

IT'S ABOUT PEOPLE 2026: ETHICAL INTELLIGENCE FOR A SUSTAINABLE FUTURE

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Richard Pagett



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Abstract:

This paper argues for positioning human dignity, ethical responsibility, and collective intelligence at the centre of Europe's sustainability transition. Building on emerging insights into the transformative, yet ambivalent role, of artificial intelligence (AI), this paper explores how digital technologies can support, rather than substitute, human judgement in addressing climate challenges, social inequities, and systemic risks. AI offers powerful capabilities for transparency, resource optimisation, environmental monitoring, and data-driven policymaking, enabling unprecedented opportunities to accelerate progress toward the UN Sustainable Development Goals. Yet, as highlighted in recent analyses, AI also carries significant ethical risks, including bias, surveillance overreach, opaque decision-making, and high environmental footprints. Sustainable development in the digital age requires a governance paradigm rooted in human values, inclusivity, and precaution. It proposes AI as an enabler of ethical co-creation: a tool that amplifies human foresight, strengthens democratic participation, and supports resilient socio-ecological systems. *It's About People 2026 - Ethical Intelligence for a Sustainable Future* thus calls for a balanced approach that unites technological innovation with ethical stewardship, ensuring that intelligence, whether human or artificial, serves the well-being of people, communities, and the planet.

Keywords:

Sustainable Development Ethical AI Governance Transparency Human-Centred Innovation

Introduction: Sustainability at a Human Crossroads

Europe's Sustainability Challenge in the Digital Age

Europe stands at a pivotal moment in its sustainability transition. Climate instability, biodiversity loss, demographic change, widening social inequalities, and geopolitical uncertainty are converging with rapid technological transformation. At the heart of this convergence lies the digital age, characterised by the accelerating deployment of artificial intelligence (AI), data-driven governance, and pervasive digital infrastructure. These technologies offer unprecedented opportunities to support sustainability objectives (European Commission, 2019), yet they also introduce new ethical, social, and environmental challenges that demand careful and principled governance. (Jasanoff, S., 2016; European Commission, 2019).

The European sustainability project has long been grounded in values of human dignity, social cohesion, democratic participation, and environmental stewardship. However, the scale and speed of digital innovation are reshaping how decisions are made, resources are allocated, and power is exercised. Algorithms increasingly influence public policy design, urban planning, energy systems, welfare provision, and environmental monitoring.

While such systems promise efficiency, optimisation, and predictive capacity, they also risk distancing decision-making from human judgement, lived experience, and moral responsibility if deployed uncritically.

A central challenge, therefore, is not merely technological adoption, but alignment: ensuring that digital transformation actively supports sustainable development rather than undermining it (Alojail, M., 2023). This includes addressing the ambivalent nature of AI itself. On the one hand, AI can enhance transparency, improve climate modelling, optimise resource use, and strengthen early warning systems for environmental and social risks. On the other, it can exacerbate inequalities through biased datasets, enable intrusive surveillance, obscure accountability through opaque decision-making, and impose significant environmental costs through energy-intensive data infrastructure.

The sustainability implications of digitalisation extend beyond environmental metrics alone. Social sustainability is equally at stake. Without deliberate safeguards, digital systems may reinforce existing structural disadvantages, marginalise vulnerable communities, and concentrate power within a narrow set of corporate or institutional actors (Suraj Begum, R., *et al.* 2025). In this context, Europe's commitment to inclusive growth and social justice requires that technological systems be designed and governed to serve collective well-being, not solely economic efficiency or innovation for its own sake.

Furthermore, the environmental footprint of digital technologies poses a paradox within the sustainability transition. While AI and data analytics can support decarbonisation and ecological monitoring, they also rely on resource extraction, global supply chains, and growing energy demand. This tension underscores the need for a holistic sustainability framework that accounts for full life-cycle impacts and avoids shifting burdens across sectors, regions, or generations.

Europe's response to these challenges must therefore be normative as well as technical. The digital age calls for a governance paradigm that places ethical responsibility, precaution, and human-centred design at its core. Sustainability in this context is not simply about deploying smarter tools, but about cultivating collective intelligence: the capacity of societies to deliberate, learn, and act together in the face of complexity and uncertainty. Digital technologies should support this collective intelligence, augmenting human foresight and democratic processes rather than replacing them (Shin, B., *et al.* 2024).

In confronting its sustainability challenge in the digital age, Europe has an opportunity to lead globally by demonstrating that innovation and ethics are not competing priorities, but mutually reinforcing foundations for a resilient and just future. This requires sustained attention to values, institutions, and accountability mechanisms that ensure intelligence, whether human or artificial, remains firmly in service of people, communities, and the planet.

Framing Ethical Intelligence and Human Dignity

As Europe confronts the sustainability challenges of the digital age, it becomes essential to clarify the ethical foundations that should guide technological development and governance. Central to this discussion is the concept of *ethical intelligence*: an approach that integrates human values, moral responsibility, and collective judgement into the design and deployment of digital systems.

Ethical intelligence is not a technical property of machines alone, nor a substitute for human reasoning. Rather, it is a relational and societal capacity that emerges when technology is aligned with human dignity, democratic accountability, and long-term sustainability goals. (European Union, 2012; Floridi, L. *et al.* 2018).

Human dignity occupies a foundational position within European legal, social, and philosophical traditions. It affirms the intrinsic worth of every person, irrespective of economic productivity, technological capability, or social status. In the context of digital transformation, this principle provides a critical counterbalance to purely instrumental or efficiency-driven models of innovation. Systems that optimise outcomes without regard to fairness, transparency, or agency risk reducing individuals to data points, undermining trust and eroding the social foundations upon which sustainable development depends.

Ethical intelligence reframes the role of AI from autonomous decision-maker to supportive partner in human deliberation. This framing recognises that while AI can process vast quantities of data and identify patterns beyond human capacity, it lacks moral awareness, contextual understanding, and accountability. Ethical responsibility therefore remains firmly human, residing with those who design, deploy, regulate, and rely upon digital systems. Embedding ethical intelligence requires explicit choices about values, priorities, and acceptable trade-offs, rather than assuming neutrality or inevitability in technological outcomes.

Within this framework, ethical intelligence is closely linked to collective intelligence. Sustainability challenges, such as climate adaptation, social resilience, and systemic risk, are inherently complex and uncertain. Addressing them effectively requires inclusive forms of knowledge generation and decision-making that draw on scientific expertise, local experience,

cultural insight, and democratic debate. Digital technologies can strengthen these processes by enhancing access to information, supporting participatory governance, and improving transparency. However, they must be deliberately designed to empower diverse voices rather than centralise control or obscure decision pathways.

Human dignity also demands attention to power asymmetries within the digital ecosystem. The concentration of data ownership, computational resources, and algorithmic expertise raises fundamental questions about who benefits from digital innovation and who bears its risks. An ethical intelligence approach insists that sustainability transitions do not exacerbate inequality or exclude vulnerable groups but instead promote social cohesion and intergenerational justice. This includes protecting privacy, preventing discrimination, and ensuring that automated systems remain open to scrutiny and redress.

Importantly, framing ethical intelligence is not about resisting technological progress, rather it is about shaping its direction (Stilgoe, J., *et al.* 2013). Europe's sustainability ambitions depend on innovation, experimentation, and adaptive learning. Yet innovation detached from ethical reflection risks becoming a source of new instability rather than resilience. By grounding digital transformation in human dignity, Europe can foster technologies that support care, responsibility, and stewardship, qualities essential for navigating ecological limits and social complexity.

