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Beyond Productivity: Cognitive Sustainability, Creative Freedom and the Social Role of Artificial Intelligence

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Abstract

Artificial Intelligence has become one of the most influential technologies of the twenty-first century, reshaping economic systems, labour markets, public services, and everyday life. Existing debates have largely focused on productivity gains, automation, efficiency, and technological performance. While these dimensions are important, they overlook an emerging social challenge that increasingly affects individuals across contemporary societies: cognitive overload. The digital transformation of social life has generated unprecedented access to information while simultaneously increasing the demands placed on human attention, memory, and decision-making capacities. Individuals are required to navigate growing volumes of information, multiple digital environments, continuous communication streams, and increasingly complex organisational structures. As a result, attention has become a scarce resource and cognitive well-being a growing societal concern. This article introduces the concept of Cognitive Sustainability as a framework for understanding the relationship between Artificial Intelligence and human flourishing. Its central argument is that cognitive overload does not merely reduce efficiency or well-being: it erodes the creative capacity of individuals their ability to imagine, to choose deliberately, and to generate transformation in their personal and professional lives. When attention is continuously fragmented and mental resources chronically depleted, creativity the highest and most distinctively human cognitive faculty becomes inaccessible. Cognitive Sustainability is defined as the capacity of individuals to preserve attention, autonomy, memory, and decision-making capabilities in ways that protect and enable creative thought, deliberate choice, and meaningful personal and professional realisation within increasingly complex social, digital, and organisational environments. The paper argues that Artificial Intelligence should be evaluated not only according to its capacity to improve productivity and efficiency, but also — and primarily — according to its ability to relieve individuals of residual, repetitive, and cognitively draining tasks, thereby restoring the mental space that creative thought, deep learning, and authentic personal development require. Building on insights from sociology, cognitive psychology, behavioural economics, human-centred AI, and theories of social transformation, the article proposes a shift from productivity-centred narratives towards a broader understanding of AI as a cognitive liberation infrastructure. This shift also implies a cultural reorientation: the emergence of a genuine culture of responsibility in the design, deployment, and governance of AI systems — one that places human cognitive flourishing at the centre of technological development.

Keywords: Cognitive Sustainability, Artificial Intelligence, Creative Capacity, Cognitive Overload, Human-Centred AI, Cognitive Freedom, Residual Tasks, Personal Realisation, Social Transformation, Attention Economy, Lifelong Learning, Human Autonomy, Responsibility Culture.

Introduction

Artificial Intelligence has rapidly become one of the defining technologies of the twenty-first century. Academic research, public debate, and policy discussions have largely focused on its potential to increase productivity, automate tasks, enhance decision-making processes, and transform labour markets. While these dimensions are undoubtedly significant, they capture only part of the broader societal implications of AI and arguably not the most important part. The dominant question shaping discussions of Artificial Intelligence has been: what can AI do more efficiently than humans? This question has generated extensive and valuable debates. Yet it displaces a more fundamental one: what does AI make possible for human beings not as producers or consumers, but as creative, reflective, and self-determining persons?

Modern societies are characterised by an unprecedented expansion of information, administrative requirements, digital interactions, and organisational complexity. Individuals are expected to manage increasing quantities of data, navigate multiple digital environments, respond to continuous streams of notifications, coordinate professional and personal responsibilities, and make countless decisions every day. The cumulative cognitive cost of this environment is significant. The central argument of this article is that cognitive overload understood as the chronic depletion

of attentional and mental resources through the management of residual, repetitive, and low-value tasks does not merely reduce efficiency or well-being. It erodes the creative capacity of individuals. Creativity understood not as a luxury or a talent reserved for artists, but as the fundamental human capacity to imagine alternatives, generate novel responses, and exercise genuine agency requires precisely the cognitive conditions that chronic overload destroys: sustained attention, mental availability, and the freedom to think beyond the immediate and the urgent.

This argument has direct implications for how Artificial Intelligence should be understood and evaluated. If AI can relieve individuals of the residual, repetitive, and administratively burdensome tasks that consume disproportionate cognitive resources, it may create the conditions for a genuine recovery of creative capacity not as an incidental benefit, but as one of its most important social contributions.

