Social, Governance (ESG): ESG (Environmental, Social, Governance) is a comprehensive framework for evaluating organisational sustainability across three dimensions: environmental impact (E), social responsibility (S), and governance transparency (G) (Gillan et al., 2021). The concept of ESG dates back to the United Nations' "Who Cares Wins" report in 2004, and Friede et al. (2015), through a meta-analysis of more than 2,200 studies, demonstrated that a positive relationship between ESG and financial performance exists in over 90% of cases. In higher education institutions, ESG provides a systematic means of evaluating governance transparency, human resource accountability, and environmental management performance (Mo & Wang, 2023).

SDG-CSR-ESG nexus

These three concepts are hierarchically related: SDGs are global goals defining "what to achieve"; CSR is an organisational principle for "how to implement with responsibility"; and ESG is a practical mechanism for "how to measure and assess" (OECD, 2020). ESG indicators provide critical information for investors

and stakeholders to assess an organisation's sustainability, risks, and opportunities, and are influential in shaping strategic decision-making.

Table 1

Interrelationship between SDG, CSR, and ESG

Concept	Goals	Scope	Theoretical sources
SDG	Global Sustainable Development Goals (2030 Agenda)	Nations, Governments, Organizations, and Individuals	United Nations (2015); Sachs et al. (2019)
CSR	Principles of Corporate Social Responsibility	Corporations and Organizations	Carroll (1991, 1999); Dahlsrud (2008)
ESG	Measurable Indicators of Sustainability Performance	Investment and Organizational Management	Gillan et al. (2021); Friede et al. (2015)

Source: author's work.

The evolution of digital technology and the digital transition

Digital technology development is inextricably linked to the Industrial Revolution, which began in the mid-18th century (Schwab, 2016; Rifkin, 2011).

The Industrial Revolution developed in four main stages.

The first revolution (1760-1840) increased industrial productivity by automating manual labour based on steam power and mechanisation. The second revolution (1870-1914) rapidly increased the speed and scale of industry, driven by mass production and electricity. The third revolution (1969-2000) saw the widespread adoption of digital technology and automation, along with the internet, digital electronics, and computer development. For the fourth revolution (since 2011), it is creating intelligent, data-driven systems based on technologies such as cyber-physical systems, artificial intelligence (AI), the internet of things (IoT), and cloud computing (Xu et al., 2018).

In the education sector, the Fourth Industrial Revolution is opening new opportunities for learning accessibility, governance transparency, and resource optimisation, serving as a foundation for ESG performance (Shenkoya & Kim, 2023; Trevisan et al., 2024). Nevertheless, Stahl et al. (2022) highlighted that alongside the expansion of digital technology, new risks are emerging, including information security, data privacy, algorithmic ethics, and digital inequality. Therefore, digital transformation creates not only opportunities but also new challenges for organisational governance.

Digital Transformation (DT) is a systematic process that an organisation uses to change its decision-making, governance and operational processes using digital technology (Vial, 2019). According to Vial (2019), a review of 282 studies identified that (a) digital technology is a driver for strategic changes, (b) leads to changes in organisational culture, structure, and capacities, and (c) is a complex transformation that affects all levels. Trevisan et al. (2024) found that digital transformation influences sustainable development both directly (through technological adoption) and indirectly (through organisational culture and human resource capacity).

Materials and Methods

Study Model

This study followed a Systematic Literature Review (SLR) methodology based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The SLR approach is an evidence-based, valid method for summarising the content, analysing the research literature and selecting articles according to established criteria (Tranfield et al., 2003).

Database and search

The search was conducted using the Scopus, Web of Science (WoS), and Google Scholar databases. The search keywords were run in the following combinations: "digital transformation" and "higher education"; "ESG" and "higher education"; "sustainability" and "digital transformation" and "university."

