

Environmental Ethics in the Digital Economy: A Narrative Review of Corporate Responsibility and Sustainable Innovation

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Received Jun 8, 2026
Revised Jul 27, 2026
Accepted Jul 28, 2026
Published Jul 31, 2026

DOI [10.35917/tb.v27i1.686](https://doi.org/10.35917/tb.v27i1.686)



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Abstract

The rapid growth of the digital economy has reshaped business models, production systems, and consumption patterns globally. Although digital technologies enhance efficiency and innovation, they also generate environmental challenges such as rising energy consumption, electronic waste, and the ecological impact of digital infrastructure. These issues have increased academic and policy focus on environmental ethics in contemporary business practices. This study aims to review and synthesize the literature on environmental ethics in the digital economy, with a focus on corporate responsibility and sustainable innovation. A narrative literature review method is applied, in which relevant peer-reviewed articles published between 2010 and 2024 were retrieved from Scopus using targeted keyword combinations, screened for relevance through title, abstract, and full-text review, and thematically synthesized to identify recurring conceptual patterns. The findings reveal four interrelated themes, synthesized in a thematic matrix. First, environmental ethics in business supplies the normative foundation for corporate environmental decision-making. Second, corporate environmental responsibility has become a key element of ethical governance in digital business contexts. Third, sustainable innovation and green technologies play a significant role in mitigating environmental impacts of digital transformation. Fourth, the integration of digital transformation and environmental sustainability shows that digital infrastructure itself generates environmental costs, such as rising energy consumption and e-waste, that require deliberate governance. Across these four themes, environmental ethics is increasingly embedded in corporate strategies, governance frameworks, and sustainability-driven business models, and an emerging fifth cluster on digital and artificial-intelligence ethics in ESG governance is identified as a direction for future research. This review strengthens the conceptual understanding of the relationship between environmental ethics, digital transformation, and sustainable innovation. The results underline the importance of aligning technological advancement with environmental responsibility. The study also provides implications for business leaders, policymakers, and researchers in promoting ethical and sustainable practices within the evolving digital economy.

Keywords: ethics, digital transformation, corporate responsibility, sustainable innovation, environmental governance, digital sustainability

Introduction

The global economy's structure has been drastically altered by the digital economy's explosive growth over the last 20 years. New business models that are more effective,

networked, and data-driven have emerged as a result of technological developments like artificial intelligence, big data analytics, cloud computing, and digital platforms. In addition to changing how businesses function, digital transformation also modifies production, distribution, and consumption networks across several sectors. Through online platforms and digital ecosystems, businesses are using digital technology more and more to improve operational efficiency, speed up product creation, and increase market reach. This phenomenon emphasizes how the digital economy is a major force behind innovation and economic growth on a worldwide scale. As digital technologies become more deeply embedded in corporate operations, scholars argue that companies also acquire a corresponding digital responsibility to manage the technological, social, and environmental consequences of their digital activities (Cheng & Zhang, 2023).

Notwithstanding these financial advantages, the growth of the digital economy also presents serious environmental issues that are gaining attention from academics and decision-makers. Data centers, telecom networks, and cloud computing systems are examples of digital infrastructure that uses a lot of energy. According to earlier research, the information and communication technology (ICT) industry is a major contributor to carbon emissions worldwide, mostly as a result of rising energy requirements to support digital activities Jones (2018), the volume of electronic waste, or "e-waste," has increased due to the quick development of electronic devices like computers, smartphones, and Internet of Things (IoT) devices, making it one of the waste streams with the fastest rate of growth in the world (Forti et al., 2020). These circumstances imply that the digital transition creates both significant environmental repercussions and economic prospects. Empirical evidence further shows that the extent to which firms undertake digital transformation is directly associated with the strength of their social and environmental responsibility performance, suggesting that the environmental consequences of digitalization are not uniform but shaped by firm-level strategic choices (Cao et al., 2025). Accounting for previously overlooked supply-chain pathways, Freitag et al. (2021) estimate that ICT's true share of global greenhouse gas emissions may in fact reach 2.1-3.9% rather than the 1.8-2.8% reported in earlier studies, and Belkhir and Elmeligi (2018) similarly project that, absent stronger efficiency and policy interventions, the sector's relative contribution to global emissions is likely to keep rising toward 2040.

In this regard, environmental ethics are becoming more and more important in commercial operations. The idea of environmental ethics highlights the need for economic activity to take ecosystem sustainability and environmental balance into account. From a business and management standpoint, environmental ethics refers to moral precepts that direct companies to minimize adverse environmental effects and manage resources ethically. Businesses are now seen as social actors accountable for society well-being and environmental sustainability in addition to being profit seeking organizations.