In this sense, ethical intelligence represents a unifying lens through which sustainability, governance, and digitalisation can be understood as mutually reinforcing rather than competing agendas. It affirms that the ultimate measure of intelligence, whether human or artificial, lies not in speed or scale, but in its capacity to serve the well-being of people and the integrity of the systems upon which life depends.

Commensurate with this "ethical" intelligence is "moral" intelligence. This term has also been used for some time. Often the way that the term has been used overlaps with "ethical intelligence", though strictly speaking it is not quite the same since "moral" intelligence also encompasses processes for decision making, including moral psychology (Wallach, W. 2025).

AI as a Transformative but Ambivalent Force

AI has emerged as one of the most consequential technologies shaping Europe's sustainability transition. Its capacity to process vast datasets, identify complex patterns, and generate predictive insights positions AI as a powerful enabler of environmental monitoring, resource optimisation, and evidence-informed policymaking. From climate modelling and energy systems management to public health and social planning, AI is increasingly embedded within the infrastructure that govern contemporary life. Yet this transformative potential is inseparable from a profound ambivalence: the same systems that promise progress also introduce new risks, uncertainties, and ethical dilemmas. This ambivalence reflects the dual character of AI as both a technical and a social phenomenon. Technically, AI systems can extend human analytical capabilities far beyond traditional limits, enabling faster responses to complex and interdependent sustainability challenges. They can support early warning systems for extreme weather events, optimise transport and energy networks to reduce emissions, and enhance transparency through improved data integration. In these roles, AI appears as a catalyst for acceleration, helping Europe meet ambitious climate and

development targets under conditions of urgency and constraint. (Mittelstadt, B. *et al.* 2016; Helbing, D., *et al.* 2019).

However, AI does not operate in a vacuum. Its impacts are shaped by the data it is trained on, the objectives it is given, and the institutional contexts in which it is deployed. As a result, AI systems often reflect and amplify existing social, economic, and political structures (Mittelstadt, B. *et al.* 2016; Noble, S. U., 2018). Biases embedded in historical data can lead to discriminatory outcomes, while optimisation goals focused narrowly on efficiency may overlook social or ecological externalities. In sustainability contexts, this can mean that short-term gains are prioritised at the expense of long-term resilience, or that vulnerable communities bear disproportionate risks.

Ambivalence of AI is particularly evident in questions of governance and accountability. Automated and algorithmic systems can obscure decision-making processes, making it difficult for citizens, policymakers, and even system designers to understand how outcomes are produced. This opacity challenges core democratic principles, including transparency, responsibility, and the right to contest decisions that affect one's life chances. When AI is used in policy-relevant domains, such as environmental regulation, welfare allocation, or urban planning, the stakes of such opacity become especially high.

Environmental sustainability itself is not immune to this tension. While AI can support decarbonisation and ecological management, it also contributes to rising energy demand, material extraction, and electronic waste through data centres, hardware production, and global digital infrastructure.

These environmental costs are often externalised geographically and temporally, raising concerns about inter-generational justice and global equity. Promise of AI-enabled sustainability must therefore be weighed against full life-cycle impacts, rather than assessed through immediate functional benefits.

Recognising AI as a transformative but ambivalent force underscores the need for ethical intelligence in its governance (Floridi, L., *et al.* 2018). Rather than treating AI as an autonomous solution to sustainability challenges, this perspective situates it as a contingent tool whose value depends on human judgement, institutional safeguards, and societal values. Ethical intelligence does not seek to eliminate ambivalence, but to navigate it consciously, whilst acknowledging trade-offs, addressing uncertainties, and embedding precaution where risks are systemic or irreversible (Stilgoe, J., *et al.* 2013).

For Europe, this framing carries strategic significance. It suggests that leadership in AI and sustainability will not be defined solely by technological prowess, but by the capacity to govern complexity responsibly. By embracing the ambivalent nature of AI, Europe can move beyond simplistic narratives of technological optimism or fear and instead cultivate approaches that harness innovation while remaining attentive to dignity, justice, and ecological limits. In doing so, AI becomes neither saviour nor threat, but a powerful instrument whose direction and consequences remain firmly within the realm of collective human choice.

Contributions of AI to the UN Sustainable Development Goals

AI has potential to make significant contributions to the achievement of the United Nations Sustainable Development Goals (SDGs), particularly by enhancing the capacity of institutions and societies to understand, manage, and respond to complex sustainability challenges. In the European context, AI is increasingly positioned as a strategic enabler, supporting evidence-based policymaking, improving system-level coordination, and accelerating progress across environmental, social, and economic dimensions of sustainable development (Vinuesa, R., *et al.* 2020; United Nations, 2019).

One of the most tangible contributions of AI lies in its ability to strengthen environmental intelligence. Advanced data analytics and machine learning techniques enable more accurate climate modelling, biodiversity monitoring, and ecosystem assessment. Satellite imagery combined with AI-driven analysis can track deforestation, land-use change, and coastal erosion in near real time, supporting SDGs related to climate action, life on land, and life below water. These capabilities enhance early warning systems, improve risk assessment, and inform adaptive responses to climate-related hazards, thereby supporting resilience at both local and regional scales.

AI also plays a growing role in advancing resource efficiency and sustainable infrastructure. In energy systems, AI-driven optimisation could improve grid stability, integrate renewable energy sources, and reduce waste across supply chains.

In urban contexts, smart mobility systems and data-informed planning tools could contribute to more sustainable cities by reducing congestion, lowering emissions, and improving access to services. When aligned with clear sustainability objectives, AI could support progress towards goals related to clean energy, sustainable cities, and responsible consumption and production.

Beyond environmental outcomes, AI has the potential to contribute to social dimensions of the SDGs, including health, education, and inequality reduction. In healthcare, AI-supported diagnostics and predictive analytics can improve early detection of disease and enhance public health planning. In education, adaptive learning systems can support personalised learning pathways and widen access to knowledge.

In social policy, data-driven tools can help identify unmet needs and target interventions more effectively. Used responsibly, these applications can strengthen social inclusion and improve quality of life.

However, realising these contributions is neither automatic nor guaranteed.

The alignment between AI deployment and the SDGs depends critically on governance choices, institutional capacity, and ethical safeguards. AI systems optimised for narrow performance metrics may inadvertently undermine broader sustainability objectives, for example by privileging efficiency over equity or economic growth over ecological integrity (Vinuesa, R., *et al.* 2020). Moreover, the benefits of AI risk being unevenly distributed, reinforcing existing disparities between regions, sectors, and social groups if issues of access, capability, and power are not addressed.

A further challenge lies in translating technical outputs into meaningful policy action. AI can generate insights, scenarios, and predictions, but it cannot determine societal priorities or

value trade-offs. The SDGs are inherently normative, reflecting collective commitments to human well-being, justice, and planetary boundaries. AI can inform progress towards these goals, but it cannot define them. Ethical intelligence is therefore essential in ensuring that AI serves as a decision-support tool that enhances human deliberation rather than displacing it.

From a European perspective, the contribution of AI to the SDGs must be understood within a broader commitment to multilateralism, human rights, and long-term stewardship. This entails investing not only in technological capability, but also in transparent institutions, participatory governance, and cross-sector collaboration. It also requires vigilance regarding unintended consequences, including environmental footprints, data governance concerns, and the risk of over-reliance on automated solutions.

Environmental, Social, and Governance Implications

The growing integration of AI into sustainability strategies brings with it a complex set of environmental, social, and governance (ESG) implications. These dimensions are deeply interconnected and must be addressed holistically if AI is to support, rather than undermine, long-term sustainability objectives. Understanding these implications is essential for moving beyond technological potential towards responsible and accountable practice. (Floridi, L., *et al.* 2018; Kemp, R. & Never, B., 2017).