Boolean Search Strings

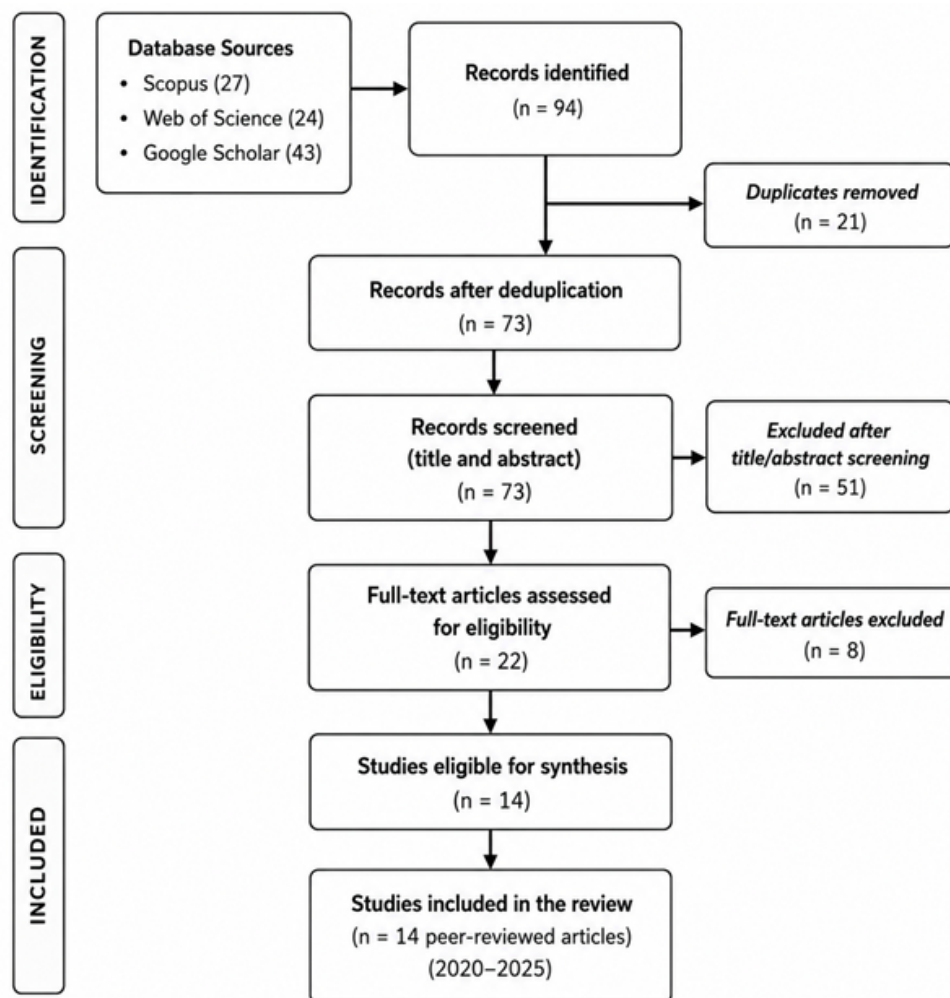
Searches were executed in three databases using the following Boolean strings. In Scopus: ("digital transformation" OR "digitalisation") AND ("ESG" OR "environmental social governance") AND ("higher education" OR "university"); ("digital transformation") AND ("sustainable development") AND ("university" OR "higher education institution"). In Web of Science (WoS): TS=("digital transformation" AND "ESG" AND "higher education"); TS=("sustainability" AND "digital transformation" AND "university"). In Google Scholar: "digital transformation" AND "ESG" AND "higher education"; "ESG" AND "sustainable development" AND "university". All searches were conducted in English and limited to publications from January 2020 to December 2025.

Search Results and PRISMA Screening Procedure

Initial database searches retrieved 27 records from Scopus, 24 from Web of Science, and 43 from Google Scholar, yielding a combined total of 94 records. Following the removal of 41 duplicate records, 53 unique records proceeded to title and abstract screening. Application of the inclusion and exclusion criteria (Table 2) at this stage excluded a further 39 records, leaving 14 records for full-text eligibility assessment. All 14 articles met the predefined criteria and were included in the final synthesis (Table 3). The complete screening process is illustrated in the PRISMA 2020 flow diagram presented below (Figure 1). Although $n = 14$ is a modest corpus, it reflects the nascent state of research specifically combining DT, ESG, and higher education: the three-database search of 94 records yielded only this number after duplicate removal and strict eligibility screening, indicating that the literature has reached near-saturation for the defined scope and time window (2020–2025). The small corpus is therefore an empirical finding in itself, confirming the gap this review aims to address, rather than a methodological limitation.

Figure 1

PRISMA 2020 flow diagram.



Note: Records identified (n = 94); records screened (n = 53); records assessed for eligibility (n = 14); records included in final synthesis (n = 14).

Data Extraction Template

Data extraction was performed independently by two of the three authors using a standardised template. For each included article the following information was recorded: (1) bibliographic details — author(s), year, journal, country/region; (2) study design — empirical (quantitative/qualitative/mixed) or conceptual/review; (3) sample — number and type of institutions, data source; (4) DT operationalisation — how digital transformation was defined and measured; (5) ESG or sustainability outcome — which dimension(s) (E/S/G) were addressed; (6) key findings — direction and magnitude of DT effect on ESG/SD; (7) mediating or moderating factors identified; (8) theoretical framework applied; and (9) study limitations noted by the authors. The third author cross-checked completed extraction sheets to ensure consistency.

Handling Disagreements During Screening

Disagreements between screeners at the title/abstract and full-text stages were resolved through a three-step process. First, each reviewer independently re-examined the contested record against the inclusion/exclusion criteria. Second, if disagreement persisted, the two screeners discussed the record and

attempted to reach a consensus. Third, if consensus could not be reached after discussion, the third author served as arbiter and made the final decision on inclusion or exclusion. All disagreements and their resolutions were logged. Inter-rater reliability was assessed using Cohen’s kappa (κ); agreement on full-text eligibility decisions exceeded $\kappa = 0.80$, indicating strong reliability before arbitration.