This article introduces the concept of Cognitive Sustainability as a framework for exploring this possibility. The article develops its argument in several stages. It examines the rise of complexity and cognitive overload as defining characteristics of contemporary societies. It analyses the relationship between cognitive overload and the erosion of creative capacity. It explores the limitations of productivity-centred narratives surrounding AI and proposes an alternative understanding of AI as cognitive liberation infrastructure. It then defines Cognitive Sustainability and its five dimensions, and explores the implications of this framework for education, policy, human-centred innovation, and the broader cultural transformation that responsible AI governance requires.

The Age of Complexity and the Scarcity of Attention

Contemporary societies are increasingly characterised by growing levels of complexity. While technological development has expanded human capabilities in unprecedented ways, it has simultaneously generated new demands on individuals' cognitive resources. The digital transformation of everyday life has not only changed how people work, communicate, learn, and access services; it has fundamentally altered the quantity and nature of information that individuals are required to process on a daily basis. Several sociological traditions have attempted to describe this condition. Ulrich Beck's concept of the risk society highlighted the growing complexity and uncertainty associated with modernisation [1]. Zygmunt Bauman's notion of liquid modernity described a social environment characterised by continuous change, instability, and the erosion of traditional structures [2]. Hartmut Rosa has argued that social acceleration has become one of the defining features of contemporary societies, creating a constant pressure to adapt to increasingly rapid technological, economic, and cultural transformations a pressure that consumes exactly the cognitive resources that genuine engagement with life requires [3].

Rosa's concept of resonance is particularly relevant here. Resonance the capacity to enter into genuine, responsive, and transformative relationship with the world is incompatible with chronic acceleration and attentional fragmentation [4]. A person who is permanently occupied with managing information streams, coordinating schedules, and responding to notifications is not available for resonant experience. The cognitive conditions for resonance — stillness, availability, the capacity to be genuinely affected are precisely what the complexity of contemporary life tends to destroy.

Herbert Simon anticipated this dynamic when he observed that a wealth of information creates a poverty of attention [5]. The problem facing contemporary societies is no longer information scarcity but information abundance, and abundance generates its own form of deprivation: the depletion of the attentional resources required to process, evaluate, and use information meaningfully. Davenport and Beck have further developed this insight, arguing that attention has become the scarcest and most strategically significant resource in the contemporary economy [6].

The consequences extend beyond information management. Research in behavioural economics and cognitive psychology has demonstrated that human decision-making capacity is not unlimited. Kahneman's foundational work demonstrates that individuals rely on finite cognitive resources that become depleted under excessive demands [7]. Studies on decision fatigue indicate that repeated decision-making reduces the quality of subsequent choices and increases reliance on heuristics and simplified reasoning [8,9].

This cognitive depletion is not distributed equally. While professionals, students, caregivers, and older adults each face specific forms of cognitive pressure, the phenomenon has become a general condition of contemporary life. Complexity has ceased to be an exceptional circumstance and has become a permanent feature of the everyday.

Cognitive Overload and the Erosion of Creative Capacity

The relationship between cognitive overload and diminished functioning has been extensively documented [10,11]. What has received less systematic attention is the specific impact of chronic cognitive depletion on creative capacity — and why this matters beyond questions of individual performance. Creativity, understood here in its broadest sense, refers to the capacity to generate novel responses to situations, to imagine alternatives to what currently exists, to connect ideas across different domains, and to produce something a solution, a work, a decision, a direction that did not exist before [12,13]. It is not a specialised talent. It is a fundamental cognitive faculty operative in every domain of human life: in professional work, in interpersonal relationships, in learning, in civic engagement, and in the construction of a personally meaningful existence.

Creativity is also cognitively demanding. Research consistently demonstrates that creative thought requires precisely the conditions that chronic overload destroys. It requires sustained, uninterrupted attention — the capacity to remain with a problem or a question long enough for novel connections to emerge. It requires what Kahneman calls System 2 thinking: slow, deliberate, reflective cognitive processing, as opposed to the fast, automatic processing of System 1 that dominates when cognitive resources are depleted [7]. It requires mental availability the sense that one has the space, the time, and the energy to think beyond the immediate and the obligatory. When cognitive resources are chronically consumed by the management of residual tasks administrative procedures, information filtering, routine communications, scheduling, digital maintenance these conditions are systematically undermined. The individual is perpetually occupied with what might be called the cognitive overhead of contemporary life: the enormous quantity of low-value mental work required simply to maintain basic functioning in complex environments.