As corporate environmental responsibility has developed, a number of frameworks emphasizing the incorporation of sustainability and ethics into business strategies have emerged. Corporate Environmental Responsibility (CER), which emphasizes that businesses must be responsible for the environmental effects of their operations, is one commonly accepted idea (Bansal & Song, 2017). Furthermore, Corporate Social Responsibility (CSR) emphasizes that businesses have a responsibility to support sustainable development by using moral and responsible business practices (Carroll, 2016). In recent times, the Environmental, Social, and Governance (ESG) framework has become a vital instrument for transparently reporting sustainability performance to stakeholders (Eccles et al., 2014).

Growing demand from stakeholders, such as governments, investors, customers, and civil society, strengthens the incorporation of environmental ethics into business strategy. Businesses are forced to implement more sustainable business strategies due to stricter

environmental legislation and growing public awareness of climate change challenges. Furthermore, companies must exhibit strong environmental commitments as part of sound corporate governance since international investors increasingly consider ESG performance when making investment decisions (Friede et al., 2015). As a result, incorporating environmental ethics into company operations is not only morally required but also strategically important for preserving long-term viability and corporate credibility. Recent evidence also points to the emergence of corporate artificial intelligence ethics as a further driver of ESG performance, indicating that the ethical governance of emerging digital technologies is becoming an additional pathway through which firms strengthen their environmental and social commitments (Zhang, 2026). Empirical evidence on listed firms further indicates that digitalization transformation itself strengthens ESG performance, partly by improving supply chain resilience and reducing information asymmetry with stakeholders (Lu et al., 2024), while Wang and Esperança (2023) similarly find that digital transformation enhances both market performance and ESG outcomes among small and medium-sized enterprises, suggesting that this digitalization-ESG link generalizes beyond large corporations.

Sustainable innovation is essential to reducing the ecological effects of corporate operations and addressing environmental issues brought on by the digital economy. According to Boons & Lüdeke-Freund (2013) sustainable innovation is the creation of goods, procedures, and business models that promote environmental sustainability while producing economic value. This idea is strongly related to the creation of green technologies, enhancements to digital infrastructure's energy efficiency, and the application of circular economy concepts to resource management in the context of the digital economy. Empirical studies further show that corporate environmental ethics itself functions as a driver of green innovation, with environmental leadership and environmental strategy strengthening this relationship and, in turn, improving firms' social, economic, and environmental performance (Aftab et al., 2022).

In the literature on sustainable innovation in the digital economy, a number of related ideas have also surfaced. The development of technology that lower carbon emissions, improve energy efficiency, and reduce manufacturing waste is the focus of green innovation (Chen, 2008). In the meantime, businesses are encouraged by the circular economy approach to create production and consumption systems that facilitate resource reuse and methodical waste reduction (Geissdoerfer et al., 2017). Sustainable digital transformation, which uses digital technology to monitor environmental effects, optimize ecologically friendly production and distribution systems, and increase resource efficiency, is also made possible by digital transformation.

Despite the tremendous growth of the literature on sustainability and the digital economy, closer inspection shows that this body of work remains divided into three largely disconnected streams, each of which overlooks part of the integration proposed in this study. The first stream, centered on digital economy and technological innovation, documents the efficiency and growth benefits of digitalization but pays little attention to its environmental or ethical implications. The second stream, comprising corporate responsibility and governance research (Bansal & Song, 2017; Carroll, 2016; Eccles et al., 2014), explains how firms manage and report environmental performance through CER, CSR, and ESG frameworks, yet treats digital transformation mainly as background context rather than as a force that actively reshapes corporate ethical obligations. The third stream, on sustainable and green innovation (Boons & Lüdeke-Freund, 2013; Chen, 2008; Geissdoerfer et al., 2017), examines technological and circular-economy solutions for reducing environmental impact, but seldom links these solutions explicitly to the normative foundations of environmental ethics or to corporate responsibility frameworks. Studies that do address the environmental costs of digital infrastructure itself, such as energy consumption and e-waste (Jones, 2018; Forti et al., 2020), likewise remain isolated from discussions of ethical governance and innovation strategy. A

recent systematic review of digital sustainability and corporate digital responsibility confirms that these two related bodies of work are still treated separately in the literature, with digital sustainability research often overlooking ethical implications and corporate digital responsibility research neglecting broader sustainability goals (Covucci et al., 2024). This pattern is corroborated at a larger scale by a bibliometric mapping of 1,251 Scopus-indexed publications on digital technologies and corporate sustainability, which finds that themes such as blockchain, artificial intelligence, and green finance continue to be studied as largely separate clusters rather than as an integrated research agenda (Alshdaifat et al., 2024). Consequently, no existing study offers an integrated account of how environmental ethics, corporate responsibility, and sustainable innovation jointly operate within the specific context of digital transformation; the digital economy is treated either as a neutral backdrop or as a source of environmental risk, rather than as a domain in which ethical, governance, and innovation perspectives must be examined together. This fragmentation constitutes the specific gap that the present study addresses.