Article selection criteria: 14 articles were selected based on the following criteria.

Table 2

Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Period	2020–2025	Articles published before 2020
Publication Type	Peer reviewed articles	Books, reports, dissertations,
Content	DT, ESG, SD, Higher Education Institution	Corporate sector study
Language	English	Other languages
Accessibility	Full-text availability	Abstract availability

Source: author’s work.

Table 3

Data from 14 articles included in the study

Nº	Authors and Years	Journal	Country / Area	Primary focus
1	Filho et al. (2024)	Int. J. Sustainable Dev. & World Ecology	39 countries, 158 HEI	DT and sustainable development, post COVID-19 era
2	Trevisan et al. (2024)	Environment, Dev. & Sustainability	International (Systematic Review)	Approaches for DT's impact on sustainable development
3	Aleryani (2024)	Int. J. Scientific & Research Publications	Arabian developing countries	DT in HEIs within developing nations
4	Al-Shamsi (2025)	Emerging Science Journal	Oman	DT, strategic planning, and accessibility
5	Abad-Segura et al. (2020)	Sustainability (MDPI)	International (Bibliometric)	Global trends in DT management within HEIs
6	Fei Mo et al. (2023)	Heliyon	China, 147 HEIs	ESG reporting formats and transparency
7	Filho et al. (2025)	Int. J. Sustainability in Higher Education	International	Sustainability rating and ranking systems
8	Jie Li et al. (2025)	Sustainability (MDPI)	China	Impact of DT on ESG performance

Nº	Authors and Years	Journal	Country / Area	Primary focus
9	Licen & Prosen (2024)	Sustainability (MDPI)	Slovenia, 411 teachers	Measurement of digital competencies for teachers
10	Al-Shaer et al. (2025)	Frontiers in Human Dynamics	Palestine (An-Najah Univ.)	DT and SDGs in conflict-affected regions
11	Elbolok & Filho (2025)	Journal of Management World	Egypt	Digital culture and sustainable innovation
12	Shenkoya & Kim (2023)	Sustainability (MDPI)	International	Industry 4.0 and open knowledge sharing
13	Tjahjono (2025)	Indonesian Sustainability Accounting & Mgmt J.	Indonesia	Evaluation of ESG implementation
14	Vita Dhameria et al. (2025)	IJE-QQR	Indonesia	Impact of DT on management

Source: author's work.

Result

According to the results of the content analysis, digital transformation has direct and indirect impacts on ESG indicators and sustainable development performance, with the impact mediated by enhanced digital culture, digital capabilities, and institutional capacity, leading to data-driven governance, transparency, accessibility, and resource optimisation. However, this impact varies depending on the supporting and hindering factors, the level of national development, and the quality of governance.

Enabling factors

Digital infrastructure and data management: Studies show that information systems and digital platforms improve the governance transparency, monitoring, and accountability of higher education institutions and positively impact the G dimension of ESG performance (Filho et al., 2024; Al-Shamsi, 2025).

Digital competence of human resources: Studies show that digital competence is a core condition for the effective implementation of digital transition and for supporting sustainable management. For example, a study involving 411 teachers in Slovenia showed that teachers' digital competence is a vital factor in creating an accessible and sustainable learning environment, and that the success of digital transition depends heavily on teachers' competence (Ličen & Prosen, 2024).

Digital Culture and Innovation Leadership: Organisational culture, leadership, and strategies that support digital transformation positively influence ESG performance by effectively integrating digital solutions into institutional policies and operations. To successfully implement digital transformation and achieve sustainable innovation, an organisation's digital culture and the digital capacities of its human resources are essential. Therefore, digital transformation is not merely a matter of technological adoption but a complex process deeply connected to organisational culture, learning capacities, and institutional competencies.

The integration of digital technologies in the learning environment provides an important contribution to increasing teacher and student engagement, optimising resource use, and improving transparency. Studies conducted at the higher education institution level have indicated that digital culture

and innovative leadership positively impact sustainability when digital transformation aligns with sustainable development policies (Trevisan et al., 2024).

A study conducted at an Egyptian higher education institution also demonstrates that digital transformation not only supports organisational cultural reforms but also that institutions with a culture that supports digital transformation are more effective at fostering sustainable innovation (Elbolok et al., 2025). In other words, the organisation's digital culture is a mediating mechanism in the impact of digital transformation on sustainable innovation.

Data-driven management

Automation and analytics systems provide important opportunities to improve educational accessibility, energy efficiency, and resource optimisation. In particular, digital integration is making a meaningful contribution to enhancing the connection between management efficiency and operations by shifting strategic planning toward data-driven decision-making. Studies conducted in universities in Indonesia, Oman, and other developing countries demonstrate that an organisation's strategic planning quality, management efficiency, and learning accessibility are noticeably improved by digitising information, automating repetitive tasks, and transferring the learning process to online learning and blended learning (Al-Shamsi, 2025; Dhameria et al., 2025). These findings demonstrate that automation and analytics are not only operational-level tools but also strengtheners of an organisation's strategic management competence and important drivers of sustainable development.