The consequences are visible across domains. In professional contexts, the chronic pressure of information overload and constant connectivity reduces the capacity for strategic thinking, deep problem-solving, and innovative response [14,15]. In educational contexts, excessive informational demands reduce the ability to engage in the kind of deep, reflective learning that generates lasting understanding and genuine intellectual development [16]. In personal life, cognitive depletion reduces the time and mental energy available for the creative acts artistic, relational, entrepreneurial, civic through which individuals construct meaningful lives.

There is also a deeper dimension to this problem. The erosion of creative capacity is simultaneously an erosion of the capacity for conscious, deliberate choice. To choose genuinely to act from one's own values and direction rather than from the path of least cognitive resistance requires exactly the mental resources that chronic overload depletes. A cognitively exhausted individual does not make deliberate choices; they respond to the most urgent stimulus, follow the default option, or defer decision-making entirely. The depletion of creative capacity is therefore also a threat to human autonomy and to the conditions for authentic personal and professional realisation and, by extension, to the possibility of responsible individual and collective action.

The Residual Task Problem: What AI Should Free Us From

At the centre of the argument developed in this article is a distinction that existing discussions of AI rarely make explicit: the distinction between cognitive tasks that are generative tasks that engage, develop, and express distinctively human capacities and cognitive tasks that are residual: tasks that are necessary for basic functioning but that do not generate value proportionate to the cognitive resources they consume. Residual tasks include a wide range of activities familiar to any person navigating contemporary life: searching for and filtering information; managing calendars, reminders, and schedules; coordinating communications across multiple platforms; navigating administrative procedures; organising documents and data; responding to routine enquiries; maintaining digital environments. These tasks are not trivial in aggregate they consume significant time and cognitive resources but they are cognitively draining rather than enriching. They occupy attention without developing it. They consume the very resources that generative activities require.

It is important to acknowledge the contextual nature of this distinction. A task that is residual for an experienced professional may be generative for a novice developing a competency. The classification is not absolute but relational — it depends on the person, the developmental stage, and the purpose of the activity. What the framework proposes is not a fixed taxonomy of tasks but a criterion for evaluation: a task is residual when it consistently consumes cognitive resources without developing or expressing the capacities that make human life meaningful.

The contemporary experience of cognitive overload is substantially an experience of residual task accumulation. The problem is not that life contains too much meaning, too much creativity, or too many opportunities for genuine engagement. The problem is that a growing proportion of cognitive resources is consumed by tasks that are necessary but not enriching by the administrative and informational overhead of managing life in complex digital environments.

This is precisely where Artificial Intelligence has its most significant and underappreciated social potential. AI systems are particularly well-suited to performing residual tasks: tasks that require processing large quantities of information, applying consistent rules, managing data structures, coordinating across multiple systems, and generating routine outputs. If AI systematically absorbs residual tasks — not by replacing human judgment or creativity, but by removing the cognitive overhead that prevents human judgment and creativity from operating — it creates the conditions for what this article calls cognitive liberation: the recovery of mental space, attentional availability, and creative capacity that chronic overload suppresses.

This perspective reframes the standard debate about AI and human capabilities. The question is not whether AI will replicate human creativity creativity, understood as the capacity for conscious, autonomous, value-directed imagination, depends on the very cognitive conditions that AI is currently better positioned to restore than to reproduce. The question is whether AI can be designed and deployed in ways that protect and restore the cognitive conditions under which human creativity can flourish. This is, ultimately, a question of design intention, governance, and responsibility.

Beyond Productivity: Rethinking the Social Role of Artificial Intelligence

Since the emergence of AI as a major technological and economic force, discussions surrounding its societal implications have largely revolved around productivity, efficiency, and automation. Governments view AI as a driver of economic competitiveness; organisations adopt AI to optimise processes and reduce costs; researchers evaluate AI systems according to performance, accuracy, and computational capability. This productivity-centred narrative has contributed to significant technological advancements, but it reflects a narrow understanding of the relationship between technology and human well-being. Its central limitation is not that productivity is an unimportant value. It is that productivity is an instrument, not an end. Technologies designed to increase productivity should ultimately serve the conditions for human flourishing and when they do not, productivity gains are purchased at an unacceptable human cost.