To address this fragmentation, and with an emphasis on corporate environmental responsibility and sustainable innovation, this article attempts to examine and integrate the scholarly literature on environmental ethics in the digital economy. It specifically aims to determine how environmental ethics are incorporated into digital business practices, how businesses create environmental responsibility plans in response to challenges posed by digital transformation, and how sustainable innovation aids in the creation of more ecologically friendly digital business models. This study offers a more thorough conceptual understanding of the connection between environmental ethics, digital transformation, and sustainable innovation in contemporary business environments through the use of a narrative review approach.

This article makes three primary contributions. It starts by creating a conceptual framework that explains how environmental ethics and digital transformation relate to modern business practices. Second, it lists the many corporate environmental responsibility policies and tactics used by businesses to deal with environmental issues in the digital economy. Third, it suggests a research agenda for the future that will enhance scholarly conversations about environmental governance and sustainable innovation in digital business settings.

The article is divided into multiple sections to accomplish these goals. The research approach used in the narrative literature review is described in the next section. This is followed by a study of the theoretical underpinnings of environmental ethics in management and business. The literature on corporate environmental responsibility and the function of sustainable innovation in the digital economy is examined in the parts that follow. The findings' ramifications for public policy and commercial operations are then covered in the paper. Lastly, it offers a research agenda for the future to further the field of environmental ethics in the digital economy.

Literature Review

Environmental Ethics

A subfield of moral philosophy known as environmental ethics studies how people, business, and the environment interact. This idea highlights the moral obligation that humans have to protect ecosystem sustainability and make sustainable use of natural resources. Environmental ethics provides a normative framework for assessing whether human actions, such as commercial and industrial operations, sufficiently take into account their impact on environmental sustainability in the context of contemporary development.

The literature on environmental ethics outlines a number of key viewpoints that clarify how people give the environment moral significance. Anthropocentrism, the first viewpoint, places people at the core of morality. According to this perspective, environmental

management is carried out to promote human welfare since the environment is seen as significant mainly because it improves human life. This strategy has been criticized for putting human needs ahead of ecosystem integrity, despite the fact that it is frequently used in development strategies.

The second viewpoint is biocentrism, which maintains that all living things have inherent worth and should be protected. This method extends human moral obligation to all living things in the ecosystem, not just other people. It encourages ecological balance and biodiversity preserving environmental management techniques.

Ecocentrism, the third viewpoint, centers moral significance around the entire ecosystem. According to this perspective, human decision-making should prioritize environmental sustainability since the environment is seen as an interrelated system. This viewpoint highlights how crucial it is to preserve natural balance and long-term sustainability in human endeavors, including commercial and economic activity (Rolston, 2020). When taken as a whole, these viewpoints offer a conceptual basis for the advancement of environmental ethics in modern commercial operations.

Environmental Ethics in Business and Corporate Responsibility

Environmental ethics have developed into a key element of corporate responsibility strategies in the setting of contemporary business. Businesses are now seen as social actors with obligations to the environment and society in addition to being economic entities that maximize profits. The idea of Corporate Environmental Responsibility (CER), which highlights that businesses must properly manage the environmental effects of their operational activities, reflects the integration of environmental ethics into business practices (Bansal & Song, 2017).

Additionally, the idea of Corporate Social Responsibility (CSR) offers a crucial framework for integrating environmental ethics into businesses. According to CSR philosophy, businesses have a duty to support sustainable development by using moral and socially conscious business practices (Carroll, 2016). According to this paradigm, businesses must integrate environmental factors into their daily operations, business strategy, and decision-making procedures.

The significance of a corporate sustainability approach, which incorporates social, economic, and environmental goals into corporate strategy, is further emphasized in the business literature. By taking into account how their operations affect the environment, this strategy helps businesses to generate long-term value. Porter & Kramer (2011) proposed the notion of shared value, which emphasizes that businesses can simultaneously create economic value and provide social and environmental benefits through creative and sustainable business practices. As a result, environmental ethics provide a normative basis for corporate responsibility in tackling issues related to global sustainability. Extending this normative basis into the digital sphere, Lobschat et al. (2021) introduce the concept of corporate digital responsibility (CDR), defined as the set of shared values and norms guiding an organization's creation, operation, and refinement of digital technology and data; this concept positions environmental and social obligations as inseparable from how firms design and deploy their digital technologies, not merely from their conventional operational footprint.

Stakeholder Theory and Environmental Responsibility

Stakeholder theory is one of the main theoretical pillars of corporate environmental ethics. According to this view, businesses are accountable to a variety of stakeholders impacted by their operations, including communities, governments, consumers, workers, and the environment as a component of a larger socio-ecological system, in addition to shareholders (Freeman, 1984).

From the standpoint of stakeholders, environmental sustainability is a crucial part of corporate responsibility since business operations have a big impact on ecosystems and society. Therefore, when making strategic decisions, firms are expected to take stakeholder interests into account. According to Donaldson & Preston (1995), stakeholder theory has a normative component that highlights the moral duties that businesses have to their stakeholders in addition to descriptive and instrumental aspects.

This perspective provides a strong theoretical basis for integrating environmental sustainability into corporate strategy. By addressing stakeholder interests, firms can develop more environmentally responsible policies and practices while enhancing their long-term social legitimacy.

