

Sustainable Digital Transformation Framework: A Comprehensive Review of Internal and External Drivers

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Abstract: *The present study investigates sustainable digital transformation among sports small and medium-sized enterprises (SMSEs) in developing nations, where organizations must deal with unstable conditions and growing technological demands. The researchers used the qualitative meta-synthesis method of Sandelowski and Barroso (2007) to review previous studies and develop an integrated conceptual framework. The results revealed that internal factors such as leadership commitment, organizational culture, digital skills, technological infrastructure, and dynamic capabilities play a significant role in the success of digital transformation. External factors, such as government support, market competition, technological change and stakeholder expectations, play important roles as well. Sustainable digital transformation is not only about technology adoption, but also a mix of economic, social, environmental and ethical elements that lead towards resilient and data-driven sports organizations.*

Keywords: *Sustainable Digital Transformation, Digital Transformation Framework, Sports SMEs, Digital Capabilities, Organizational Sustainability*

1. INTRODUCTION

Two intertwined strands are shaping the modern world: the digital revolution and the growing demand for sustainability [1]. Technologies enabling computational powers and digital platforms are advancing rapidly [1]. At the same time, Industry 4.0 has produced a volatile, uncertain, complex, and ambiguous (VUCA) environment that has made organizations consider digital transformation as more than a technology choice [2]. It is now a matter of strategic necessity for survival, for remaining competitive and for building long-term value [1, 2]. Here, the notion of “Sustainable Digital Transformation” (SDT) has been introduced as a broad and still evolving paradigm in management and business literature [3]. SDT is a strategic, multidimensional and ethics-driven process [3]. Organizations utilize digital technologies to re-engineer business models to increase economic value, reduce environmental and social impacts,

and respect principles such as protection of privacy, algorithmic fairness and human responsibility [4]. That’s how SDT surpasses basic digitalization [4]. It adds the dimension of “ethical sustainability” to the traditional Triple Bottom Line framework and provides a more integrated and responsible view on how organizations develop [4, 5].

The definition of sustainability has also changed [5]. It now includes economic and social aspects besides environmental concerns [6, 7]. Organizations are being held accountable for Sustainable Development Goals (SDGs) [8]. Digitalization was deeply accelerated by the COVID-19 pandemic [7, 8]. It has pushed the use of digital technologies from a competitive advantage to something almost unavoidable [8]. Thus, SDT is a new and more attractive way for supporting economic growth with less negative social and environmental impacts [9, 10].

These developments influence global sports industry, which is one of the biggest and most active sectors in the world [10]. Already the value has exceeded USD 500 billion and it is expected to keep rising [11, 12]. The industry extends well beyond professional sports [11]. It includes the fields of sports equipment manufacturing, recreational services, sports tourism, event management and related entertainment [12]. All these activities have a real economic, social and cultural importance [13]. Sports is about experiences, about being connected with fans all the time and about the massive use of data and media [14]. These features have made the digital technologies more important in the sector. Moreover, a high amount of investment in sports technology start-ups also indicates the growing importance of this field [14].

Small and medium-sized sports enterprises (SMSEs) represent a significant portion of the sports industry [14]. Their flexibility, agility, lower research and development costs and stronger relationships with local communities have obvious potential for innovation and digital transformation [15]. In developing countries these enterprises boost job creation, economic development and progress on sustainable development goals [16]. But there are many

hurdles in the way of sustainable digital transformation [16, 17]. The lack of capital and digital infrastructure, the lack of digital skills, organization resistance to change, the costs of technology adoption and the lack of consistent supportive policies impede [18-19]. The ethical dimension of digital transformation is one of the most pressing issues today, because of concerns about privacy breaches, algorithmic bias, disappearance of traditional jobs and increasing social inequalities [20, 21]. In the developing world, these conditions increase the risk of failure in digital transformation projects [18]. So many companies either don't even start down this path, or run into problems in the early stages [21].

Although, many studies addressed digital transformation and sustainability as distinct issues [22, 23]. Only a limited amount of work combines them in the digital transformation and business perspectives [22, 23]. Second, the ethical dimension of digital transformation is relatively ignored [22]. These include privacy, algorithmic fairness, implications for the workforce, and social inequalities [20, 21]. Third, the sports industry and especially SMSEs in developing countries are under-represented in the extant literature while these enterprises face unique structural, cultural and institutional limitations [24]. Fourth, there is a lack of extensive qualitative meta-syntheses that bring together scattered findings and offer a conceptual and operational framework for the field [25, 26].

