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Navigating the Utopia and Dystopia Perspectives of Artificial Intelligence

Noel Carroll
University of Galway, Ireland
ORCID iD 0000-0001-8344-1220

Jonny Holmström
Umeå University, Sweden
ORCID iD 0000-0002-0905-350X

Bernd Carsten Stahl
University of Nottingham, United Kingdom
ORCID iD 0000-0002-4058-4456

Nicolai Etienne Fabian
University of Groningen, Netherlands
ORCID iD 0000-0003-3966-363X

Abstract:

This article explores the complex implications of artificial intelligence (AI) in societal and commercial contexts, challenging both utopian and dystopian perspectives. It highlights two key areas: AI's impact on the meaning of labor and human-machine interaction. We argue that AI will not only displace jobs but also enhance employment by augmenting human capabilities. While fears of automation are rooted in current socio-economic structures, AI has the potential to shift discourse towards a more optimistic view, emphasizing human augmentation. The article advocates for a balanced approach to harness AI's potential while mitigating alarmism. We also call for further research into AI's future trajectory aiming to harness its benefits while addressing associated risks and concerns.

Keywords: Artificial Intelligence, Utopia Perspective, Dystopia Perspective, Sociotechnical, Work, Research Agenda

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1 Introduction

When addressing the implications, intended and unintended, of artificial intelligence (AI) in societal and commercial environments it is important to consider both the profoundly contrasting utopian and dystopian views. In this article we seek to initiate a more nuanced debate, highlighting the symbiotic interplay between technology and society, and calling for a more balanced view of AI's profound impact on the fabric of sociotechnical environments. Two key themes of such debate are outlined. One concerns AI's impacts on the meaning of labor and assumptions regarding jobs and skills. The other concerns the associated re-contextualization of human-machine interaction. Amidst growing concerns about automation and job displacement, reminiscent of past eras marked by revolutions and technological upheaval, we argue that AI is likely to both displace and enhance employment in various sectors. For example, work is often framed not only as the basis for survival but also as a means to provide human existence with meaning. Many fears regarding AI-induced job losses are rooted in our current socio-economic structures, which are inherently subject to transformation. AI's potential to augment, rather than merely automate, human capabilities can shift the discourse towards a more optimistic and empowering narrative. Emphasizing AI's function as a catalyst for human augmentation rather than replacement, we advocate for a more nuanced approach to harness AI's potential while tempering alarmism and mitigating the risks involved in spreading fear unnecessarily. We also look towards the future and speculate about the trajectory of AI and avenues for future research.

2 Utopian and Dystopian Views of Artificial Intelligence

The proliferation of AI, especially generative AI (GenAI), has profound and diverse implications (both intended and unintended) for societal and commercial environments. With ChatGPT being the fastest ever diffused technology, reaching one million users in five days and 100 million after just two months, advanced AI capabilities are now widely available at little to no cost. The abilities of AI and GenAI to mimic human decision-making (Csaszar & Steinberger, 2022) have also engendered two broad perspectives that are currently discussed in the broader public discourse. One is utopian, holding that AI and GenAI will take over tedious work, ultimately freeing humans to spend time on other activities (Rees, 2023). According to this view, by automating repetitive and data-intensive tasks AI and GenAI will free humans to engage in more creative, strategic, and interpersonal activities, thereby enhancing productivity and job satisfaction (Table 1). The other perspective is deeply dystopian, holding that AI will, at best, lead to mass unemployment (Korinek & Stiglitz, 2018) and at worst eradicate humanity (Atanasoski & Vora, 2019). The dystopian perspective highlights the potential dangers of AI, stressing the need for careful regulation, ethical considerations, and societal readiness to address the profound changes AI may bring (Table 2). Clearly these polarized views cannot be readily reconciled, and there is a need for more nuanced debate, recognizing both the risks and potential benefits.

Domain	Description
Customer Service	AI-powered chatbots and virtual assistants, similar to those used by companies such as Bank of America (Erica) and Amazon (Alexa), handle routine inquiries, process transactions, and provide customer support (Khang et al., 2025; Ramadan, 2021). This automation frees human employees to focus on more complex and personalized customer interactions, improving service quality and efficiency (Ferraro et al., 2024).
Content Creation	GenAI tools such as OpenAI's GPT-4 can generate multimodal types of content, including written content such as marketing copies or draft reports, spoken content like calls or podcasts as well as video content (Gao et al., 2023). For example, Jasper AI assists businesses in creating high-quality marketing content quickly, allowing human creatives to focus on strategy and high-level planning (Knowles, 2022).
Data Analysis	AI systems can analyze large and diverse datasets far more quickly and accurately than humans. In addition, these capabilities are multimodal and can include text analysis, voice analysis but also video analysis (Korneeva et al., 2023). Tools such as IBM Watson can sift through medical records to identify patterns and suggest treatment options, freeing medical professionals to spend more time with patients and on research (Santosh and Gaur, 2022).