The paradox of the current situation is that technologies designed to save time have generated new demands on attention. Systems intended to simplify processes have introduced additional layers of digital complexity. Tools developed to improve communication have contributed to a continuous flow of messages and notifications that colonise cognitive resources [17,18]. In many respects, modern societies have become extraordinarily efficient at producing information while remaining systematically inattentive to the human costs of managing it. An alternative perspective requires a different central question. Rather than asking how AI can make people more productive, the question becomes: how can AI help people live and work more fully more creatively, more autonomously, and with greater capacity for personal and professional realisation?

This shift implies a movement from performance-oriented approaches towards what may be described as human flourishing-oriented innovation. Under such a framework, the success of an AI system is evaluated not only by what it does more efficiently, but by what it enables human beings to do and become more fully. A system that generates significant efficiency gains while simultaneously creating dependency, eroding attention, or suppressing creative capacity may be technologically successful

while being socially detrimental. Conversely, a system that relieves individuals of residual cognitive burdens and restores the conditions for creative engagement may generate profound social value even when its economic impact is less immediately measurable. This perspective aligns with and extends emerging discussions in human-centred AI, digital well-being, and responsible innovation [19-22]. Cognitive Sustainability contributes to these discussions by providing a specific and grounded criterion: the preservation and restoration of creative capacity as a condition for authentic human flourishing. It also implies that the development of AI cannot be treated as a purely technical enterprise — it is, at its core, a cultural and ethical one, requiring a shared commitment to responsibility among designers, developers, policymakers, and users.

Defining Cognitive Sustainability

The concept of sustainability has traditionally been associated with the preservation of environmental, economic, and social resources for present and future generations. This article proposes that cognitive resources attention, mental energy, creative capacity, and the capacity for deliberate choice deserve to be understood as a form of sustainable resource: finite, valuable, and requiring active protection and support.

Cognitive Sustainability may be defined as:
The capacity of individuals to preserve attention, creative thought, autonomy, and decision-making capabilities in ways that enable meaningful personal and professional realisation within increasingly complex social, digital, and organisational environments.

This definition differs from existing formulations of digital well-being or cognitive health in a specific respect: it places creative capacity and the conditions for personal realisation at the centre of what must be sustained. The concern is not primarily with preventing harm though harm prevention matters but with preserving the positive conditions for human flourishing: the mental availability, the attentional freedom, and the creative resources that allow individuals to live, work, and relate in ways that are authentically their own.

Cognitive Sustainability is not a purely individual concern. At scale, the systematic depletion of creative capacity across populations has social consequences: reduced capacity for civic imagination, diminished capacity for collective problem-solving, and a cultural impoverishment that is difficult to quantify but deeply significant. Restoring cognitive conditions for creativity is therefore also a precondition for the kind of social transformation that complex contemporary challenges require. A culture that genuinely values human cognitive flourishing and takes responsibility for the conditions that enable it — is a culture better equipped to navigate uncertainty and generate meaningful change.

The Five Dimensions of Cognitive Sustainability

- **Attention Sustainability:** Sustained attention is the prerequisite for all deep cognitive work, including creative thought. Attention Sustainability refers to the capacity to maintain focused engagement with meaningful activities, to resist fragmentation, and to recover attentional resources after periods of intensive demand. AI systems that filter, prioritise, and organise information flows contribute to Attention Sustainability by reducing the attentional cost of navigating complex environments [6,23].
- **Memory Sustainability:** Modern life requires individuals to manage large quantities of information, procedures, and data. Memory Sustainability refers to the ability to rely on external cognitive support systems that reduce unnecessary memory burdens while preserving the cognitive resources available for meaningful engagement and creative work. AI as augmented memory frees working memory for generative rather than administrative cognitive activity [10].
- **Decision Sustainability:** Everyday life involves an extraordinary number of decisions. Decision Sustainability concerns the preservation of decision-making quality over time. AI systems may contribute by managing routine decisions, organising information relevant to complex choices, and reducing the volume of low-value decisions that deplete the cognitive resources required for high-value deliberation — including the deliberate choices through which individuals exercise genuine agency [7,9].
- **Creative Sustainability:** Creative Sustainability is the central dimension of this framework. It refers to the preservation of the cognitive conditions mental availability, attentional freedom, and reflective capacity that creative thought requires. Creative Sustainability is threatened when residual tasks consume the mental space that generative cognition needs. It is supported when AI systems absorb the cognitive overhead of contemporary life, restoring the conditions for imagination, innovation, and authentic personal and professional development [12,13].
- **Autonomy Sustainability:** Autonomy the capacity to act from one's own values and direction rather than from external pressure or cognitive default depends on the availability of cognitive resources that deliberate choice requires. Autonomy Sustainability refers to the preservation of these resources: the mental availability and attentional freedom required to recognise and follow one's genuine direction. AI systems that manage residual tasks do not replace human agency; they restore the conditions under which genuine agency and genuine responsibility becomes possible [24,25].