From an environmental perspective, AI presents a dual challenge. On the one hand, AI-enabled systems can significantly enhance environmental management through improved monitoring, modelling, and optimisation. On the other, the digital infrastructure underpinning AI, data centres, cloud services, and global hardware supply chains, carry substantial environmental costs. Rising energy demand, water usage for cooling, and the extraction of critical raw materials contribute to carbon emissions and ecological degradation. These impacts are often geographically displaced and temporally deferred, obscuring responsibility and complicating governance. A sustainability-oriented approach therefore requires full life-cycle assessment of AI systems, ensuring that environmental gains in one domain are not offset by hidden costs elsewhere.

Social implications are equally profound. AI systems increasingly shape access to services, opportunities, and resources, influencing outcomes in employment, healthcare, education, and social protection. Without robust ethical safeguards, such systems risk reinforcing existing inequalities or introducing new forms of exclusion. Algorithmic bias, data gaps, and uneven access to digital infrastructure can marginalise already vulnerable populations. Moreover, the automation of decision-making processes may weaken human agency, particularly when individuals are subject to decisions they cannot understand, contest, or influence. Social sustainability in the digital age therefore depends on preserving fairness, transparency, and meaningful human oversight.

The governance implications of AI are perhaps the most far-reaching. As decision-making becomes more data-driven and automated, traditional accountability mechanisms are placed under strain. Questions arise regarding who is responsible for algorithmic outcomes, how decisions can be audited, and how democratic control can be maintained in complex technical systems. Opacity in algorithmic design and deployment challenges principles of transparency and the rule of law, particularly when AI is used in policy-relevant or regulatory contexts.

Effective governance must therefore ensure explainability, clear lines of responsibility, and access to redress.

Within Europe, these challenges intersect with broader commitments to democratic governance, human rights, and the precautionary principle. Addressing ESG implications requires institutions capable of anticipating systemic risks, adapting regulatory frameworks, and fostering cross-sector collaboration. It also calls for participatory approaches that involve citizens, civil society, and diverse stakeholders in shaping how AI is used and governed. Governance, in this sense, is not solely about control, but about cultivating trust and legitimacy in digital systems.

Importantly, the ESG implications of AI cannot be managed through isolated interventions. Environmental, social, and governance dimensions must be considered together, recognising trade-offs and feedback loops. For example, efforts to improve efficiency through automation may reduce emissions while simultaneously affecting employment patterns or concentrating power. Ethical intelligence provides a framework for navigating these tensions by foregrounding values, responsibility, and long-term consequences. So, the ESG implications of AI underscore the need for a deliberate and values-based approach to digital transformation. AI can support Europe's sustainability ambitions only if it is embedded within governance structures that respect human dignity, protect ecological integrity, and uphold democratic accountability.

By addressing environmental, social, and governance considerations together, Europe can move towards a model of innovation that strengthens resilience and serves the common good, rather than fragmenting responsibility or externalising risk.

Bias, Inequality, and Algorithmic Harm

As AI becomes more deeply embedded in sustainability governance and public decision-making, concerns regarding bias, inequality, and algorithmic harm move from the margins to the centre of ethical debate. These risks are not incidental flaws but structural challenges that arise from the ways AI systems are designed, trained, and deployed within existing social, economic, and institutional contexts. Addressing them is essential if AI is to contribute positively to sustainable development rather than reinforcing injustice or exclusion. (Malmio, I., 2024).

Algorithmic bias typically originates in data (Ntoutsi, E. *et al.* 2020). AI systems learn from historical datasets that reflect past decisions, social norms, and power relations. Where these histories include discrimination, marginalisation, or unequal access to resources, AI systems may reproduce and amplify those patterns at scale. In sustainability-related domains, such as housing allocation, welfare eligibility, environmental risk assessment, or access to public services, biased outputs can have material consequences for individuals and communities, shaping life chances and reinforcing spatial or social inequalities.

Importantly, algorithmic bias is not limited to explicit discrimination. Even systems designed with ostensibly neutral objectives may generate unequal outcomes due to proxy variables, incomplete data, or assumptions embedded in model design. For example, optimisation models that prioritise cost efficiency or aggregate outcomes may overlook distributional

effects, disproportionately disadvantaging rural populations, low-income households, or minority groups. In this way, AI can unintentionally undermine social cohesion while appearing technically successful.

Inequality is further exacerbated by uneven access to digital infrastructure, data, and expertise. Regions, institutions, and communities with greater technological capacity are better positioned to shape AI systems and benefit from their deployment. Conversely, those with limited access may become passive subjects of automated decision-making without meaningful influence or recourse. This asymmetry raises critical questions about participation, consent, and fairness within sustainability transitions that increasingly rely on digital tools.

Algorithmic harm also arises when AI systems are treated as authoritative or objective, discouraging critical scrutiny. The perceived neutrality of technical systems can mask value-laden assumptions and obscure responsibility. When decisions are justified by reference to algorithms rather than human judgement, accountability becomes diffused, making it difficult to identify who is responsible for adverse outcomes or how harms can be remedied. This is particularly problematic in public-sector applications, where legitimacy depends on transparency and trust. From an ethical intelligence perspective, addressing bias and inequality requires more than technical fixes. While improvements in data quality, model testing, and auditing are necessary, they are insufficient on their own. Ethical intelligence calls for reflexivity: an ongoing awareness of how values, assumptions, and power relations shape technological systems. It also demands institutional mechanisms that enable oversight, challenge, and correction when harms occur.

Human dignity provides a critical normative anchor in this context. It affirms that individuals should not be reduced to statistical profiles or treated solely as means to optimisation goals. Systems that affect people's lives must remain open to explanation, contestation, and human intervention. Safeguarding dignity requires preserving human agency within AI-enabled processes and ensuring that automated systems support, rather than replace, moral and political responsibility. Ultimately, confronting bias, inequality, and algorithmic harm is central to aligning AI with sustainability ambitions of Europe. Sustainable development cannot be achieved through technological advancement that deepens social divides or erodes trust in public institutions. By embedding ethical intelligence into AI governance, through inclusive design, participatory oversight, and clear accountability, Europe can work towards digital systems that enhance fairness and resilience rather than reproducing the injustices of the past.

This perspective aligns with ethics-by-design approaches developed within the field of philosophy of technology where it is argued that values such as human dignity, fairness, and accountability must be systematically embedded into the design and governance of digital systems, rather than treated as external constraints applied after deployment (van den Hoven, J. 2007; van den Hoven, J. *et al.*, 2015).

Surveillance, Transparency, and Accountability

The expansion of AI within public administration, environmental governance, and security infrastructure has intensified long-standing concerns regarding surveillance, transparency,

and accountability. While data-driven systems can enhance situational awareness and policy effectiveness, they also risk reshaping power relations in ways that challenge democratic norms and individual rights. In the context of sustainability, where long-term legitimacy and public trust are essential, these issues demand careful and principled attention. (Zuboff, S. 2019; Ananny, M. & Crawford, K., 2018).

AI-enabled surveillance technologies are increasingly used to monitor behaviour (Zuboff, 2019), movement, consumption patterns, and environmental conditions. In sustainability applications, such monitoring can support compliance with environmental regulations, improve urban planning, and enhance public safety. However, the boundary between legitimate oversight and intrusive surveillance is often blurred. When data collection becomes pervasive and continuous, individuals and communities may experience a loss of privacy and autonomy, even when systems are deployed in the name of collective benefit.

This challenge is compounded by the asymmetry of visibility inherent in many AI systems. Citizens are increasingly transparent to institutions, while the systems governing them remain opaque. Complex algorithms, proprietary models, and technical jargon can obscure how decisions are made, what data are used, and whose interests are prioritised. This opacity undermines informed consent and weakens the capacity of individuals to understand, challenge, or influence decisions that affect their lives.