Therefore, this study uses the qualitative meta-synthesis approach proposed by [27] to develop a conceptual framework for the analysis of sustainable digital transformation in small and medium-sized sports enterprises in developing countries [27]. It studies the factors affecting success or failure from the two perspectives of "internal factors" and "external factors" [28, 29]. Moreover, stakeholder theory also supports a multilevel analysis of the roles of athletes, fans, employees, local communities, and policymakers in creating sustainable value [30]. Theoretically, the paper adds to the literature of sustainable digital transformation in sports by aggregating fragmented qualitative results and providing a conceptual framework for future studies [30]. From a practical perspective, the results can help managers and policymakers to identify barriers, recognize the necessary capabilities, and choose effective strategies to carry out a successful sustainable digital transformation [30, 31].

2. LITERATURE REVIEW

2.1 Digital Transformation

Digital Transformation (DT) is a strategic, multi-layered and iterative process, where digital technologies are used not only to improve operational efficiency, but to significantly redefine business models, value propositions, customer experiences, organizational culture and broader stakeholder ecosystems [2, 31]. Within the VUCA dynamics and fast developments of Industry 4.0, digital transformation is much more than a discretionary initiative, it is related to the survival of the organization and its long-term competitiveness [1]. DT is not equivalent to simple digitization or digitalization as it involves deeper changes in organizational identity, strategic orientation, structural arrangements and inter-organizational relationships [32]. This distinction is important, since many organizations still mistakenly view automation alone as evidence of true business model reinvention [33].

The major enabling technologies for DT are also evolving our everyday mobile applications [34, 35]. However, the literature points out repeatedly that technology is an enabling mechanism in and of itself only [34]. The success/failure of digital transformation is highly contingent on the degree to which technological initiatives are aligned with organizational conditions, human capacities and environmental pressures [34, 35]. But technology-organization-environment (TOE) model and other multilevel DT frameworks emphasize the role of top management commitment, organizational culture, and employee capabilities to influence transformation outcomes [28, 29]. In particular, digital transformation in SMEs is often related to a so-called "resource paradox" as termed by researchers [36]. Monetary limitations, lack of practical capability and inadequate human resources can lead to project failure rates between 70% and 90% [36]. However, SMEs also have features that may help to adapt more rapidly, such as flexibility, informal internal structures, and closer ties with customers, all of which can facilitate agile forms of innovation [37].

Study has recognized a number of aspects that have a strong influence on successful DT implementation in SMEs [37]. These include active support from top management, a learning-oriented culture, continuous development of digital competencies and collaboration with external actors and partners [38]. These conditions are even more important for small and medium-sized sports enterprises, which are often characterized by deficiencies in digital capabilities and technological expertise [15]. IOT helps in monitoring of athlete performance, injury

prevention and optimization of game strategies [7, 39]. Technologies and digital gadgets including wearable sensors, AI-powered analytics systems, fan engagement platforms, and customized mobile apps are increasingly being adopted by sport enterprises of small and medium size [40]. The sports industry is highly dynamic and experience-oriented [40]. Therefore, it gradually became a “living laboratory” for DT in the SME sector as described by some scholars [41].

2.2 Sustainability and Digital Transformation

In general, sustainability is understood as the capability of creating long-term economic value, while at the same time meeting social, environmental and ethical obligations [42]. The concept is heavily built on the Triple Bottom Line framework with its core components of economic, social and environmental dimensions [6, 42]. Recently, the SDGs have emerged as the dominant global framework to operationalize sustainability principles at the organizational level [40, 43]. Meanwhile, the Fourth and Fifth Industrial Revolutions have led to a greater focus in academic and managerial discussions on a fourth dimension of sustainability: ethical and human-centered sustainability [41, 44]. This dimension deals with issues such as algorithmic fairness, privacy and data protection, technology-related unemployment and the reduction of digital inequality among different groups and societies [43, 44].