Recent scholarship extends stakeholder theory toward business model design, showing that value creation should be reframed as a reciprocal process in which stakeholders are both recipients and co-creators of economic, social, and environmental value rather than passive beneficiaries of corporate output (Freudenreich et al., 2020). This reframing reinforces the argument that environmentally responsible strategies are most effective when firms treat environmental stakeholders as active partners in value creation rather than external constraints to be managed.

Sustainability and Environmental Governance

In contemporary business practices, sustainability and environmental governance are intimately related to environmental ethics. In development processes, sustainability highlights striking a balance between social welfare, economic progress, and environmental preservation. The Triple Bottom Line, which was first proposed by Elkington (1998), is a popular paradigm that contends that a company's success should be evaluated not only by its financial performance (profit) but also by its benefits to society (people) and the environment (planet).

The Environmental, Social, and Governance (ESG) framework has emerged as a crucial instrument for assessing the sustainability performance of corporations in more recent times. Investors and stakeholders use ESG to evaluate how companies ethically and transparently handle environmental risks, social responsibilities, and corporate governance (Eccles et al., 2014). Environmental ethics are becoming a crucial component of sustainability-focused corporate governance procedures, as seen by the incorporation of ESG concepts into business strategy. Underlying much of this governance-level progress is firm-level green innovation itself: in a study of large manufacturing firms, Rehman et al. (2021) show that green innovation is positively associated with environmental performance, indicating that ESG-oriented governance structures translate into ecological outcomes largely through concrete innovation activity rather than reporting alone.

Empirical research on Chinese listed firms shows that this incorporation of ESG principles is itself being reshaped by digitalization: digital transformation improves corporate ESG performance, and part of this effect operates through green innovation, which mediates the relationship between firms' digital capabilities and their environmental, social, and governance outcomes (Wu & Li, 2023). This finding suggests that digital governance infrastructure and environmental governance are becoming mutually reinforcing rather than separate corporate priorities.

Therefore, environmental ethics goes beyond philosophical discussion and provides a normative framework for creating sustainable corporate governance practices and regulations. Businesses that successfully incorporate environmental ethics into their plans typically improve stakeholder trust and sustainability performance.

Environmental Ethics in the Digital Economy

New dynamics in the application of environmental ethics in business are brought about by the growth of the digital economy. Cloud computing, artificial intelligence, and digital platforms are examples of digital technologies that have increased economic efficiency and opened up new avenues for innovation. But these developments also pose serious environmental problems. The growing energy usage of data centers supporting digital services is one significant problem. In order to run computing and data storage systems, digital infrastructure needs a significant amount of energy, which raises carbon emissions worldwide (Jones, 2018). Furthermore, an increasing amount of electronic garbage, or "e-waste," results from the expanding usage of electronic gadgets, which presents significant environmental dangers (Forti et al., 2020).

In this context, technology firms bear a moral responsibility to develop environmentally friendly digital innovations. The concepts of digital sustainability and green digital transformation emphasize that digital transformation must consider the environmental impacts of technology. Therefore, the application of environmental ethics in the digital economy becomes essential to ensure that technological progress does not undermine environmental sustainability.

Empirical evidence from the digital economy literature further supports this concern. Using panel data from Chinese manufacturing firms, Guo and Xu (2021) found that the intensity of digital transformation is positively associated with operating performance, indicating that firms pursuing digital transformation experience lasting organizational gains that must be matched by equally lasting environmental commitments. At a broader level, Pan et al. (2022) demonstrated that the digital economy functions as a key driver of total factor productivity, suggesting that the same digital infrastructure responsible for productivity gains also carries a growing environmental footprint that firms have an ethical obligation to manage responsibly.

Integration of Environmental Ethics and Sustainable Innovation

Additionally, environmental ethics offer a vital basis for the growth of sustainable innovation in businesses. The creation of goods, procedures, and business models that both provide economic value and lessen adverse environmental effects is referred to as sustainable innovation (Boons & Lüdeke-Freund, 2013).

At the product level, sustainable innovation is closely tied to the development of green products designed around energy minimization, materials reduction, and pollution prevention across the product life cycle (Dangelico & Pujari, 2010). This product-level perspective complements business-model-level accounts of sustainable innovation by showing that ethical environmental commitments must be embedded not only in strategic decision-making but also in the technical design choices firms make when developing new offerings.

In the context of the digital economy, green innovation which focuses on creating solutions that increase resource efficiency and lower emissions and waste is frequently linked to sustainable innovation. Furthermore, the circular economy concept encourages companies to create production systems that facilitate resource reuse and ongoing waste reduction (Geissdoerfer et al., 2017).

Sustainable digital transformation, in which digital technologies are used to enhance energy efficiency, track environmental effects, and optimize ecologically friendly production and distribution systems, is also made possible by digital transformation. Businesses can create environmentally conscious business models that promote economic growth and preserve environmental sustainability by fusing environmental ethics with technical innovation. In conclusion, environmental ethics serve as both a strategic basis for promoting sustainable innovation in the digital economy and a normative standard in corporate activities.

