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Intelligent Knowledge For Sustainable Organizations

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Special Track n.: 17

From Climate Action to Circularity: Integrating Knowledge Management and Digital Technologies for Resilient Models

Description

Climate change represents one of the most profound and systemic challenges of our time, with far-reaching implications for the environment, the economy, and society as a whole (IPCC, 2023). Rising global temperatures, the intensification of extreme weather events, accelerating biodiversity loss, and strains on food and water systems collectively signal the need for urgent, coordinated action (Esposito et al., 2025). At the centre of this crisis are anthropogenic greenhouse gas (GHG) emissions, largely driven by the extraction, processing, and consumption of natural resources. Consequently, addressing climate change entails not only technological innovation but also a far-reaching transformation of production and consumption patterns across all economic sectors (Serrano et al., 2021). In this vein, scientific and policy communities distinguish two distinct yet complementary avenues: mitigation, tackling root causes by reducing or avoiding GHG emissions through measures such as renewable energy roll-out, energy efficiency, and carbon sequestration (VijayaVenkataRaman et al., 2012); and adaptation, which strengthens systems' resilience to adverse climatic effects via climate-resilient infrastructure, drought-tolerant crops, and improved water governance (Lackner et al., 2022). Mitigation curbs the scale of future impacts, whereas adaptation builds the capacity to cope with those already unfolding; both are indispensable and mutually reinforcing pillars of an effective climate strategy.

In light of mounting urgency, institutions at global, European, and national levels have advanced a broad suite of strategies to promote both mitigation and adaptation. Internationally, the Paris Agreement anchors climate governance through progressively strengthened national commitments, explicit recognition of adaptation and resilience, and financial support for developing countries. In the EU, the Green Deal targets climate neutrality by 2050, the Climate Law enshrines net zero and a -55% GHG target by 2030, "Fit for 55" operationalises cross-sector decarbonisation, and the EU Adaptation Strategy advances nature-based solutions, resilient infrastructure, and the integration of climate risk into planning.

Beyond climate-specific measures, an expanding body of legislation now explicitly embeds climate objectives within the circular economy (CE) agenda. The EU Circular Economy Action Plan (2020), a key component of the European Green Deal, underscores the nexus between resource use and climate change. It advances actions to reduce the carbon and material footprints of products and value chains through product design, extended producer responsibility, and the scaling of circular business models (Yang et al., 2023). This regulatory trajectory reflects a growing consensus on the capacity of CE strategies to support both mitigation and adaptation (Gallego-Schmidt et al., 2020; Leal Filho et al., 2023). The CE departs from the linear take-make-dispose model, advancing a regenerative approach anchored in resource efficiency, material circularity, and the minimisation of waste (Kirchherr et al., 2017). Given its capacity to serve both mitigation and adaptation objectives, the CE has garnered increasing scholarly interest as a strategic instrument for tackling climate change (e.g., Khanna et al., 2022; Yang et al., 2023). Yet, notwithstanding the prominence of the CE as a response to the pressing imperative to address and mitigate climate change, an effective shift to circular modes of production and consumption remains markedly constrained (Esposito et al., 2025).

One of the primary barriers is the complexity of redesigning traditional linear processes into closed-loop systems (Su et al., 2013). This shift requires overcoming entrenched organisational routines, legacy technologies, and path-dependent supply chains. Many firms also lack the expertise, resources, and know-how to implement circular strategies effectively

(Chu et al., 2018). Information asymmetries further impede symbiotic exchanges: transparency and accuracy in data collection and dissemination are preconditions for informed decision-making (Piscicelli, 2023). Finally, in the absence of robust tools and frameworks to assess sustainability metrics and circular performance, firms struggle to quantify benefits and communicate them credibly to stakeholders (Wang et al., 2019).

To address these frictions, organisations should invest in Knowledge Management (KM) systems that develop the skills and capabilities required for CE transitions (Ritzén & Sandström, 2017). Effective KM frameworks codify and diffuse expertise, enabling circular design, process optimisation, and the measurement of sustainability outcomes (Valkokari, 2015; Ul-Durar et al., 2023).

In this evolving landscape, digital technologies (DT) emerge as catalytic complements to KM, expanding the reach and timeliness of knowledge capture and sharing, automating parts of decision support, and facilitating collaboration at scale and at a distance (Andreeva & Kianto, 2012; Bocken et al., 2016). Specifically, Big Data analytics, the Internet of Things (IoT), Artificial Intelligence (AI), and blockchain offer deep visibility into resource flows, waste reduction opportunities, and life-cycle performance (Gupta et al., 2019).

More specifically, blockchain can secure provenance and authenticity along supply chains, thereby reducing information asymmetry and verifying circular practices (Piscicelli, 2023). IoT devices and smart sensors generate high-frequency telemetry on processes, resource use, and environmental performance that supports operational optimisation and waste minimisation, even under climate stress (Sica et al., 2023). Digital platforms and collaborative networks match residual streams and capacities across firms and territories, enabling industrial symbiosis and cross-sector learning (Zhang et al., 2020).