Transparency is therefore a central requirement of ethical intelligence. Yet transparency cannot be reduced to technical explainability alone. While efforts to make algorithms interpretable are important, transparency also involves clarity about institutional purpose, governance structures, and lines of responsibility. Citizens must be able to know not only how a system functions, but why it exists, who controls it, and how its outcomes align with publicly articulated sustainability goals.

Accountability represents a further critical dimension. As AI systems become increasingly embedded within decision-making processes, responsibility can become diffused across designers, operators, policymakers, and automated systems themselves. This diffusion creates accountability gaps, particularly when harm occurs. In environmental and social policy contexts, such gaps threaten the rule of law and democratic legitimacy. Effective accountability requires that responsibility for AI-enabled decisions remains traceable to human actors and institutions, supported by clear regulatory frameworks and oversight mechanisms.

From a sustainability perspective, accountability also has a temporal dimension. Decisions informed by AI can have long-term ecological and social consequences that extend beyond electoral cycles or institutional mandates.

Ethical intelligence therefore calls for governance arrangements capable of addressing long-term responsibility, including mechanisms for monitoring impacts over time and revising systems in light of new evidence or unintended effects. Normative traditions of Europe offer important resources in addressing these challenges. Commitments to fundamental rights, proportionality, and the precautionary principle provide a basis for limiting surveillance, demanding transparency, and enforcing accountability in digital systems.

However, these principles must be actively operationalised within the context of rapidly evolving technologies. This includes investing in institutional capacity, interdisciplinary expertise, and public engagement to ensure that governance keeps pace with innovation. Surveillance, transparency, and accountability are not peripheral concerns but central determinants of whether AI can contribute to sustainable development. Without trust, legitimacy, and clear responsibility, even technically effective systems risk public resistance or misuse. By embedding ethical intelligence into the governance of AI, Europe can work towards digital infrastructure that support sustainability while respecting democratic values and human dignity, ensuring that power exercised through technology remains accountable to society as a whole.

Environmental Footprints of Digital Technologies

While AI and digital technologies are frequently presented as tools for advancing environmental sustainability, their own environmental footprints demand critical scrutiny. The material and energy requirements underpinning digital systems introduce significant, and often underestimated, ecological impacts. Addressing these impacts is essential if AI is to support sustainability transitions in a credible and coherent manner, rather than contributing to new forms of environmental pressure. (Jones, 2018; International Energy Agency, 2023).

At the core of this challenge lies the rapid expansion of digital infrastructure. Data centres, cloud computing services, high-performance computing facilities, and global communication networks are energy-intensive and increasingly resource-dependent. The training and deployment of advanced AI models require substantial computational power, driving demand for electricity and water for cooling, often in regions already facing environmental stress. Although efficiency gains are being made, overall energy consumption continues to rise as digital services proliferate.

Beyond energy use, the environmental footprint of AI extends across global supply chains. The production of digital hardware relies on the extraction of critical raw materials, including rare earth elements and minerals associated with significant ecological degradation and social harm. Manufacturing processes generate emissions and waste, while short product lifecycles contribute to growing volumes of electronic waste. These impacts are frequently externalised geographically, affecting communities far removed from the primary beneficiaries of digital technologies.

This spatial and temporal displacement of environmental costs raises fundamental questions of responsibility and justice. Sustainability gains achieved through AI-enabled optimisation in Europe may depend on environmental degradation elsewhere or impose burdens on future generations. Such dynamics are incompatible with the principles of intergenerational equity and global responsibility that underpin sustainable development. Ethical intelligence therefore requires a systemic perspective that accounts for full life-cycle impacts rather than focusing narrowly on local or short-term benefits.

A further risk lies in the assumption that digitalisation is inherently dematerialising. While AI can support efficiency and optimisation, these gains may be offset by rebound effects, whereby increased efficiency leads to increased consumption or expanded system use. Without clear boundaries and governance, digital technologies may accelerate resource use

rather than reduce it, undermining environmental objectives despite apparent technological progress.

Addressing the environmental footprint of digital technologies requires both technological and governance responses. On the technical side, this includes improving energy efficiency, investing in renewable energy for digital infrastructure, extending hardware lifecycles, and developing less resource-intensive models. On the governance side, it calls for transparency regarding environmental impacts, sustainability standards for digital infrastructure, and alignment between digital policy and climate objectives.

Ethical intelligence plays a critical role in bridging these dimensions. It emphasises the need for informed judgement about trade-offs, explicit prioritisation of sustainability outcomes, and precaution where environmental risks are systemic or irreversible. Rather than treating environmental impacts as secondary concerns to be addressed after deployment, ethical intelligence integrates ecological considerations into the earliest stages of system design and policy planning.

Recognising and addressing the environmental footprints of digital technologies is essential to maintaining the integrity of the sustainability agenda (Samuel, G., *et al.* 2022). AI cannot be credibly positioned as a solution to environmental challenges if its own impacts remain unexamined or unmanaged. By embedding ecological responsibility within digital innovation, Europe can work towards a model of technological progress that respects planetary boundaries and reinforces, rather than contradicts, its commitment to sustainable development.

Human Dignity, Responsibility, and Precaution

In response to the ethical risks and systemic challenges associated with AI, Europe faces a fundamental governance question: how can digital transformation be guided in ways that uphold human dignity, ensure responsibility, and protect society from irreversible harm? A human-centred governance paradigm offers an answer by reasserting normative principles that place people, rather than technology, at the core of sustainability transitions.

Within this paradigm, human dignity, responsibility, and precaution serve as mutually reinforcing foundations for ethical intelligence in the digital age. (European Union, 2012).

Human dignity provides the normative anchor for governing AI-enabled systems (European Union, 2012). It affirms that individuals are not merely data sources, variables in optimisation models, or subjects of automated decision-making, but moral agents with intrinsic worth. In practical terms, this means that digital systems must be designed and governed in ways that respect autonomy, fairness, and the right to explanation and redress. Decisions that significantly affect citizen lives, whether in environmental regulation, social policy, or resource allocation, cannot be delegated entirely to opaque technical systems without undermining democratic legitimacy and social trust.

Responsibility follows directly from this commitment to dignity. While AI systems may perform complex analytical tasks, they do not possess moral accountability. Responsibility therefore remains with human actors and institutions: those who design algorithms, curate data, deploy systems, and authorise their use.

A human-centred governance paradigm rejects narratives that portray technological outcomes as inevitable or self-determining. Instead, it emphasises that choices about objectives, thresholds, and acceptable risks are inherently ethical and political, requiring explicit deliberation and accountability.

In sustainability contexts, responsibility also has a collective and intergenerational dimension. Decisions informed by AI can shape environmental trajectories, infrastructure investments, and social outcomes for decades to come. Ethical intelligence thus demands that responsibility extends beyond immediate performance metrics to include long-term consequences and systemic effects. This requires governance frameworks capable of learning, adaptation, and correction as new evidence emerges or unintended impacts become visible.

The precautionary principle plays a critical role in navigating uncertainty and complexity. AI systems often operate in domains characterised by incomplete knowledge, dynamic interactions, and non-linear effects. In such contexts, waiting for full certainty before acting may be neither possible nor desirable. Precaution does not imply technological paralysis, but rather a commitment to foresight, proportionality, and restraint where potential harms are significant or irreversible. It supports iterative deployment, robust oversight, and the ability to pause, modify, or withdraw systems when risks outweigh benefits.