Barriers

Disparities in Digital Infrastructure and Technology Accessibility: In developing nations and conflict-affected regions, factors such as limited infrastructure, poor internet access, and financial constraints significantly impede equal access to learning. In particular, findings from studies conducted in Arab developing countries show that internet speed, network interruptions, lack of devices, limited digital skills, and financial and infrastructure obstacles hinder the effective use of digital technology and negatively affect access to learning (Aleryani, 2024). On the other hand, case studies show that in conflict-affected countries such as Palestine, digital transformation and online learning platforms have become critical solutions for ensuring continuity of education (Al-Shaer et al., 2025). Furthermore, these experiences demonstrate that digital transformation can make a tangible contribution not only to increasing accessibility but also to achieving sustainable development goals, specifically quality education (SDG4), innovation and infrastructure (SDG9), and partnerships (SDG17). Nevertheless, disparities in digital infrastructure and unequal access to resources remain major obstacles to the equitable distribution of the benefits of digital transformation, and these issues are further intensified in conflict-affected settings (Aleryani, 2024; Al-Shamsi, 2025).

Human resource competency gaps: Gaps in digital skills and a lack of training and development hinder the effective use of technology, thereby undermining the positive impact of digital technologies on ESG. The results of a study involving 158 universities across 39 countries show that, while the post-COVID-19 digital transition has supported the sustainable development of higher education institutions through e-learning, e-communication and collaboration, critical weaknesses in digital capacity, infrastructure and human resource skills persist (Filho et al., 2024). Furthermore, it was found that the knowledge and skills of university teachers and staff in using digital technologies effectively and creatively are insufficient, due to a lack of necessary training and capacity-building programs (Ličen & Prosen, 2024). In addition, researchers point out that the pace of digital transformation is widening the competency gap among staff, which risks increasing workload and psychological stress (Trevisan et al., 2024). These results demonstrate that successful digital transformation requires more than just technology investments,

systematic development of human resource capacity and the creation of continuous training and support mechanisms.

Weak alignment of organisational policies and strategies: A common challenge is the lack of integration of digital transformation, ESG performance, and sustainable development goals into organisational strategies, structures, and operations. In particular, studies indicate that at the organisational level, a lack of clear, unified policies on digital transformation, a lack of rules, and poor responsibilities and coordination between departments lead to redundancies and oversights, which negatively affect operational efficiency and the implementation of sustainable development (Al-Shaer et al., 2025). In line with this, a study of 158 universities across 39 countries found that while faculty and staff have acquired some level of new digital skills, the lack of institutional policies, strategies, infrastructure, and training and development support hinders the effective alignment of digital transformation with the Sustainable Development Goals (Filho et al., 2024). Furthermore, research on ESG conducted at Indonesian universities found that while faculty and students demonstrate relatively high levels of knowledge and awareness of sustainable development, actual implementation and engagement remain weak, a phenomenon referred to as a “behaviour gap.” At the same time, institutional weaknesses were noted, including insufficient alignment of ESG indicators with organisational strategy, a lack of unified policy, and inadequate stakeholder understanding and participation (Tjahjono, 2025). These findings indicate the need to systematically align digital transformation and ESG goals at the organisational strategic level, and to strengthen clear governance structures, accountability mechanisms, and cross-sectoral coordination.

Lack of a unified ESG assessment and reporting framework: Although international models and methodologies for measuring, reporting, and ranking sustainable development goals and ESG indicators are widely used, coordination among them remains insufficient, and the criteria and measurement standards continue to vary. As a result, it is challenging to compare the ESG performance of higher education institutions and assess the actual impact. An analysis of the ESG-related reports and data of 147 leading universities from 2020 to 2023, supported by the Chinese government, revealed that the format and structure of the information presented substantial variations, and the indicators are reported using different methodologies, which limits the ability to integrate and compare data (Mo & Wang, 2023).

Moreover, most universities report ESG performance data primarily through annual reports and institutional websites rather than in a dedicated reporting format, thereby obstructing transparency and systematic monitoring. In terms of content, the quality of information on environmental impacts is relatively poor, while there is a greater focus on governance and social responsibility indicators. The study also emphasised that the lack of clear indicators, assessment criteria, and target levels aligned with the Sustainable Development Goals limits the ability to manage ESG performance at a strategic level (Mo & Wang, 2023). These results clearly demonstrate the necessity for higher education institutions to have unified standards and reporting of ESG and sustainable performance, comparable indicator systems, and transparent reporting mechanisms for assessment.

Contextual Variations

Table 4

Comparative Analysis of DT–ESG–SD Impact by Development Level

Factor	HEIs in Developing Nations	HEIs in Developed Nations
Goals of DT	Ensuring continuity and increasing accessibility.	Innovation, competitiveness, and strategic advancement.