Research Method

Research Design

The growth of research on environmental ethics, corporate environmental responsibility, and sustainable innovation in the context of the digital economy is examined in this study using a narrative literature review methodology. The narrative review method is chosen because it allows for the synthesis of research findings from relevant fields, such as digital transformation, sustainability management, and corporate ethics, as well as the integration of various theoretical viewpoints.

This approach is especially useful for examining interdisciplinary and developing fields of study. It enables researchers to evaluate conceptual advancements, spot important trends in the literature, and create a more thorough grasp of the subject of the study (Snyder, 2019). This method is often used in business and management research to create theoretical syntheses that make connections between concepts clear and suggest future lines of inquiry (Torraco, 2016). Furthermore, the narrative literature review approach provides flexibility in integrating findings from diverse contexts and methodological approaches. By systematically analyzing relevant literature, this study seeks to explain how environmental ethics, corporate responsibility, and sustainable innovation interact within the evolving dynamics of the digital economy (Webster & Watson, 2002).

Literature Search Strategy

This study performs a comprehensive search of scientific articles in the Scopus database in order to gather pertinent and high-quality material. Scopus was chosen as the sole source because it indexes a wide range of credible, peer-reviewed business, management, ethics, and sustainability studies journals, ensuring that only quality-assured articles are used as the basis of this narrative literature review. A list of keywords related to the research topic is used in the literature search procedure. Environmental ethics, digital economy, corporate environmental responsibility, sustainable innovation, green innovation, ESG and sustainability, digital sustainability, and sustainable digital transformation are among the main keywords. The purpose of these keywords is to encompass many aspects of study concerning the convergence of corporate responsibility, environmental ethics, and digital transformation.

To broaden the search scope, the keywords are combined using Boolean operators such as AND and OR. Examples include “environmental ethics AND digital economy,” “corporate environmental responsibility AND digital transformation,” and “sustainable innovation AND digital sustainability.” This strategy enables the identification of relevant studies across various disciplines associated with the research topic.

Inclusion and Exclusion Criteria

This study uses particular inclusion and exclusion criteria to guarantee the caliber of the examined material. There are multiple components to the inclusion criteria. First, selected sources must be peer-reviewed academic publications. Second, articles must be in pertinent domains including corporate governance, management, sustainability, business ethics, and the digital economy. Third, articles must be written between 2010 and 2024 in order to represent the quick advancements in digital technology and the growing focus on environmental sustainability challenges. Fourth, the relationship between environmental ethics, corporate responsibility, sustainable innovation, or digital transformation must be specifically addressed in the chosen studies.

The exclusion criteria are applied to eliminate irrelevant or less rigorous sources. Non-academic publications such as opinion pieces, news articles, and popular writings are excluded. Additionally, studies lacking clear theoretical or methodological foundations are omitted.

Literature not directly related to environmental ethics or sustainability within the digital economy context is also excluded from the analysis.

Screening and Selection Process

To guarantee that the material is pertinent to the goals of the study, it is selected through a number of methodical stages, and the outcome of each stage is reported to make the review procedure transparent. The first stage is identification: the database search in Scopus using the predetermined keyword combinations yielded an initial pool of 286 records, all sourced from Scopus. After 45 duplicate records were removed, 241 unique articles proceeded to the screening stage. The researcher assesses each article's congruence with the research subject during the second stage, which involves screening titles and abstracts. At this point, 185 articles that don't specifically discuss how environmental ethics, corporate responsibility, sustainable innovation, and the digital economy are related are excluded, leaving 56 articles for full-text assessment.

In the third stage, known as the full-text review, the articles that made it through the first screening are thoroughly reviewed to make sure they meet the inclusion requirements. At this point, the researcher assesses methodological rigor, issue relevance, and theoretical contributions; 20 articles are excluded at this stage, primarily due to insufficient theoretical or methodological grounding, limited relevance to the intersection of environmental ethics, corporate responsibility, and sustainable innovation, or failure to meet the 2010-2024 publication window.

Finding papers that satisfy all predetermined requirements for in-depth study is the last step, known as final selection, resulting in a total of 36 articles included in this review. This procedure guarantees that the chosen literature is both excellent and pertinent, and the number of records retained at each stage is summarized in Table 1 below to allow the review process to be traced and replicated.