Importantly, precaution complements innovation rather than opposing it. By embedding safeguards early in system design and governance, precaution reduces the likelihood of societal backlash, loss of trust, or long-term harm that could ultimately constrain innovation more severely. From this perspective, ethical intelligence enhances resilience by ensuring that technological experimentation proceeds within socially legitimate and ecologically responsible boundaries.

Together, human dignity, responsibility, and precaution form a coherent ethical framework for governing AI in support of sustainability. They shift the focus from what technology *can* do to what it *should* do, and under what conditions. For Europe, adopting this framework is not merely a regulatory exercise, but an expression of its broader commitment to democratic values, human rights, and stewardship of the planet.

By grounding digital transformation in these principles, Europe can begin to move from risk management towards ethical co-creation, laying the foundation for governance systems that harness AI potential while remaining firmly accountable to people, communities, and future generations.

Democratic Participation and Inclusive Decision-Making

Democratic participation and inclusive decision-making are essential components of a human-centred governance paradigm in the digital age. As AI increasingly informs public policy, sustainability planning, and regulatory enforcement, questions of who participates in decision-making, whose knowledge counts, and whose interests are prioritised become central to ethical legitimacy. Without inclusive governance, even well-intentioned technological systems risk eroding trust and weakening the social foundations required for sustainable development. (Fung, A., 2015; Bächtiger, A., 2018).

Sustainability challenges are inherently collective in nature. Climate adaptation, ecological restoration, and social resilience depend on shared understanding, cooperation, and long-term commitment. AI can support these processes by expanding access to information, enabling participatory data collection, and supporting scenario modelling that makes complex trade-offs more visible. However, these benefits materialise only when digital systems are deliberately designed to enhance democratic engagement rather than substitute for it.

A key risk associated with AI-enabled governance is the concentration of decision-making power. Technical expertise, data ownership, and computational capacity are often held by a limited number of actors, creating barriers to meaningful participation. When sustainability decisions are framed primarily as technical optimisation problems, broader social values and lived experiences may be marginalised. This technocratic tendency can distance citizens from decisions that directly affect their environments, livelihoods, and futures.

Inclusive decision-making requires recognising multiple forms of knowledge. Scientific and technical expertise is indispensable, but it must be complemented by local knowledge, experiential insight, and ethical reflection. Communities often possess detailed understanding of environmental conditions, social dynamics, and historical contexts that cannot be captured fully in datasets or models. Ethical intelligence emphasises the integration of these diverse perspectives, ensuring that AI-informed decisions remain grounded in social reality.

Digital technologies also reshape participation itself. While online platforms and data-driven tools can lower barriers to engagement, they can also exclude those with limited digital access, skills, or confidence. Age, income, education, and geography continue to shape who is able to participate effectively in digital processes. Inclusive governance therefore requires attention to digital divides and proactive measures to ensure that participation mechanisms do not reinforce existing inequalities.

From a governance perspective, participation is not merely consultative. Meaningful inclusion entails the capacity to influence outcomes, not just to provide input. This requires transparency about how AI systems inform decisions, how public contributions are weighed, and how competing values are balanced. Feedback mechanisms, deliberative forums, and participatory oversight bodies can help ensure that AI-supported sustainability policies remain responsive and accountable.

European democratic traditions provide a strong foundation for this approach. Principles of subsidiarity, proportionality, and public deliberation align closely with the requirements of ethical intelligence. Embedding these principles into digital governance means designing institutions and processes that treat participation as a core element of sustainability, rather than an optional addition. It also means fostering civic literacy about AI, enabling citizens to engage critically with digital systems that shape collective outcomes.

Democratic participation and inclusive decision-making are not obstacles to effective AI governance but prerequisites for it (Fung, A., 2015). Sustainability transitions require legitimacy, trust, and shared ownership, qualities that cannot be generated by technical systems alone. By integrating AI into participatory governance frameworks, Europe can

strengthen collective intelligence and ensure that digital transformation enhances, rather than diminishes, democratic capacity in the pursuit of a sustainable future.

Governance Transparency in the Digital Era

Transparency is a cornerstone of democratic governance and a critical enabling condition for ethical intelligence in the digital age. As AI systems become more deeply embedded in sustainability policymaking, regulatory oversight, and public administration, the need for clear, accessible, and meaningful transparency becomes increasingly urgent.

Without it, trust in institutions erodes, accountability weakens, and the legitimacy of sustainability transitions is placed at risk. (Burrell, J., 2016; Diakopoulos, N., 2016).

In the digital era, transparency extends beyond the disclosure of decisions or outcomes. It encompasses the processes, assumptions, and value judgements that shape how AI systems are designed and used. Algorithmic models often involve complex layers of data processing, statistical inference, and optimisation criteria that are difficult to interpret even for specialists. When such systems inform public decisions, particularly those with significant social or environmental consequences, opacity can undermine citizen ability to understand, question, or contest the basis of those decisions.

Governance transparency therefore requires more than technical explainability. While efforts to make algorithms interpretable are essential, transparency also demands institutional clarity. This includes clear articulation of policy objectives, disclosure of the role AI plays within decision-making processes, and identification of the actors responsible for system design, deployment, and oversight. Citizens must be able to distinguish between human judgement and automated input, and to know where responsibility ultimately lies.

In sustainability contexts, transparency has particular significance because decisions often involve trade-offs between competing values and interests. Choices about land use, energy infrastructure, climate adaptation, or resource allocation are not purely technical matters; they reflect normative priorities and societal values. Ethical intelligence insists that these choices be made visible and open to public deliberation, rather than embedded implicitly within algorithmic systems.

The challenge of transparency is further complicated by the involvement of private actors in the development and operation of AI systems. Proprietary models, commercial confidentiality, and intellectual property claims can limit access to information about how systems function. While innovation incentives must be respected, governance frameworks must ensure that the use of AI in public-interest contexts is subject to appropriate scrutiny. Transparency is essential to maintaining public trust, particularly where digital systems influence rights, obligations, or access to services.

Transparency also supports learning and adaptation. Sustainability challenges are dynamic, and AI systems may produce unintended consequences or perform differently across contexts. Open governance arrangements that enable monitoring, evaluation, and feedback allow systems to be refined over time. This adaptive capacity is central to ethical intelligence, which treats governance as an ongoing process rather than a one-time design choice.

European governance traditions offer strong foundations for advancing transparency in the digital era. Commitments to openness, the rule of law, and fundamental rights provide a normative basis for demanding clarity and accountability in AI-enabled governance. Operationalising these commitments requires investment in institutional capacity, interdisciplinary expertise, and public communication, ensuring that transparency is meaningful rather than merely symbolic. Governance transparency is indispensable to aligning AI with sustainability and democratic values. It enables accountability, supports participation, and fosters trust in institutions navigating complex transitions.

By embedding transparency at the heart of digital governance, Europe can strengthen ethical intelligence and create the conditions for AI to function not as a hidden authority, but as a visible and accountable contributor to collective decision-making in pursuit of a sustainable future

Augmenting Human Judgement and Collective Intelligence

If AI is to contribute meaningfully to sustainable development, it must be understood not as a replacement for human judgement, but as a means of augmenting it. This distinction is central to the concept of ethical co-creation. Rather than positioning AI as an autonomous decision-maker, ethical intelligence frames it as a supportive tool that enhances human capacity to reason, deliberate, and act collectively in the face of complex and uncertain challenges. (Amershi, S., *et al.* 2019).

Human judgement plays a critical role in sustainability because it integrates values, context, and moral responsibility, elements that cannot be fully encoded in algorithms. Sustainability decisions often involve competing objectives, incomplete information, and long-term consequences that resist optimisation. AI can assist by analysing data, modelling scenarios, and revealing patterns that would otherwise remain hidden. However, interpreting these outputs, weighing trade-offs, and deciding what constitutes an acceptable or desirable outcome remain fundamentally human tasks.