In this sense, digital transformation can be both a value creation mechanism and an ethical risk source [45]. Organizations thus increasingly require a human-centered and systemic approach that can handle this tension in a balanced manner [20]. International organizations like International Olympic Committee, FIFA and UEFA have already established clear targets concerning carbon neutrality, social justice, transparency and governance standards [46]. In this regard, the intersection of DT and sustainability through the notion of “Sustainable Digital Transformation” (SDT) has started to appear as a rather new paradigm in business management research and practice [45, 46]. From this perspective, digital technologies are seen as enabling instruments supporting at the same time economic efficiency, social legitimacy and environmental protection [4]. The relevance of this approach and SDT could open up opportunities to “leapfrog” to greener, more inclusive and more human-centered business models with lower levels of investment and enabling faster organizational adaptations [47].

3. METHODOLOGY

This study applied a meta-synthesis approach grounded in the seven-stage model introduced by [27] in order to systematically combine and interpret findings from previous studies and, subsequently, construct a conceptual framework for digital maturity in small and medium-sized sports enterprises [45, 47]. The central aim of the research was to clarify and describe how internal and external factors connected to digital transformation in SMEs are conceptualized, particularly in relation to sustainability-related considerations and organizational adaptation [48].

From the standpoint of research purpose, the study can be categorized as applied-developmental [49]. Methodologically, because the research relied on secondary sources and did not involve direct intervention within actual organizational environments, it is considered descriptive, non-experimental, and qualitative in character [50]. The meta-synthesis procedure followed the seven-stage framework and included these sequential steps: (1) formulation of the research question, (2) conducting a systematic review of the literature, (3) selection and evaluation of relevant sources, (4) extraction of data and conceptual information, (5) analysis and synthesis of the identified concepts, (6) quality assessment and control of the analytical process, and finally, (7) presentation and development of the final conceptual model [40, 50].

4. FINDINGS

The main research questions guiding this study were formulated as follows: Which dimensions are linked to DT in the sports enterprises when examined from a sustainability perspective? And, what specific components constitute each dimension of sustainable digital transformation within sports enterprises? To answer these questions, the research population included scholarly publications and academic studies published between 2020 and 2026 that were directly related to the topic under investigation. Data collection was conducted through systematic searches in the databases Emerald, SpringerLink, Scopus, and Web of Science. For the retrieval process, different combinations of following keywords were used:

Table 1. Keywords

"Digital Transformation" AND "SMEs"
"Sustainable Digital Transformation" AND "SMEs"
"Digital Transformation" AND "Sustainability" AND "Sports Industry"
"Digital Technologies" AND "Sports Industry" AND "Developing Countries"
"Sustainable Digital Transformation" AND "Sports

Industry"
"Digital Transformation" AND "SMEs" AND "Developing Countries"
<i>Source: Authors</i>

The initial database search resulted in the identification of 405 articles. The screening and selection procedure was then carried out in several stages. During this process, duplicate

records, irrelevant studies, articles lacking sufficient scientific quality, and publications falling outside the defined language and time-period criteria were excluded from further analysis. After completing these screening stages, a smaller group of articles was retained for detailed and in-depth review.

Table 2. Criteria for Acceptance or Rejection of Articles

Acceptance Criteria	Rejection Criteria
Language: English	Languages other than English
Time Frame: 2020 to 2026	Prior to 2020
Study Type: Peer-reviewed journal or conference articles	Personal reports, websites, theses
Methodology: Studies with scientific approach (qualitative or quantitative)	Experimental studies lacking scientific basis
Thematic Focus: Digital transformation in SMEs	Other domains or large enterprises

Source: Authors

Each selected article was assessed using ten separate criteria, with scores assigned on a 1 to 5 scale for every criterion. These criteria covered a range of methodological and reporting aspects, and the overall contribution or value of the study. Based on this assessment process, only articles that scored an average of above 30 (out of a

possible total of 50) were considered eligible to move forward to the final stage of the analysis. Articles below this cut-off were excluded from further consideration. An example of the completed quality assessments is provided below.

Table 3. CASP Assessment of Selected Studies

Article	Research Aims	Methodology Rationale	Research Design	Sampling	Data Collection	Reflexivity	Ethical Considerations	Analysis Rigor	Clarity of Findings	Research Value	Total Score
Article 1	5	3	4	4	4	5	5	4	4	5	43
Article 2	5	5	5	4	4	5	5	5	5	5	49
Article 3	4	5	3	5	4	5	5	5	4	5	45
Article 4	4	5	4	5	5	3	4	4	5	4	43
Article 5	5	4	5	4	5	3	5	4	5	4	44
Article 6	4	5	5	5	4	4	4	5	4	5	45
Article 7	4	5	4	5	5	5	3	5	3	3	42
Article 8	4	4	4	5	5	3	4	5	5	4	46
Article 9	5	4	5	4	5	5	3	5	5	3	44
Article 10	4	5	3	5	4	5	5	5	4	5	45

Source: Authors

Following the CASP quality assessment, 22 studies were excluded from the dataset. Finally,

at the end of the whole screening and appraisal process 39 articles were retained for the final stage of detailed analysis. **Figure 1** gives an overview of the whole process and its results.