Table 1. Screening and Selection Process

Steps	Count
Records identified (Scopus)	286
Duplicate removed	45
Records screened	241
Records excluded	185
Full text assessed	56
Full text excluded	20
Included studies	36

Data Analysis and Thematic Synthesis

A thematic analysis approach is used to examine the 36 included articles. The coding process begins with open coding, in which key concepts, arguments, and findings from each article are extracted and recorded in a structured data-extraction matrix covering the article's focus, theoretical lens, and main conclusions relevant to environmental ethics, corporate responsibility, sustainable innovation, and the digital economy. These initial codes are then compared iteratively across articles and grouped into broader categories based on conceptual similarity, following an inductive, constant-comparison procedure. Where codes could plausibly fit more than one category, the research team discussed the classification jointly and reconciled it by consensus before finalizing the coding scheme. Through this iterative process of comparison and consolidation, the literature is divided into multiple major themes. The first subject deals with environmental ethics in business, emphasizing moral standards and ethical ideals that direct corporate environmental actions. The second theme focuses on corporate environmental responsibility in the digital economy, namely how businesses incorporate

sustainability concepts into their digital-based business strategy. The third theme looks at the importance of green technology and sustainable innovation, highlighting initiatives to create eco-friendly business models and technologies. The fourth theme explores the integration of digital transformation and environmental sustainability, highlighting how digital technologies can support more sustainable business practices.

This thematic analysis approach enables the study to develop a comprehensive conceptual synthesis of the relationships among environmental ethics, corporate responsibility, and sustainable innovation within the digital economy context.

Research Limitations

The narrative literature review approach has a number of drawbacks even if it offers wide conceptual insights. First, prejudice pertaining to database coverage and keyword selection may affect the literature selection process. Second, because this study is based on literature found in particular scholarly databases, pertinent studies that are not indexed in these sources may be excluded. Third, research published in other languages is not included in the review because it is restricted to English-language publications. However, by combining several research viewpoints and producing a more thorough conceptual grasp of environmental ethics in the digital economy, the narrative review approach makes substantial advances.

Results and Discussion

Integration of Environmental Ethics in Digital Transformation

The growth of the digital economy has profoundly changed how businesses function, innovate, and engage with stakeholders. Artificial intelligence, big data analytics, cloud computing, and digital platforms are examples of digital technologies that have improved operational efficiency and increased prospects for innovation across industries. Nonetheless, research suggests that digital revolution also brings with it more complicated environmental issues. Large-scale computing systems, data centers, and telecommunications networks are examples of digital infrastructure that uses a lot of energy and increases carbon emissions worldwide (Jones, 2018). Furthermore, the proliferation of electronic gadgets has resulted in a rise in electronic garbage, or "e-waste," which presents hazards to the environment and public health (Forti et al., 2020).

These results imply that digital transformation is more than just an economic and technological phenomenon. It also includes an ethical component on corporate accountability for the effects of technology use on the environment. Businesses have a moral duty to make sure that technological innovation does not jeopardize ecosystem sustainability from the standpoint of environmental ethics. In order to match technological advancement with sustainability goals, environmental ethical principles must be incorporated into digital transformation initiatives.

Digital technologies, however, have a great deal of potential to improve environmental management. Businesses can monitor energy use, streamline supply chains, and increase resource efficiency thanks to technologies like artificial intelligence and big data. According to empirical research, using digital technologies for resource management can greatly improve operational efficiency and lower carbon emissions (George et al., 2021). Therefore, including environmental ethics into digital transformation serves as both a strategic strategy to optimizing the environmental advantages of digital technologies and a normative framework.

Corporate Environmental Responsibility in the Digital Economy

Corporate Environmental Responsibility (CER) has grown in importance as a component of corporate governance in the digital economy. At first, pollution control, resource efficiency, and regulatory compliance were the main goals of corporate environmental responsibility.

Digital supply chains, technical innovation, and the effects of digital infrastructure on the environment are now included in the definition of digital transformation. Sustainable supply chain management is one strategic strategy that is frequently explored in the literature. Businesses can more accurately and transparently track environmental effects throughout supply chains thanks to digital technologies. Businesses can reduce carbon emissions and increase energy and resource efficiency by using digital information systems and data analytics (Bansal & Song, 2017).

Adopting green IT techniques, which seek to lessen the environmental impact of digital infrastructure, is another new strategy. The creation of energy efficient hardware and software systems, the use of renewable energy in digital processes, and energy-efficient data centers are some examples of these activities.

Additionally, businesses are incorporating the Environmental, Social, and Governance (ESG) framework into corporate governance frameworks at an increasing rate. ESG promotes the incorporation of environmental sustainability metrics into business reporting and strategic decision-making. Research indicates that companies with good ESG performance typically improve sustainability outcomes and increase stakeholder and investor trust (Eccles et al., 2014). As a result, demands for more sustainable company practices from regulators, investors, customers, and the global community are shaping corporate environmental responsibility in the digital economy. These external pressures are complemented by internal organizational practices: Aftab et al. (2023) find that green human resource management strengthens environmental performance largely through its effect on employees' green innovation behavior, suggesting that corporate environmental responsibility in digital firms depends not only on governance frameworks but also on how sustainability values are embedded in day-to-day human resource practices.