At the same time, a reflective literature cautions against the dark side of DT, from material intensity and e-waste to energy consumption. Large-scale crypto-mining, for instance, consumed approximately 121.36 TWh in 2021 and has been criticised as potentially misaligned with net-zero pathways (Dwivedi et al., 2022). Accordingly, a dual-lens approach — optimistic yet critical — is needed, foregrounding trade-offs and rebound effects amid accelerating digital adoption; consequently, carbon-aware, circular-by-design digital portfolios are imperative.

DT also matters for the disclosure and assurance of CE information. By interfacing with LCA and carbon accounting, DT strengthens the accuracy, timeliness, and comparability of environmental metrics (Aryal et al., 2018; Sica et al., 2023; D'Eusanio & Petti, 2024). KM systems help close persistent information gaps, while digital channels — including corporate websites, social media, and emerging product passports — enhance transparency and stakeholder engagement around CE performance and climate outcomes, aligning corporate strategies with stakeholder expectations (Gupta et al., 2019; Esposito et al., 2023; L'Abate et al., 2023; L'Abate et al., 2024a; L'Abate et al., 2024b).

Accordingly, scholars have mainly investigated DT for resource efficiency (e.g., Zhang et al., 2020; Rodrigo et al., 2024; Sánchez-García et al., 2024), inter-organisational collaboration (Schöggel et al., 2024), and firm performance (Truant et al., 2024). Parallel studies deploy DT within LCA to refine environmental impact measurement (Aryal et al., 2018; Sica et al., 2023; D'Eusanio & Petti, 2024), while disclosure-oriented research explores digital communication of CE strategies to external audiences (L'Abate et al., 2023; 2024a; 2024b; Esposito et al., 2023). In addition, scholarship has begun to probe the interface between DT and KM, analysing how digital platforms can be embedded within KM architectures to enable collaboration, innovation, and the co-creation of circular solutions, often through the lens of industrial symbiosis (Stachová et al., 2020; Acerbi et al., 2020; De Marchi & Di Maria, 2020; Xiang & Yuan, 2024).

Yet a core research gap persists. We still lack integrative frameworks that jointly leverage DT and KM within robust information systems to enable circular transitions that deliver verifiable climate outcomes — advancing decarbonisation and resilience while improving the credibility and decision-usefulness of CE/climate disclosures (Aibar-Guzmán et al., 2024; García-Sánchez et al., 2024; Raimo et al., 2025; Salvi et al., 2025).

This special track addresses this literature gap by inviting conceptual, empirical, and methodological contributions that specify, operationalise, and validate KM–DT configurations through which circular strategies deliver measurable mitigation and adaptation outcomes, generate decision-useful climate disclosure, and ultimately support a durable competitive advantage.

In particular, the track aims to explore, though not limited to, the following research questions:

- What roles do DT play in facilitating CE adoption and operationalising climate-risk management across industries and territories?
- How can digital tools enhance transparency, comparability, and assurance in CE and climate disclosure, reducing information asymmetry along value chains?
- What are the challenges and opportunities in integrating DT with LCA and carbon accounting to generate timely, decision-useful metrics for climate mitigation and adaptation?
- How can businesses manage CE–climate information and performance metrics within KM frameworks aligned with net-zero targets and stakeholder expectations?
- What barriers hinder DT adoption in CE–climate contexts, and how can KM-enabled capability building overcome them?
- How can digital platforms and collaborative networks support the creation, dissemination, and co-creation of CE–climate knowledge across supply chains and regions, enabling industrial symbiosis and systemic resilience?

Keywords

Circular economy; Climate change; Digital technologies; Knowledge management

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Guidelines and Requirements

Researchers wishing to contribute are invited to submit an EXTENDED ABSTRACT (in doc/docx format) of min 500 and max 1000 words, not later than **31 JANUARY 2026**. All submission must be done via dedicated form on our website. The abstract should address theoretical background, research objective, methodology, and results in terms of expected contribution to Knowledge Management theory and practice. Authors are required to follow the guidelines and templates available on IFKAD website: www.ifkad.org

Important Dates

31 January 2026 – Extended Abstract Submission Deadline
24 February 2026 – Acceptance Notification to Authors
20 April 2026 – Early-Bird Registration & Payment Deadline
02 May 2026 – Full Paper Submission Deadline
31 May 2026 – Regular and PhD Students Registration & Payment Deadline
15 June 2026 – Conference Program Release
1-3 July 2026 – Conference sessions (*to be considered as 3 full working days*)

Please note that all above indicated dates are CUT-OFF deadlines. There will not be an extension to any of these.

Further Information

For any information related to the conference and/or any special track, please see the event website at www.ifkad.org or contact the conference manager at info@ifkad.org