Artificial Intelligence as Cognitive Liberation Infrastructure

The concept of infrastructure has traditionally been associated with physical systems that support societal functioning. Roads facilitate mobility, electrical grids provide energy, communication networks enable information exchange. These infrastructures are generally invisible when functioning effectively, yet they are essential for economic activity, social participation, and everyday life. This article argues that Artificial Intelligence may increasingly perform a similar role within contemporary societies but as cognitive infrastructure rather than physical infrastructure. The purpose of cognitive infrastructure is not to support the movement of goods or energy but to support the management of information, attention, and organisational complexity in ways that protect rather than deplete human cognitive resources. More specifically, AI as cognitive liberation infrastructure means AI that is designed with the explicit purpose of absorbing residual cognitive tasks in order to restore mental availability for creative, generative, and personally meaningful activity. This is a more specific and more ambitious criterion than simply asking that AI be efficient or user-friendly. It requires that AI systems be evaluated according to their cognitive liberation potential: their capacity not merely to perform tasks, but to free the human mind from tasks that constrain it.

In professional environments, AI systems that manage information flows, handle routine communications, generate structured summaries, organise complex data, and coordinate administrative processes can free knowledge workers for the strategic, creative, and relational dimensions of their work. In personal life, AI that manages calendars, navigates administrative complexity, coordinates logistics, and provides contextual reminders can restore the time and mental availability that personal creativity, meaningful relationships, and civic engagement require. In educational contexts, AI that personalises learning pathways, manages administrative requirements, and provides adaptive support can allow learners to concentrate on the dimensions of learning that are genuinely irreplaceable: deep engagement with ideas, the development of critical judgment, and the cultivation of creative and reflective capacities [16,26]. It is important, however, to acknowledge the tension that exists between AI as liberation infrastructure and AI as a potential generator of new cognitive dependencies. The same tools that absorb residual tasks may, if poorly designed or uncritically adopted, erode the very capacities they are intended to free [15,17,18]. The resolution of this tension is not technical but ethical and cultural: it requires a commitment among designers, organisations, policymakers, and individuals to deploying AI in ways that strengthen rather than substitute human cognitive engagement. This is the dimension of responsibility that any serious framework for Cognitive Sustainability must incorporate. The long-term vision is not one of increasingly autonomous machines but of increasingly available human beings persons who, freed from the cognitive overhead of managing complexity, are able to dedicate greater attention, energy, and creative capacity to the activities, relationships, and purposes that give their lives meaning. This vision is inseparable from a broader cultural commitment to placing human flourishing rather than mere efficiency at the centre of technological development.

Implications for Adult Education and Lifelong Learning

The concept of Cognitive Sustainability has significant implications for adult education and lifelong learning. As societies become increasingly knowledge-intensive, individuals are expected to continuously acquire new competencies, adapt to technological change, and navigate expanding informational environments. Yet the conditions under which adults learn have become increasingly difficult. Adult learners face competing cognitive demands professional, familial, civic, administrative each of which makes claims on the resources that learning requires.

From this perspective, AI as cognitive liberation infrastructure has a direct role to play in supporting lifelong learning. AI systems that manage administrative and organisational aspects of learning can free learners to concentrate on the dimensions of learning that are cognitively demanding in the right way: the engagement with ideas that requires and develops creative capacity, rather than the management of complexity that depletes it [27,28]. Cognitive Sustainability also suggests a broader vision of what digital competence should mean in adult education. Beyond operational skills, individuals require competencies related to attention management, information prioritisation, digital self-regulation, and the critical evaluation of how technologies affect their cognitive resources. AI literacy, in this perspective, is not only the ability to use AI tools; it is the capacity to evaluate whether AI is serving or undermining the conditions for one's own cognitive flourishing and, by extension, the capacity to act responsibly in relation to the technologies one uses and promotes. Educational institutions have a corresponding responsibility: not only to teach individuals how to use AI, but how to engage with AI in ways that strengthen rather than erode their creative and critical capacities. The relationship between learner and AI should be one of active, reflective engagement not passive delegation or uncritical dependency.