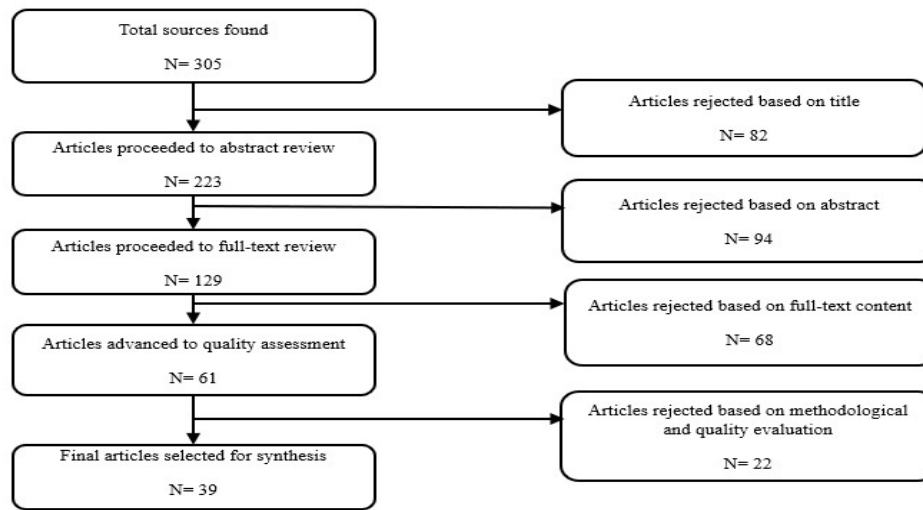


Figure 1. Search Results and Selection of Suitable Articles
Source: Authors

Thematic Analysis and Extraction of Indicators

Data analysis employed thematic analysis, involving multistage coding. The selected articles were read multiple times to extract key themes and indicators. This method was deemed appropriate for meta-synthesis due to its capacity to identify hidden patterns in qualitative data and systematically integrate findings [27]. Thematic

analysis identified dimensions and indicators related to internal and external factors influencing sustainable digital transformation in small and medium-sized sports enterprises [2]. The table below presents a comprehensive classification of the extracted dimensions and indicators, developed through thematic analysis of articles addressing digital transformation and sustainability in the sports industry.

Table 4. Thematic Synthesis of Factors Influencing Sustainable Digital Transformation

Main Category	Subcategory	Key Codes (Indicators)	Brief Description	Reference
Internal Factors	Senior Management Leadership and Commitment	Transformational leadership, top management commitment, creation of digital vision, digital governance, strong executive support, ethical leadership, data-driven strategic decision-making	Main driver of direction-setting, resource allocation, and sustainable digital transformation leadership	[28, 31, 48, 49]
	Organizational Culture	Open and innovative culture, employee technology acceptance, flexibility toward digital changes, strong internal communication, continuous digital learning culture, agile and data-driven culture, organizational readiness for transformation	Main foundation for the adoption, institutionalization, and maturity enhancement of sustainable digital transformation	[2, 36, 50, 51]
	Human Resources and Digital Competencies	Employees' digital skills and competencies, training programs, digital talent acquisition, employee empowerment, employee participation in digital innovation, data and AI literacy, employee digital well-being and resilience	Human capital as the most important driver for moving from digitization toward sustainable transformation	[17, 38, 52-54]
	Financial Resources and Internal Budget	Budget limitations, investment in technology, digital training budget, Digital ROI analysis, green investment, technology investment risk	Financial limitations as one of the major internal barriers to transformation in investment	[52, 55]