Factor	HEIs in Developing Nations	HEIs in Developed Nations
Key Barriers	Infrastructure gaps, financial constraints, and internet connectivity.	Data security, ethical considerations, and standardization.
ESG Reporting	Limited and non-systematic.	Relatively developed, yet lacking harmonization.
Case Study Examples	Palestine, Indonesia, Oman, Arab Nations.	Europe, North America, South Korea, Australia.

Source: author's work.

The findings of the studies indicate that the impact of the digital transition on ESG and sustainable development is uneven across higher education institutions, and this disparity is related to the following main factors.

Country development level and external conditions: Digital technology accessibility, such as hardware, software, internet speed, and network connectivity, varies between developing and conflict-affected regions (Al-Shaer et al., 2025). Digital transformation in such countries tends to be driven by necessity or by the need to ensure educational continuity. For example, in countries such as Indonesia, Palestine, and Oman, online and blended learning approaches are playing an important role in enhancing access to learning and ensuring continuity of learning and related activities. But in developed countries (Europe, North America, South Korea, and Australia), digital transformation is more commonly used as a strategic tool to advance organisational competitiveness, innovation, and sustainable value creation.

Digital readiness and institutional competence gap: The gap between digital infrastructure and technology readiness and organisational policy and management capacity is a vital factor in shaping the consequences of digital transformation. Some organisations have good governance policies and strategies but weak digital infrastructure, or, conversely, technological readiness but a lack of governance and management capacity, which can stifle the impact of digital transformation and create conditions that are not aligned with ESG performance.

Governance quality and regulatory environment: In organisations with transparent, accountable, data-driven management and ethical governance, the benefits of digital transformation and improved reporting quality tend to be pronounced, reinforcing ESG performance. However, in environments with weak governance and unclear regulations, digital transformation is prone to pose risks to data security, privacy, reporting quality, and decision-making (Trevisan et al., 2024).

Differences in assessment, ratings, and standards: Different methodologies, rating criteria, and reporting formats for ESG and sustainability assessments make it difficult to compare institutions' performance (Mo & Wang, 2023). On the other hand, sustainability ratings have been shown to advance universities' efforts to promote sustainability by updating their policies and strategies, increasing their investments, and expanding their engagement across the institution (Filho et al., 2024). However, differences in assessment methodologies and institutions' own reporting practices have led to varying assessment quality and, in some cases, a "surface compliance" approach that focuses more on meeting the rating criteria than real impact.

Risks of negative impacts from digital transformation: Although digital technologies are considered key drivers of ESG performance, research has also highlighted potential negative impacts, such as increased energy consumption and loss of data privacy and security (Trevisan et al., 2024). Therefore, aligning digital transformation with sustainable development goals, it is necessary to manage these risks appropriately.

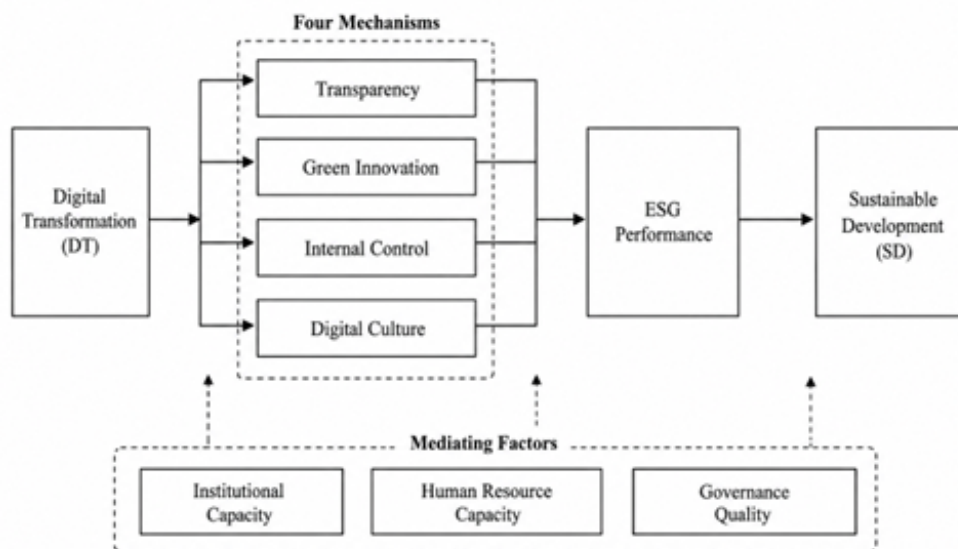
Discussion

This section will explain the SLR's findings in relation to the theoretical framework and previous research, and answer the research questions.

The content analysis follows the three-mechanism model proposed by Xie et al. (2024), which suggests that digital transformation affects ESG performance through information transparency, green innovation, and strengthened internal controls. However, this study also suggests a fourth mechanism. For example, Elbolok et al. (2025) and Ličen & Prosen (2024) found that the impact of digital transformation on ESG is mediated by an organisation's digital culture, human resource capacity, and governance quality. This finding supports the RBV theory (Barney, 1991). Digital capabilities are not technological tools but strategic resources that acquire VRIN properties only when integrated with organisational culture. Figure 2 presents the proposed conceptual model, which synthesises these findings into a four-mechanism pathway: DT → (transparency / green innovation / internal control / digital culture) → ESG → SD.