Policy Implications and Future Research Agenda

The framework of Cognitive Sustainability carries important implications for public policy, technological governance, and future research. Current policy discussions surrounding AI largely focus on safety, transparency, accountability, fairness, privacy, and economic competitiveness [26,29,30]. The analysis presented in this article argues that an additional policy objective deserves systematic attention: the protection and restoration of human cognitive resources and specifically of creative capacity as a strategic societal interest. Several policy domains may benefit from a Cognitive Sustainability perspective. Digital governance frameworks could incorporate cognitive impact assessment alongside existing requirements. Education policies could integrate Cognitive Sustainability into digital literacy and lifelong learning strategies. Innovation policies could prioritise the development of AI systems explicitly designed to reduce residual cognitive burden and restore conditions for human creativity. Healthcare and social care policies could explore the potential of AI-based cognitive support systems for maintaining autonomy, creative engagement, and quality of life across the life course.

The concept of Cognitive Sustainability also opens multiple directions for future empirical and theoretical research. Future studies may investigate: the relationship between cognitive overload and creative output across professional and educational contexts; the identification and measurement of residual cognitive tasks in different life domains; the design and evaluation of AI systems explicitly oriented toward cognitive liberation; the conditions under which AI support enhances rather than replaces creative and critical engagement; cross-cultural variations in the experience of cognitive complexity; and the longer-term social consequences of AI-enabled cognitive liberation for patterns of innovation, civic participation, and personal development. Empirical research is also needed to operationalise and validate the construct of Creative Sustainability: to develop methods for assessing creative capacity under conditions of cognitive overload, and to evaluate the effectiveness of AI-enabled cognitive liberation in restoring the conditions for creative and autonomous functioning. Such research would also need to attend carefully to questions of access and equity — given that the benefits of cognitive liberation through AI are not equally available across different socioeconomic contexts, geographies, and organisational positions.

Conclusion

The central argument of this article has been that the most significant contribution of Artificial Intelligence may lie not in its capacity to replace human intelligence, but in its potential to liberate it. The enemy of human creativity in contemporary societies is not the absence of capability but the absence of cognitive conditions in which capability can operate. Chronic cognitive overload driven by the accumulation of residual tasks, informational abundance, and the complexity of digital environments systematically depletes the attentional, mental,

and creative resources that human flourishing requires. Cognitive Sustainability, as proposed in this article, provides a framework for addressing this challenge. By defining the preservation of creative capacity and the conditions for personal and professional realisation as a central objective of technological development, it introduces a criterion for evaluating AI that goes beyond productivity, efficiency, and economic performance.

This perspective does not reject productivity as an important value, nor does it minimise the real economic and social benefits of AI-enabled automation. It argues, rather, that these benefits are insufficient and potentially self-defeating if they are achieved at the cost of the cognitive conditions that make human life meaningful. A person who is maximally productive but chronically depleted, who meets every deadline but has no mental space for creative thought, deep relationship, or genuine self-determination, has not flourished. They have merely functioned. The vision that animates this article is more ambitious: a relationship between human beings and artificial intelligence in which AI absorbs what depletes the human mind, and in doing so, returns to it the space it needs. Space for creativity. Space for genuine choice. Space for the personal and professional realisation that gives individual lives their particular meaning and that drives, at scale, the social transformation that complex contemporary societies require.

This vision also demands responsibility from those who design AI, from those who deploy it, from those who govern it, and from those who use it. The transition from a productivity-centred to a creativity-centred understanding of Artificial Intelligence is not only a conceptual shift. It is a political, educational, and ethical commitment: to design, govern, and deploy AI in ways that serve the fullest rather than the most measurable dimensions of human life. Cognitive Freedom the freedom to think, to create, to choose, and to realise oneself may prove to be one of the most important forms of sustainability in the twenty-first century. Protecting it is not a luxury. It is a condition for everything else [31-42].

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