Collective intelligence emerges when diverse forms of knowledge and perspective are brought together in shared processes of understanding and decision-making. Sustainability challenges are systemic by nature, spanning ecological, social, and economic domains. No single discipline, institution, or actor possesses sufficient insight to address them alone. AI can strengthen collective intelligence by supporting collaboration across sectors and scales, integrating scientific data with local knowledge, enabling participatory modelling, and facilitating dialogue around future scenarios.

In practice, this may involve AI-supported platforms that help communities visualise the impacts of policy choices, explore alternative pathways, or identify unintended consequences. When designed inclusively, such tools can empower stakeholders to engage more meaningfully in decision-making, making abstract sustainability goals tangible and actionable. The value of AI in these contexts lies not in producing definitive answers, but in enriching the quality of collective deliberation (Stilgoe, J., *et al.* 2013).

A key ethical consideration is ensuring that augmentation does not slide into substitution. Over-reliance on automated outputs can erode human agency, discouraging critical reflection and moral responsibility. Ethical intelligence therefore emphasises maintaining clear

boundaries between decision support and decision authority. AI systems should inform and challenge human judgement, not displace it. This requires institutional cultures that value reflection, dissent, and learning, rather than unquestioning deference to technical outputs.

Augmenting collective intelligence also requires attention to inclusivity and power dynamics. If AI tools are accessible only to technical experts or dominant institutions, they risk reinforcing existing asymmetries rather than enabling shared understanding. Ethical co-creation demands that AI-supported processes be designed to accommodate different levels of expertise, cultural contexts, and communicative styles. This includes transparent assumptions, interpretable outputs, and opportunities for dialogue rather than one-way information delivery.

From a European perspective, this approach aligns closely with traditions of deliberative democracy and social partnership. By embedding AI within participatory governance structures, Europe can harness digital innovation to strengthen, rather than weaken, democratic capacity. Ethical intelligence thus becomes a practical means of translating human values into action, enabling societies to navigate sustainability transitions with foresight, humility, and shared responsibility.

The most valuable contribution of AI to sustainability lies in its capacity to augment human judgement and collective intelligence. When guided by ethical intelligence, AI can help societies think more clearly, anticipate consequences more effectively, and deliberate more inclusively about their shared future. In this role, technology becomes not a driver of outcomes in its own right, but a catalyst for ethical co-creation in service of people, communities, and the planet.

Supporting Resilient Socio-Ecological Systems

Resilience has become a defining concept in contemporary sustainability discourse (Folke, 2016), reflecting the growing recognition that social and ecological systems are interconnected, dynamic, and subject to increasing uncertainty. Climate change, biodiversity loss, and socio-economic disruption interact in complex ways, producing cascading risks that cannot be addressed through linear planning or isolated interventions. Within this context, AI has the potential to support the resilience of socio-ecological systems, provided it is governed through the lens of ethical intelligence and human-centred design. (Folke, 2016; Stockholm Resilience Centre, 2015).

Socio-ecological resilience depends on the capacity to anticipate change, absorb shocks, adapt to new conditions, and transform where existing structures become unsustainable. AI can contribute to these capacities by enhancing system awareness and foresight.

Through advanced modelling, real-time monitoring, and scenario analysis, AI can help identify emerging risks, reveal interdependencies, and support adaptive responses across environmental and social domains. For example, AI-enabled models can integrate climate data with land-use patterns, infrastructure networks, and demographic trends, offering more holistic insights into vulnerability and resilience.

However, resilience is not solely a technical property; it is also a social and institutional one. The ability of communities and ecosystems to respond to disturbance depends on governance arrangements, trust, and the distribution of resources and power.

AI systems that prioritise efficiency or stability in narrow terms may inadvertently reduce resilience by suppressing diversity, flexibility, or local autonomy. Ethical intelligence therefore requires careful consideration of how AI interventions interact with social structures and ecological processes over time. Supporting resilient socio-ecological systems also demands respect for ecological limits. While AI can optimise resource use and improve environmental management, it cannot substitute for the regenerative capacities of natural systems.

There is a risk that technological optimism may encourage continued exploitation under the assumption that digital tools can compensate for environmental degradation. Ethical co-creation challenges this assumption by situating AI within a broader commitment to stewardship, conservation, and restoration.

Community engagement is central to resilience. Local knowledge, cultural practices, and place-based experience play a vital role in managing ecosystems and responding to change. AI can support these processes by complementing, rather than overriding, local decision-making. Participatory modelling, citizen science, and community-based monitoring initiatives offer examples of how digital tools can strengthen collective capacity when designed inclusively and transparently.

Another dimension of resilience concerns adaptability and learning. Socio-ecological systems evolve, and governance responses must evolve with them. AI can support iterative learning by enabling continuous feedback, monitoring outcomes, and testing alternative strategies. However, such learning requires openness to uncertainty and the willingness to revise assumptions. Ethical intelligence emphasises humility in the face of complexity, resisting the temptation to treat AI-generated insights as definitive or final. From a European perspective, supporting resilient socio-ecological systems aligns with broader commitments to climate adaptation, biodiversity protection, and regional cohesion. AI can contribute to these goals by facilitating coordination across scales, from local ecosystems to transnational policy frameworks. Yet coordination must not come at the expense of local agency or ecological diversity. Resilience thrives on plurality, redundancy, and distributed capacity, qualities that must be preserved within AI-supported systems.

AI can play a constructive role in supporting resilient socio-ecological systems when it is embedded within ethical intelligence and participatory governance. By enhancing understanding, supporting adaptation, and respecting ecological and social complexity, AI can help societies navigate uncertainty without undermining the very systems upon which resilience depends. In this role, technology becomes a partner in stewardship rather than a substitute for care and responsibility.

Case Illustrations and Emerging Practice

While the concept of ethical intelligence provides a normative framework for aligning AI with sustainability, its practical significance becomes most evident through emerging practices and real-world applications. Across Europe and beyond, a growing number of initiatives illustrate how AI can be used to support ethical co-creation, enhancing human judgement,

strengthening participation, and reinforcing socio-ecological resilience when guided by clear values and inclusive governance (Stilgoe, J., *et al.* 2013).

One area of emerging practice lies in environmental monitoring and stewardship. AI-enabled analysis of satellite imagery, sensor networks, and citizen-generated data is increasingly used to track deforestation, water quality, biodiversity loss, and climate impacts. In the most ethically-grounded examples, these systems are not deployed as top-down surveillance tools, but as shared resources that support collaboration between public authorities, scientists, and local communities. By making environmental data more accessible and interpretable, AI can support collective understanding and informed action while respecting local knowledge and agency.

Urban and regional planning offers further illustrations of ethical co-creation. AI-supported scenario modelling is being used to explore alternative development pathways, assess climate risks, and evaluate infrastructure investments. When embedded within participatory planning processes, such tools enable stakeholders to visualise trade-offs, test assumptions, and engage in deliberation about long-term outcomes. The ethical value of these applications lies not in predictive accuracy alone, but in their capacity to facilitate dialogue and shared responsibility for place-based futures.

In the social domain, emerging practices highlight the importance of using AI to support, rather than automate, judgement in sensitive contexts. Decision-support systems in health, social care, and public services can help identify patterns, anticipate needs, and allocate resources more effectively. However, ethically responsible initiatives emphasise human oversight, contextual interpretation, and safeguards against bias. These approaches recognise that care, dignity, and trust cannot be reduced to algorithmic outputs, and that AI must operate within relational and institutional frameworks that preserve moral responsibility.