Figure 2

Conceptual model of the DT–ESG–SD pathway with four mechanisms and mediating factors



Source: Authors' own conceptualisation based on Xie et al. (2024), Elbolok et al. (2025), and Barney (1991).

The governance dimension (G) shows the most consistently positive correlation in the research, which aligns with the predictions of agency theory. Specifically, digital platforms improve governance quality by reducing information asymmetry and strengthening accountability and oversight mechanisms between management and stakeholders. The impact on the environmental dimension (E), however, is more complex and ambiguous. On the one hand, digital technology creates opportunities for resource optimisation and increased efficiency; on the other hand, studies highlight the risk of rising energy consumption driven by the growth of data centres and computational capacity (Trevisan et al., 2024). Therefore, more detailed, sector-specific studies are required to examine the impact of the digital transition on the environmental dimension.

The findings clearly demonstrate that governance quality mediates DT–ESG alignment. Organisations with transparent and data-driven governance can use digital tools more effectively for ESG reporting and accountability mechanisms (Al-Shamsi, 2025; Wu et al., 2024). On the other hand, weak governance can lead to an image-centric “surface compliance” approach (Pu, 2025). Therefore, strengthening the quality of governance is a necessary prerequisite for implementing DT–ESG alignment.

The supporting factors identified in the study, such as digital infrastructure, human resource capacity, digital culture, and data-driven management, have a stronger impact in developed nations. However, the hindering factors, including infrastructure gaps, capacity constraints, weak policy alignment and a lack of unified ESG standards, are more pronounced in developing countries such as Mongolia (Aleryani, 2024; Tjahjono, 2025). Bindeeba et al. (2025) meta-analysis shows that the magnitude of the impact decreases in 2023–2024, indicating that as the regulatory environment stabilises, the impact of digital transition tends to diminish. Therefore, this trend needs further study, including long-term assessment using panel data.

Mongolia is a unique country that shares common features with developing countries, such as limited infrastructure, financial constraints, and a lack of institutional and human resource capacity (Aleryani, 2024). At the same time, it exhibits hallmarks of transition economies, including rapid institutional reform, adaptation to a market system, and an economic structure highly reliant on foreign investment. Therefore, Mongolia's development situation combines the common challenges of developing countries with the unique dynamics of transition economies and has complicated, multifaceted features.

When studying the DT–ESG linkages in Mongolian universities, the most pressing challenges are likely to be institutional policy uncertainty, weak digital human resource capacity, and a lack of ESG standards. The examples of Oman and Indonesia (Al-Shamsi, 2025; Tjahjono, 2025) provide a suitable comparison for Mongolia. However, the institutional characteristics of Mongolia, despite a small population base, a higher education system and a high global performance in terms of student enrollment, yet weak funding and policy coherence, suggest that this linkage needs to be studied in a specific and context-specific manner.

Conclusions

This PRISMA-compliant systematic review (SLR) reached the following conclusions based on 14 peer-reviewed articles published between 2020 and 2025.

First, digital transition is not a factor that directly and automatically improves ESG performance; its impact is mediated by factors such as institutional competence, digital culture, and human resource capabilities. This suggests that digital adoption alone is insufficient; rather, the organisation's internal readiness is essential.

Second, among the ESG dimensions, governance transparency (G) exhibits the most consistent positive correlation with digital transformation. However, social dimensions (S), such as educational accessibility and equal opportunities, are more pronounced, especially in developing countries.

Third, a country's level of development is identified as an important factor in moderating the impact of digital transformation. In developing countries, digital transformation is seen as a necessary means to ensure operational continuity. In contrast, in developed countries, it is seen as a means of enhancing strategic innovation and competitiveness. This difference directly affects the nature and scope of ESG performance.

Fourth, the lack of unified ESG reporting standards and methodologies constrains the performance of higher education institutions globally, complicating assessment of real impact and guiding decision-making (Mo & Wang, 2023).

Theoretical Contribution: This study is one of the few to integrate the interrelationships among digital transition (DT), ESG, and sustainable development (SD) into a unified theory and systematically identify the mechanisms linking these concepts. In particular, it provides theoretical and empirical evidence that the impact of digital transition on ESG performance is indirect and mediated by institutional capacity, digital culture, and human resource capacities. In addition, this study is important to identify the theoretical

basis and future research directions for explaining the digital transition-ESG nexus within the specific context of a transition economy such as Mongolia.

Practical contribution: At the higher education institution (HEI) management level, there is a necessity to develop a unified policy framework that aligns the digital transformation strategy with ESG objectives. At the same time, it is important to continuously develop the digital skills of human resources, strengthen internal competence, and implement transparent and unified ESG reporting methods.