The Role of Sustainable Innovation in Addressing Digital Environmental Challenges

In order to lessen the negative effects of digital economic activity on the environment, sustainable innovation is essential. According to Boons & Lüdeke-Freund (2013), it refers to the creation of technology, production methods, and business strategies that minimize environmental damage while producing economic benefit. Eco-friendly digital technologies are strongly linked to sustainable innovation in the digital economy. Green digital technologies are one such type that aims to lower carbon emissions and increase energy efficiency. The creation of renewable energy-based computing systems and energy-efficient data centers serves as an example of how technological innovation may support environmental sustainability.

The digital technology industry is also using the circular economy concept more and more. In order to limit e-waste and lessen resource extraction, this strategy places a strong emphasis on the reuse, repair, and recycling of electronic devices (Geissdoerfer et al., 2017). In reality, technology companies are creating business models that use product take-back and recycling programs to prolong product life cycles. Emerging digital technologies are increasingly theorized as enablers of this transition: Böhmecke-Schwafert et al. (2022) show that blockchain can support the shift toward a circular economy by increasing transactional trust and traceability across reuse, repair, and recycling processes, offering a concrete technological pathway through which the circular economy concept can be operationalized in digital business settings. The rise of sustainable digital platforms, which encourage more effective and sustainable consumption habits, is another significant development. These platforms increase the efficiency of resource distribution, lessen the need for transportation, and strengthen ties between producers and customers. Digital innovation is therefore a strategic tool for striking a balance between environmental sustainability and economic prosperity.

Ethical Challenges in the Digital Economy

Digital technologies have the potential to promote sustainability, yet there are also a number of moral dilemmas. The growing energy demand needed to maintain the world's digital infrastructure is a major problem. Large-scale data processing and storage facilities use a lot of energy, which could raise carbon emissions if they are not handled responsibly (Jones, 2018). Additionally, one of the waste streams with the greatest rate of increase in the world, e-waste, is increasing due to the rapid proliferation of electronic gadgets. Particularly in underdeveloped nations with inadequate waste management systems, improper e-waste handling can result in environmental contamination and pose major health hazards (Forti et al., 2020).

Table 2. Thematic synthesis matrix of environmental challenges, corporate strategies, and digital technologies in the reviewed literature

Thematic Cluster	Environmental Challenge	Corporate Strategy	Digital Technology	Supporting References
Environmental ethics in business	Absence of an explicit normative/ethical foundation guiding firms' environmental decision-making in digital contexts	Adoption of Corporate Environmental Responsibility (CER) and Corporate Social Responsibility (CSR) as ethical decision-making frameworks	Applies across digital operations generally (governance-level, not technology-specific)	Bansal & Song (2017); Carroll (2016)
Corporate environmental responsibility in the digital economy	Lack of transparency and accountability for environmental impacts across digital supply chains	Sustainable supply-chain management; ESG-based governance and reporting; green human resource management practices	Digital information systems, data analytics	Bansal & Song (2017); Eccles et al. (2014); Aftab et al. (2023)
Green technology and sustainable innovation	Tension between economic growth from digital consumption and the need to limit environmental footprint	Circular-economy practices (product take-back, repair, recycling programs); sustainable/collaborative digital platforms	IoT-enabled tracking, blockchain, sharing-economy platforms	Boons & Lüdeke-Freund (2013); Geissdoerfer et al. (2017); Böhmcke-Schwafert et al. (2022)
Integration of digital transformation and environmental sustainability	Rising energy consumption and carbon emissions from digital infrastructure (data centers, cloud computing, telecommunications networks); growing volume of electronic waste	Green IT adoption; energy-efficient data centers; renewable energy in digital operations; product take-back and recycling	Artificial intelligence, big data analytics, cloud computing	Jones (2018); Forti et al. (2020); George et al. (2021); Freitag et al. (2021); Belkhir & Elmelig (2018)
Integration of digital transformation and environmental sustainability	Absence of uniform international standards for digital sustainability, creating regulatory inconsistency across countries	Development of internal governance frameworks and voluntary sustainability standards; transparency in disclosure	Digital reporting and compliance-monitoring platforms	Lobschat et al. (2021); Bansal & Song (2017); Cheng & Zhang (2023)
Emerging digital/AI ethics and ESG governance	Growing ethical uncertainty surrounding the use of artificial intelligence in ESG data processing, disclosure, and risk assessment	Development of corporate AI ethics frameworks integrated with digital responsibility and ESG governance	Artificial intelligence, ESG analytics and reporting platforms	Cheng & Zhang (2023); Zhang (2026); Lin (2024)

The absence of uniform international guidelines for digital sustainability presents another difficulty. Different nations have varying environmental laws governing digital technologies, making it challenging for multinational technology companies to adopt consistent sustainability standards. Because of this, there is conflict between protecting the environment and encouraging technological innovation. These difficulties demonstrate the necessity of more thorough corporate governance strategies. Businesses must increase transparency in disclosing the environmental effects of digital operations and incorporate sustainability concepts into technological innovation initiatives.