	management	SMEs
Internal Capabilities and Infrastructure	Access to IoT, AI, and Cloud technologies, technology-process integration, investment in emerging technologies, infrastructure, platform incorporation capability, cybersecurity	Technical and data [3, 56, 57] infrastructure required for implementing digital transformation and ethical sustainability
	Dynamic Capabilities and Organizational Agility	Continuous learning, resource reconfiguration, organizational agility, strategic flexibility, continuous innovation, rapid adaptation to the VUCA environment [2, 36, 37, 58]
	Government Policies and Support	Government financial and regulatory support, incentive policies for SMEs, digital subsidies and facilities, national digital transformation frameworks, policies supporting green innovation and digital ethics [52, 59, 60]
	Competitive and Market Pressure	Intense competition, changing customer behavior, demand for digital services, competition grounded on digital fan involvement, marketplace stress for transparency and digital responsibility [8, 61]
	Technological Advancements and Accessibility	Advancements in IoT, AI, and AR, technology cost and accessibility, national digital infrastructure, digital innovation ecosystem, cloud platforms, green and energy-efficient technologies, data-driven transformation [48, 62]
External Factors	Stakeholder Expectations	Expectations of fans, sponsors, athletes, and policymakers, demands for digital transparency and accountability, digital trust, stakeholder participation in value co-creation [61, 63]
	Economic Sustainability	Reduction of operational costs, new revenue models, financial transparency, long-term growth, digital economic resilience, sustainable competitive advantage, data-driven productivity [6, 28, 63, 64]
	Social Sustainability	Digital inclusion, gender equality, access for disadvantaged communities, digital fan engagement, enhancement of social capital, improved stakeholder experience, digital social welfare [45, 50, 54, 65]
	Environmental Sustainability	Carbon footprint reduction, energy optimization, smart waste management, Green IT, low-energy digital technologies, reduced resource consumption, development of green sports operations [44, 50, 66, 67]
	Ethical Sustainability	Data protection, responsible use of AI, digital transparency and fairness, ethical governance of data and [20, 21, 68, 69, 70]
Sustainability		Ensuring trust, legitimacy, and accountability in sustainable digital [20, 21, 68, 69, 70]

		algorithms, algorithmic transparency, transformation Explainable AI, digital trust, prevention of algorithmic bias, AI accountability	
Digital Transform- ation	Digital Transformation Strategy	Process digitization, business model transformation, data-driven decision-making, Digital Maturity Model (DMM), digital transformation alignment between DT and sustainability, integration of sustainability goals with digital strategy, sustainable transformation governance	Roadmap and governance [23, 26, 71, mechanism for sustainable 72]
	Applied Digital Technologies	Sports mobile applications, online platforms, IoT and wearable devices, artificial intelligence and data analytics, implementing sustainable automation, fan engagement platforms, digital transformation in the digital twins, big data analytics, sports industry intelligent fan experience systems	Practical tools and [40, 53, 61]

Source: Authors

Thematic analysis identified dimensions and indicators associated with DT [27]. These dimensions and indicators function as a

groundwork for qualitative synthesis and the progress of an integrated framework (see **Figure 2**) to guide future research and managerial decision-making [2, 27].