Mongolian policymakers should develop a national standard and unified indicator system for ESG reporting in higher education institutions and establish a funding mechanism that aligns digital transformation investments with sustainable development goals. Such policy support will not only significantly improve the sustainable development performance of higher education institutions but also expand their global competitiveness.

Limitations and future trends

This study has some limitations. First, as the 14 articles included in the study represent a relatively small sample, caution should be exercised when generalising the findings to a broader context. Second, limiting the scope to publications from 2020 to 2025 may exclude findings from earlier research. Third, the lack of empirical data based on actual conditions in Mongolia limits the ability to confirm the study's conclusions at the local level. Three additional SLR-specific limitations deserve acknowledgement. Fourth, the search was restricted to English-language publications, which may introduce language bias by excluding relevant research published in Mongolian, Chinese, or other languages in which transition-economy scholarship is prominent. Fifth, restricting the corpus to peer-reviewed articles indexed in major databases risks publication bias, as studies reporting null or negative findings between DT and ESG are less likely to be published and therefore under-represented in this synthesis. Sixth, the DT-ESG field is evolving rapidly; given that some articles in the 2020–2025 window were still in press at the time of the search, the review may be partially outdated by the time of publication, and findings should be interpreted with this dynamic context in mind.

Based on the above limitations, the following directions for future research are suggested. First, an empirical study combining surveys, case studies, and in-depth interviews in Mongolian higher education institutions is necessary. Second, it is important to develop a unified theoretical model and a comparable composite index to study the interdependencies among digital transition (DT), ESG, and sustainable development (SD). Third, there is potential to conduct a more detailed study about the stability and causal interaction of the DT-ESG nexus using long-term panel data analysis. Fourth, conducting comparative studies among similar transition economies, such as Kazakhstan and Vietnam, is important for identifying regional features and common trends.

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Ethical considerations

As this study is a systematic literature review based exclusively on published peer-reviewed articles, no human participants were involved, and no ethical approval was required.

Conflict of interest

All the authors contributed equally to the conception and design of the study. The authors declare that they have no competing interests relevant to the content of this article.

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References

- Abad-Segura, E., González-Zamar, M., Infante-Moro, J. C., & García, G. R. (2020). Sustainable management of digital transformation in higher education: Global research trends. *Sustainability*, *12*(5), Article 2107. <https://doi.org/10.3390/su12052107>
- Aleryani, A. Y. (2024). Digital transformation in higher education in developing countries to promote sustainable development. *International Journal of Scientific and Research Publications*, *14*(2), 127–141. <https://doi.org/10.29322/IJSRP.14.02.2024.p14615>
- Al-Shaer, N. E., Hattab, M. K., Khlaif, Z. N., Alsher, T. N., Adas, N. O., Al-Kielani, J. A., Fatayer, O. S., Khaled, G. S., Odeh, M. S., & Bkheet, M. I. (2025). Digital transformation in higher education for achieving sustainable development goals in conflict zones: A case study of An-Najah National University. *Frontiers in Human Dynamics*, *7*, Article 1585538. <https://doi.org/10.3389/fhumd.2025.1585538>
- Al-Shamsi, I. R. (2025). Empowering higher education through digital transformation and strategic planning for academic advancement. *Emerging Science Journal*, *8*, 321–334. <https://doi.org/10.28991/ESJ-2024-SIED1-019>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bindeeba, D. S., Tukamushaba, E. K., & Bakashaba, R. (2025). Digital levers for sustainability: A meta-analytic review of digital transformation's influence on ESG performance. *Cogent Business & Management*, *12*(1), Article 2564919. <https://doi.org/10.1080/23311975.2025.2564919>
- Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organisational stakeholders. *Business Horizons*, *34*(4), 39–48. [https://doi.org/10.1016/0007-6813\(91\)90005-G](https://doi.org/10.1016/0007-6813(91)90005-G)
- Carroll, A. B. (1999). Corporate social responsibility: Evolution of a definitional construct. *Business & Society*, *38*(3), 268–295. <https://doi.org/10.1177/000765039903800303>
- Dahlsrud, A. (2008). How corporate social responsibility is defined: An analysis of 37 definitions. *Corporate Social Responsibility and Environmental Management*, *15*(1), 1–13. <https://doi.org/10.1002/csr.132>
- Dhamera, V., Muazeib, A. I., Blhaj, K. M., Sugiyarsih, S., & Rosadah, R. A. (2025). The impact of digital transformation in higher education management: Integrating online learning and educational applications for efficiency and accessibility. *International Journal of Educational Qualitative Quantitative Research*, *4*(1), 15–24. <https://doi.org/10.58418/ijeqq.v4i1.135>
- Elbolok, R. M., Alshafie, W. F., Eldalash, S. A., Mohamed, H. M., & Sabaa, S. M. (2025). The role of digital transformation in enhancing sustainable innovation: The mediating effect of digital organisational culture in higher education institutions. *Journal of Management World*, *2025*(4), 104–116. <https://doi.org/10.53935/jomw.v2024i4.1171>
- Filho, W. L., Salvia, A. L., Beynaghi, A., Fritzen, B., Azeiteiro, U., Avila, L. V., Shulla, K., Vasconcelos, C. R., Moggi, S., Mifsud, M., Anholon, R., Rampasso, I. S., Kozlova, W., Iliško, D., Skouloudis, A., & Nikolaou, I. (2024).