Participatory and deliberative uses of AI also point towards new forms of democratic innovation. Digital platforms that combine AI with facilitated dialogue, citizen assemblies, or collaborative foresight exercises demonstrate how technology can enhance collective intelligence. By structuring information, surfacing diverse perspectives, and supporting scenario exploration, AI can help groups navigate complexity without predetermining outcomes. Such practices illustrate how ethical intelligence can be operationalised as a process rather than a fixed set of rules.

At the same time, these emerging practices reveal common challenges. Successful ethical co-creation requires time, institutional capacity, and sustained engagement. It depends on transparency about system limitations, openness to critique, and willingness to adapt. Where AI is introduced without adequate governance, participation risks becoming symbolic, and ethical aspirations may be undermined by operational pressures or commercial incentives. These tensions highlight the importance of embedding ethical intelligence at both strategic and operational levels (Stilgoe, J., *et al.* 2013).

Taken together, these case illustrations demonstrate that ethical intelligence is neither abstract nor utopian. It is already being enacted, albeit unevenly, through practices that treat AI as a means of enhancing shared understanding and collective agency. The lessons from these experiences suggest that the transformative potential of AI lies less in automation and

more in its capacity to support reflection, learning, and cooperation across diverse actors. It becomes clear that AI can function as an enabler of ethical co-creation when guided by human-centred values and robust governance. These emerging practices provide a bridge from normative principles to policy-relevant action, setting the stage for a more systematic consideration of how Europe can translate ethical intelligence into institutional frameworks, policy pathways, and cross-sector collaboration.

Aligning Innovation with Ethical Stewardship

For Europe, the challenge of governing AI in support of sustainability is not one of choosing between innovation and ethics, but of aligning the two through deliberate and coherent stewardship. Innovation is indispensable to addressing climate change, ecological degradation, and social resilience. Yet without ethical orientation, innovation risks accelerating harm, deepening inequality, or undermining public trust.

Ethical stewardship provides a framework through which technological progress can be guided towards outcomes that are socially legitimate, environmentally responsible, and democratically accountable (Schot, J. & Steinmueller, W., 2018). Ethical stewardship recognises that innovation is never value-neutral (Schot, J. & Steinmueller, W., 2018). Decisions about research priorities, funding mechanisms, performance metrics, and deployment contexts shape how technologies interact with society and the environment. In the case of AI, these decisions influence whether systems reinforce short-term efficiency or support long-term resilience; whether they centralise power or enable participation; and whether they externalise costs or respect ecological limits. Aligning innovation with ethical stewardship therefore requires making values explicit within policy and institutional design.

From a European policy perspective, this alignment begins with reframing innovation goals. Rather than treating technological advancement as an end in itself, ethical stewardship situates innovation as a means to achieve clearly articulated sustainability objectives. This implies closer integration between digital policy, environmental policy, and social policy, ensuring that AI development is evaluated against its contribution to public value rather than solely its economic or technical performance. Such an approach reinforces coherence across policy domains and reduces the risk of contradictory incentives.

Ethical stewardship also places responsibility at the centre of innovation systems. Public institutions, research organisations, and private actors all play roles in shaping AI trajectories. Clear expectations regarding accountability, transparency, and social responsibility are essential to ensuring that innovation aligns with sustainability goals. This includes embedding ethical considerations into research funding criteria, public procurement, and regulatory sandboxes, as well as supporting interdisciplinary collaboration between technical experts, social scientists, and ethicists.

Importantly, stewardship is an active and ongoing practice rather than a one-time intervention. AI systems evolve through iterative development, learning from new data and adapting to changing contexts. Ethical alignment must therefore be sustained throughout the lifecycle of technologies, from design and testing to deployment, monitoring, and revision. This requires institutional capacity for oversight, evaluation, and learning, as well as mechanisms for responding to unintended consequences or emerging risks.

Public trust is a critical asset in this process. Sustainability transitions depend on societal acceptance and cooperation, particularly where changes affect everyday practices, resource use, or livelihoods. Ethical stewardship contributes to trust by demonstrating that innovation is governed in the public interest, with attention to fairness, dignity, and long-term consequences. Transparent decision-making, meaningful participation, and accountability for outcomes help ensure that AI-enabled innovation is perceived not as an imposed solution, but as a shared endeavour.

At a strategic level, aligning innovation with ethical stewardship positions Europe to offer a distinctive model of digital leadership. Rather than competing solely on speed or scale, Europe can demonstrate how technological capability can be combined with democratic values and environmental responsibility. This approach strengthens Europe's credibility in international forums and supports collaboration around global sustainability challenges. Ethical stewardship provides the connective tissue between innovation and sustainability. By aligning AI development with human dignity, responsibility, and precaution, Europe can ensure that technological progress contributes to resilient societies and healthy ecosystems. This alignment is not a constraint on innovation, but a condition for its legitimacy and durability in a world defined by ecological limits and social complexity.

Policy Pathways for Sustainable and Responsible AI

Translating ethical intelligence into practice requires clear and actionable policy pathways that guide the development, deployment, and governance of AI. For Europe, the task is not to prescribe a single model of responsible AI, but to establish enabling conditions that ensure digital innovation consistently aligns with sustainability, human dignity, and democratic accountability. This involves a combination of regulatory frameworks, institutional coordination, and capacity-building measures that operate across sectors and scales. (European Commission, 2021; World Economic Forum, 2022).

A first policy pathway lies in embedding sustainability and ethical criteria into AI governance frameworks from the outset. Regulatory approaches must move beyond narrow considerations of safety or compliance to incorporate environmental, social, and governance impacts across the full lifecycle of AI systems. This includes requirements for impact assessment, transparency regarding data sources and model objectives, and mechanisms for ongoing monitoring once systems are deployed. Such approaches help ensure that sustainability considerations are proactive rather than reactive.

Public policy also plays a crucial role in shaping incentives within innovation ecosystems. Research funding, public procurement, and state-supported innovation programmes can be powerful levers for steering AI development towards public value.

By prioritising projects that demonstrably contribute to sustainability goals, social inclusion, and ecological responsibility, policymakers can influence not only what technologies are developed, but how success is defined and measured. Ethical intelligence thus becomes embedded within innovation cultures rather than appended as an external constraint.

Another critical pathway concerns institutional capacity and coordination. Sustainable and responsible AI governance requires expertise that spans technical, ethical, legal, and social domains. Fragmented institutional arrangements risk creating gaps between policy ambition and operational reality. Strengthening coordination across ministries, regulatory bodies, and levels of governance can help ensure coherence between digital, environmental, and social policy agendas. At the same time, investment in skills and training is essential to equip public institutions with the capacity to understand, evaluate, and oversee complex AI systems. Participation and accountability mechanisms also form a core element of effective policy pathways. Policies for responsible AI should enable meaningful stakeholder engagement, including civil society, local communities, and affected groups.

This may involve participatory impact assessments, deliberative forums, or oversight bodies with diverse representation. Such mechanisms help ensure that policy responses remain grounded in lived experience and responsive to societal concerns, reinforcing legitimacy and trust.

International cooperation represents a further dimension of policy development. AI systems, data flows, and environmental impacts do not respect national boundaries. Europe's commitment to multilateralism and global sustainability positions it to contribute to international norms and standards for responsible AI. Aligning domestic policy with global frameworks, including the UN SDGs, supports consistency and reduces the risk of regulatory fragmentation while reinforcing shared ethical commitments.