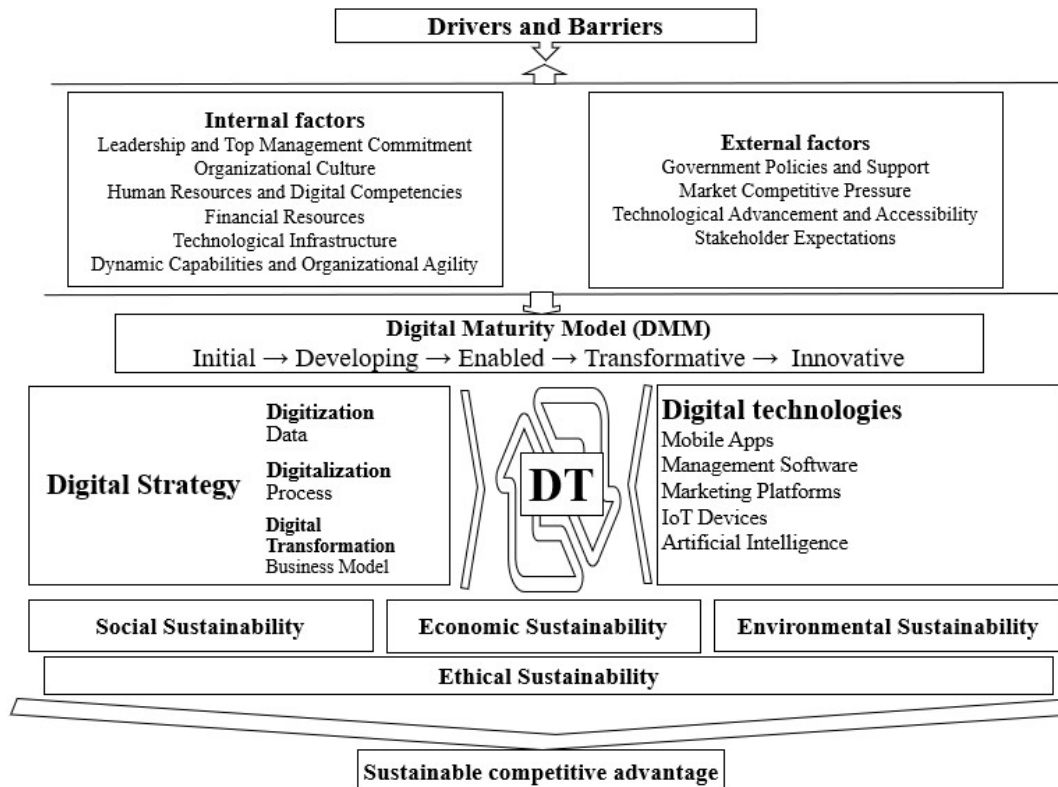


Figure 2. Conceptual Framework for Sustainable Digital Transformation
Source: Authors

5. DISCUSSION

The strategic linking of digital transformation with sustainability is no longer an optional competitive edge in today's complex, fast-moving, technology-shaped environment in which

the VUCA [2, 22] conditions and the demands that come from the Fourth and Fifth Industrial Revolutions are constantly in play [52, 55]. Rather, it is a necessary ingredient for organizational survival, legitimacy, and resilience [2, 28]. The results of this meta-synthesis suggest that DT in SMSEs is not only driven by

new technologies but is a multi-layered and dynamic process that depends on continuous interaction among human, organizational, technological and institutional conditions [58, 59].

A closer look at the results suggests a kind of “systemic interdependence” between internal and external drivers of sustainable digital transformation [66]. Yes, the main driving forces are top management commitment, transformational leadership and having a clear digital vision [73] but their actual effectiveness is heavily shaped by organizational culture, employee readiness, organizational learning processes and how open the organization is to change [74]. In this sense, organizational culture should not be considered only as a background factor [72, 74]. It is much more a living capability that determines how well a firm can adapt to digital changes [74]. Thus, if an organization has no innovation values, trust and continuous learning habits, it is likely to fail in its digital transformation, even if there is external support or infrastructure [75].

In addition, the market competition, changing consumer behavior, and increased fan expectations for more personalized digital experiences [76] are compelling sports enterprises to rethink their digital governance structures, data systems, and the overall logic of value creation [77]. In this case it is more about a mechanism to strengthen digital engagement, boost fan participation and develop new revenue pathways that were not really possible before, than a technical upgrade [78]. The analysis also points to what can be called a “resource paradox” in SMSEs [79]. Financial constraints, infrastructure gaps and shortages in digital skills increase the risk of failure in digital transformation projects, with failure rates in many cases often being estimated between 70% and 90% [36]. But on the flip side, the same organizations that are being more flexible, informal and less rigid are often better equipped for rapid innovation and faster technological adaptation [80].

6. CONCLUSION

DT in SMSEs is much more than an IT change [78]. It is rather a deeper modification of the organizational identity, logic of value creation and of the stakeholders' interaction [78]. The results of this study show that a successful sustainable digital transformation in developing countries is dependent on a kind of synergy between internal dynamic capabilities and external institutional and infrastructural support [7, 78]. The study further highlights the complex interplay of factors including transformational leadership, learning-oriented organizational culture, digital skills, data governance structures, policy support, and competitive market pressure towards DT [78]. Organizations that can balance digital innovation

with economic sustainability, social responsibility and data-driven ethics will likely be stronger going forward [78, 80]. The use of such an integrated framework can harness digital technologies to promote sustainability, social trust, and digital transformation.

GENERATIVE AI STATEMENT

The authors confirm that the generative artificial intelligence tool Grok (developed by xAI) was used solely for improving written expression, enhancing readability, and refining the fluency of the text. The prompts provided to this tool were limited to sentence rewriting and improvements in clarity and coherence. All outputs generated by the artificial intelligence were extensively reviewed, edited, and integrated by the authors.

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