- Digital transformation and sustainable development in higher education in a post-pandemic world. *International Journal of Sustainable Development & World Ecology*, 31(1), 108–123. <https://doi.org/10.1080/13504509.2023.2237933>
- Filho, W. L., Trevisan, L. V., Wahaj, Z., Nunes, D. D., Vasconcelos, C. R., Dibbern, T. A., Vargas, V. R., Iyer-Raniga, U., Anholon, R., Novikau, A., Abubakar, I. R., & Dinis, M. A. (2025). University rankings and sustainable development: The state of the art. *International Journal of Sustainability in Higher Education*, 26(7), 1615–1636. <https://doi.org/10.1108/IJSHE-11-2023-0530>
- Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210–233. <https://doi.org/10.1080/20430795.2015.1118917>
- Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 66, Article 101889. <https://doi.org/10.1016/j.jcorpfin.2021.101889>
- Li, J., Ding, N., Park, S. P., & Zang, Z. (2025). How does digital transformation impact ESG performance in uncertain environments? *Sustainability*, 17(10), Article 4597. <https://doi.org/10.3390/su17104597>
- Ličen, S., & Prosen, M. (2024). Strengthening sustainable higher education with digital technologies: Development and validation of a digital competence scale for university teachers (DCS-UT). *Sustainability*, 16(22), Article 9937. <https://doi.org/10.3390/su16229937>
- Mo, F., & Wang, D. D. (2023). Emerging ESG reporting of higher education institutions in China. *Heliyon*, 9(11), Article e22527. <https://doi.org/10.1016/j.heliyon.2023.e22527>
- OECD. (2020). *ESG investing: Practices, progress and challenges*. OECD Publishing. <https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>
- Pu, T. (2025). E, S, and G, not just ESG: Exploring the digital transformation–environmental, social, and governance performance nexus through patent-based evidence. *SAGE Open*, 15(4). <https://doi.org/10.1177/21582440251384402>
- Rifkin, J. (2011). *The third industrial revolution: How lateral power is transforming energy, the economy, and the world*. Palgrave Macmillan.
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six transformations to achieve the sustainable development goals. *Nature Sustainability*, 2, 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Schwab, K. (2016). *The fourth industrial revolution*. World Economic Forum.
- Shenkoya, T., & Kim, E. (2023). Sustainability in higher education: Digital transformation of the fourth industrial revolution and its impact on open knowledge. *Sustainability*, 15(3), Article 2473. <https://doi.org/10.3390/su15032473>
- Stahl, B. C., Antoniou, J., Ryan, M., Macnish, K., & Jiya, T. (2022). Organisational responses to the ethical issues of artificial intelligence. *AI & Society*, 37(1), 23–37. <https://doi.org/10.1007/s00146-021-01148-6>

- Tjahjono, G. A. (2025). Evaluation of sustainability practices in higher education using ESG concepts. *Indonesian Journal of Sustainability Accounting and Management*, 9(1), 29–51. <https://doi.org/10.20448/ijsam.v9i1.7258>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222. <https://doi.org/10.1111/1467-8551.00375>
- Trevisan, L. V., Eustachio, J. H., Dias, B. G., Filho, L. W., & Pedrozo, E. Á. (2024). Digital transformation towards sustainability in higher education: State-of-the-art and future research insights. *Environment, Development and Sustainability*, 26, 2789–2810. <https://doi.org/10.1007/s10668-022-02874-7>
- United Nations. (2015). *What are the sustainable development goals?* United Nations Development Programme. <https://www.undp.org/sustainable-development-goals>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., Felländer, A., Langhans, S. D., Tegmark, M., & Nerini, F. F. (2020). The role of artificial intelligence in achieving the sustainable development goals. *Nature Communications*, 11(1), Article 233. <https://doi.org/10.1038/s41467-019-14108-y>
- Wu, X., Li, L., Liu, D., & Li, Q. (2024). Technology empowerment: Digital transformation and enterprise ESG performance—Evidence from China's manufacturing sector. *PLOS ONE*, 19(4), Article e0302029. <https://doi.org/10.1371/journal.pone.0302029>
- Xie, X., Zhu, H., & Zhao, J. (2024). How effective is digital transformation? Heterogeneous insights from listed companies' ESG performance. *Humanities and Social Sciences Communications*, 11(1), Article 1534. <https://doi.org/10.1057/s41599-024-04039-5>
- Xu, M., David, J. M., & Kim, S. H. (2018). The fourth industrial revolution: Opportunities and challenges. *International Journal of Financial Research*, 9(2), 90–95. <https://doi.org/10.5430/ijfr.v9n2p90>