To provide a more analytical synthesis of the themes discussed above, Table 2 maps each environmental challenge identified in the reviewed literature to the thematic clusters established through the coding scheme described in the Data Analysis and Thematic Synthesis section. In addition to the four core themes generated through thematic coding, the review also identified a cross-cutting emerging cluster concerning digital and AI ethics in ESG governance. Because this cluster spans multiple thematic domains rather than constituting a standalone theme, it is discussed as a priority direction for future research. This thematic matrix highlights the interrelationships among the identified themes rather than presenting them as isolated, sequential discussions.

Implications for Corporate Governance and Public Policy

The study's conclusions have significant ramifications for public policy and corporate governance. From a business standpoint, it is crucial to incorporate sustainability into digital transformation plans. Businesses must make sure that technical advancements promote environmental sustainability in addition to improving economic success. It is also essential to improve environmental governance in organizations. Top management and boards of directors must make sure that environmental concerns related to digital activities are methodically recognized and controlled. Corporate accountability to stakeholders is improved by transparency in sustainability reporting.

From a public policy perspective, governments play a strategic role in fostering a sustainable digital economy. Environmental regulations related to digital technologies must be developed to ensure compliance with sustainability standards. Policies promoting green technologies and sustainable innovation can accelerate the transition toward environmentally sustainable digital economies.

Future Research Agenda

There are still a number of gaps in the growing body of research on environmental ethics in the digital economy. The creation of conceptual frameworks for digital environmental governance, which include sustainability concepts into digital technology management, is one important field. Additionally, future studies should create more precise techniques for quantifying the effects of digital change on the environment. There is still a dearth of empirical data regarding the lifecycle environmental effects of digital technologies, underscoring the necessity of methods like life cycle assessment (LCA).

Furthermore, a significant new field of study is the connection between corporate ethics, sustainability, and artificial intelligence. More knowledge of AI's ethical and environmental ramifications is needed as its use grows. Emerging finance-oriented scholarship already illustrates this convergence, showing how artificial intelligence is being integrated into ESG data processing, disclosure, and risk assessment, while also raising new governance and ethical questions that echo longstanding concerns in environmental ethics (Lin, 2024). How circular economy models are supported by digital innovation might be investigated further. Blockchain, IoT, and digital platforms are examples of technologies that present chances to develop sustainable business models and more effective resource utilization.

Lastly, to investigate how legislative frameworks, cultural elements, and economic growth impact company sustainability practices, cross-national and institutional viewpoints are required. Best practices for controlling environmental effects in the digital economy can be found through comparative research. To improve knowledge in this area, an interdisciplinary approach combining computer science, management, corporate ethics, and sustainability studies is crucial. The creation of creative, ethical, and long-lasting business models in the digital economy will be aided by such integration.

Conclusion

This narrative review of 36 peer-reviewed studies published between 2010 and 2024 shows that environmental ethics has moved from a peripheral concern to a structural feature of the digital economy. Four interrelated patterns emerge from the thematic synthesis: environmental ethics supplies the normative foundation for corporate environmental decision-making; corporate environmental responsibility is increasingly embedded in digital governance structures such as ESG reporting and green human resource practices; sustainable innovation, including green technology and circular-economy models, mitigates the ecological costs of digital transformation; and digital infrastructure itself generates measurable environmental burdens, rising energy consumption, e-waste, and carbon emissions, that require deliberate governance rather than incidental mitigation. An emerging fifth cluster, at the intersection of artificial intelligence, ESG governance, and digital ethics, signals that these questions will intensify rather than resolve as digital transformation deepens.

Theoretically, this review repositions environmental ethics as an integrative framework rather than a compliance add-on. By tracing how normative reasoning in business ethics connects to the operational realities of digital transformation, it shows that sustainability and technological advancement are interdependent rather than competing objectives, a link that prior research has tended to treat as two separate agendas, digital efficiency on one side and environmental responsibility on the other. This synthesis extends the corporate sustainability literature by explaining not only that firms should integrate sustainability into digital strategy, but why the two are increasingly inseparable: digital infrastructure is itself an environmental actor, and its governance is now a component of corporate environmental responsibility rather than context surrounding it.

Practically, the findings point to three concrete priorities. Businesses need to embed environmental ethics into digital transformation strategy at the design stage, through ESG-integrated governance, green human resource practices, and transparent sustainability reporting, rather than retrofitting it after systems are deployed. Policymakers need to close the regulatory gap this review identifies by developing binding standards for the environmental impact of digital technologies, since voluntary disclosure alone has not produced consistent practice across countries. Researchers, in turn, need to move from conceptual synthesis toward empirical measurement, particularly life-cycle assessment of digital infrastructure and cross-national comparative studies, to test whether the patterns identified here hold across regulatory and cultural contexts.

Ultimately, the trajectory of the digital economy will be shaped less by the pace of technological innovation than by how consistently environmental ethics is embedded in its governance. The four themes identified in this review indicate that this embedding is already underway; the remaining challenge, for business leaders, policymakers, and researchers alike, is to make it consistent, measurable, and enforceable across the digital economy rather than an aspiration confined to individual firms.

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