Importantly, policy pathways for sustainable and responsible AI must remain adaptive. Technological change is rapid, and sustainability challenges evolve over time. Ethical intelligence therefore calls for governance arrangements that support learning, experimentation, and revision. Regulatory sandboxes, iterative evaluation processes, and feedback loops can help balance innovation with precaution, allowing policy to evolve in response to evidence and experience. Effective policy pathways for sustainable and responsible AI require an integrated approach that combines regulation, incentives, institutional capacity, and participation. By embedding ethical intelligence within these pathways, Europe can move from principled aspiration to practical governance, ensuring that AI contributes to sustainability not as an isolated technological fix, but as part of a coherent and values-driven policy landscape.

Institutional and Cross-Sector Collaboration

The effective governance of AI for sustainability depends not only on sound policy frameworks, but also on robust institutional and cross-sector collaboration. Sustainability challenges cut across traditional administrative boundaries, disciplinary silos, and sectoral interests. Similarly, AI systems are developed, deployed, and governed by a diverse array of actors spanning public institutions, private enterprises, research organisations, and civil society. Aligning these actors around shared ethical and sustainability objectives is therefore a central task for European policy and practice (Schot, J. & Steinmueller, W., 2018; United Nations, 2015).

Institutional collaboration is essential to achieving coherence across policy domains. Digital transformation, environmental protection, social policy, and economic development are often governed by separate institutions with distinct mandates and priorities. Without coordination, AI initiatives risk advancing narrow objectives while undermining broader sustainability goals. Cross-ministerial cooperation, joint strategies, and shared assessment frameworks can help ensure that AI deployment supports integrated policy outcomes rather than fragmented or contradictory approaches.

Cross-sector collaboration also plays a critical role in shaping innovation pathways. Private sector actors drive much of AI development, while public institutions set regulatory conditions and articulate societal goals. Research organisations contribute expertise and critical reflection, and civil society organisations represent public interests and ethical concerns. Ethical intelligence requires mechanisms that bring these perspectives together in structured and ongoing dialogue. Public-private partnerships, multi-stakeholder forums, and collaborative research initiatives can provide spaces for shared learning and co-creation, provided they are governed transparently and inclusively.

Trust is a key enabling factor in such collaboration. Historical asymmetries of power, knowledge, and resources can create tensions between sectors, particularly where commercial interests intersect with public values. Ethical stewardship demands clear rules, accountability structures, and safeguards against conflicts of interest.

Transparency regarding roles, responsibilities, and decision-making processes helps build confidence that collaboration serves the public good rather than narrow institutional or economic agendas.

Institutional collaboration must also extend vertically across levels of governance. Sustainability transitions unfold at local, regional, national, and European levels, each with distinct responsibilities and capacities. AI systems deployed at scale often interact with local contexts in unpredictable ways. Effective governance therefore requires channels for feedback and coordination across scales, enabling local experience to inform strategic decision-making and ensuring that European-level frameworks remain sensitive to contextual diversity.

Capacity-building is another critical dimension of collaboration. Institutions and sectors vary widely in their ability to engage with AI technologies and ethical governance. Investing in shared learning, training programmes, and interdisciplinary expertise helps reduce asymmetries and supports more equitable participation. Ethical intelligence thrives in environments where actors are empowered to understand, question, and shape technological systems rather than merely responding to them.

From a strategic perspective, fostering institutional and cross-sector collaboration positions Europe to respond more effectively to systemic risks and long-term sustainability challenges. Complex issues such as climate adaptation, energy transition, and biodiversity protection require coordinated action and shared responsibility. AI can support these efforts, but only if it is embedded within collaborative governance structures that reflect collective priorities and values.

Ethical intelligence is not solely a matter of principles or policies, but of relationships and institutions. By strengthening collaboration across sectors and scales, Europe can translate ethical commitments into practical capacity, ensuring that AI-enabled innovation supports sustainability through shared stewardship, mutual accountability, and collective action.

Conclusion

Balancing Technological Innovation and Human Values and Looking Ahead

The sustainability challenges facing Europe in the digital age cannot be addressed through technological innovation alone. While AI offers powerful tools for analysis, optimisation, and foresight, its value ultimately depends on how it is governed, contextualised, and aligned with human values. This paper has argued consistently that intelligence, whether human or artificial, must remain in service of people, communities, and the planet.

Achieving this balance is not a technical problem to be solved, but an ethical and political task to be continually negotiated. Balancing innovation and human values requires rejecting false dichotomies. Ethical governance does not stand in opposition to technological progress, nor does innovation necessitate the erosion of dignity, democracy, or ecological responsibility. Rather, innovation that neglects these foundations risks losing legitimacy and durability. Sustainable development demands technologies that are socially embedded, morally accountable, and responsive to long-term consequences, rather than short-term performance metrics.

Throughout this paper, ethical intelligence has been presented as a means of holding this balance. It recognises the analytical strengths of AI while insisting on the primacy of human judgement, responsibility, and care. Ethical intelligence affirms that decisions affecting people's lives and shared environments cannot be reduced to algorithmic outputs, however sophisticated. Instead, they require deliberation, transparency, and the capacity to reflect on values, trade-offs, and uncertainty.

Human dignity emerges as the central reference point in this balancing act. It anchors governance in the intrinsic worth of individuals and communities, resisting tendencies to instrumentalise people as data points or optimisation variables. When dignity is respected, innovation becomes a tool for empowerment rather than control, and sustainability transitions become collective projects rather than technocratic exercises.

In this sense, balancing technological innovation and human values is not a static achievement, but an ongoing practice. It requires vigilance, adaptability, and a willingness to revisit assumptions as technologies evolve and societal contexts change. Ethical intelligence provides the orientation needed to sustain this practice over time, ensuring that progress remains aligned with Europe's deepest commitments to justice, democracy, and environmental stewardship.

Looking ahead, ethical intelligence offers a guiding framework for Europe as it navigates accelerating digital transformation amid growing ecological and social pressures. The future of

sustainable development in Europe will be shaped not only by technological capability, but by the quality of governance, participation, and institutional learning that accompanies it. Ethical intelligence points towards several interrelated directions for action.

First, it calls for deeper integration of ethical reflection into policy, innovation, and education. Ethical considerations must move upstream, informing research agendas, system design, and strategic planning rather than being addressed only after deployment. This includes strengthening interdisciplinary approaches that bring together technical expertise, social science, environmental knowledge, and ethical reasoning.

Second, ethical intelligence highlights the importance of institutional resilience and learning. AI-enabled systems will continue to evolve, and their impacts will not always be predictable. Future governance frameworks must therefore support monitoring, evaluation, and adaptation over time. This requires institutions capable of acknowledging uncertainty, responding to evidence, and correcting course when unintended consequences arise.

Third, Europe's role in global sustainability and digital governance will remain significant. Ethical intelligence provides a basis for constructive international engagement, supporting shared norms around responsible AI, human rights, and environmental protection. By demonstrating that digital innovation can be governed in line with democratic values and planetary boundaries, Europe can contribute to global efforts to align technology with sustainable development.

Finally, ethical intelligence underscores a fundamental truth that runs throughout this paper: sustainability in the digital age is ultimately about people. Technologies matter, but relationships, values, and collective responsibility matter more. AI can support better decisions, but it cannot replace the moral work of defining what kind of future is worth pursuing.

In conclusion, ethical intelligence offers Europe a way forward that is neither technologically naïve nor ethically complacent. It provides a framework for harnessing the power of AI while remaining grounded in human dignity, democratic participation, and ecological responsibility. In doing so, it reaffirms that the intelligence needed for a sustainable future is not only artificial or computational, but deeply human.

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Written By Richard Pagett

Full Professor for Sustainable Development
European Center for Peace and Development
UN University for Peace
Belgrade, Serbia

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