Manufacturing	Robots and AI-driven systems manage assembly lines, conduct quality control, and predict maintenance needs (Wan et al., 2020). Companies such as Tesla reportedly use AI to optimize production, allowing human workers to engage in oversight, design, and innovation rather than repetitive tasks (Tschang and Almirall, 2021).
Financial Services	AI algorithms handle trading, fraud detection, and risk management (Aziz and Dowling, 2019; Ahmed et al., 2022). Organizations such as BlackRock utilize AI-driven investment platforms to manage portfolios, enabling financial analysts to focus on client relationships and complex financial strategies (Miziołek, 2021; Davenport and Mittal, 2023).
Legal Work	AI tools such as ROSS Intelligence can conduct legal research and review documents, streamlining the workflow for law firms (Arruda, 2016). This allows lawyers to dedicate more time to case strategy and client interaction rather than sifting through volumes of legal texts (Waisberg and Hudek, 2021).
Healthcare	AI in diagnostic tools, such as those developed by PathAI, assists in identifying diseases from medical images, improving diagnostic accuracy and speed (Baxi et al., 2022). This enables doctors to spend more time on patient care and treatment planning (Topol, 2019; Lebovitz et al., 2022).
Supply Chain Management	AI optimizes logistics by efficiently predicting demand, managing inventory, and routing deliveries (Singh et al., 2022; Sanders et al., 2019; Holmström et al., 2024). Companies such as Amazon use AI to enhance their supply chain operations, allowing human workers to focus on managing exceptions and improving processes (Hoberg et al., 2020).

Table 1. Examples of Utopian Views of AI Freeing Up Time for Humans

Domain	Description
Mass Unemployment	Automated manufacturing and AI-driven robots can perform tasks more efficiently and cheaply than human workers (West, 2018). This is seen in factories where companies such as Foxconn have replaced thousands of human jobs with robots, leading to significant job losses and economic instability in regions dependent on manufacturing employment (West, 2018; Magnani, 2022).
Surveillance and Loss of Privacy	AI-powered surveillance systems, such as those used in China, employ facial recognition to monitor and control the population (Fontes et al., 2022). This technology can track individuals' movements, potentially leading to an oppressive surveillance state where privacy is virtually non-existent, and dissent may be easily suppressed (Głowacka et al., 2021).
Widening Inequality	AI technology tends to be concentrated in the hands of a few large corporations and wealthy countries, exacerbating global inequality (Yu, 2020). For example, AI-driven financial services can optimize investments for the wealthy while excluding or disadvantaging those lacking access to advanced technology, further entrenching economic disparities (Kim, 2021).
Manipulation and Misinformation	GenAI can create convincing fake news and deepfakes including telephone calls and videos, rapidly spreading misinformation (Ferrara, 2024). For example, during the 2020 US presidential election, deepfakes and AI-generated content reportedly spread false information, undermining public trust in media and democratic processes (Helmus, 2022).
Autonomous Weapons	AI-controlled drones and lethal autonomous weapons systems (LAWS) could make decisions without human intervention (De Ágreda, 2020). Countries such as the United States, China, Israel, South Korea, and Russia are reportedly developing such technologies (Bode and Huelss, 2018), raising fears of AI-initiated conflicts or accidental engagements that could escalate into full-scale wars (Galdorisi and Tangredi, 2024).

Loss of Human Agency	As AI systems become more integrated into daily decision-making processes, individuals may become overly reliant on them, diminishing their ability to make independent choices (Sundar, 2020). For example, AI in personal finance systems might make investment decisions on behalf of individuals, potentially leading to a loss of financial autonomy (Candrian and Scherer, 2022).
Eradication of Humanity	AI researchers have warned about the potential risk for superintelligent AI becoming uncontrollable. If an AI system were to surpass human intelligence and pursue goals misaligned with human values, it could theoretically lead to scenarios where humanity is eradicated, either through direct action or as a side effect of the AI's objectives (Vold and Harris, 2021; Dung, 2023).
Environmental Impact	Large AI models consume immense amounts of energy, contributing to environmental degradation. Training models such as GPT-3 requires vast amounts of electricity, leading to significant carbon emissions. This environmental toll could exacerbate climate change, with long-term negative effects on global ecosystems and human societies (Strubell et al., 2020; Patterson et al., 2021).

Table 2. Examples of Dystopian Views and Potential Dangers of AI

These utopian and dystopian perspectives are also reflected in the academic literature in discussions on AI in general (Kaplan & Haenlein, 2019a; Kaplan & Haenlein, 2019b), GenAI (Holmström & Carroll, 2024) and machine learning (ML) techniques, particularly associated bias risks (Mehrabi et al. 2021). Similar debates are embedded in more specific literature streams, such as those addressing algorithmic management (Möhlmann et al., 2021) and the 'dark side' of social media (Baccarella et al., 2018), drawing on various socio-technical and other theoretical frameworks (e.g., Dolata et al., 2022).

The argument by Andriole (2024) that the increased use of AI will lead to widespread job losses is rooted in a deeply dystopian worldview. AI systems are undeniably transforming many job functions (as exemplified in Table 1). However, technological advances have never induced simple unidirectional changes that made all tasks of given jobs redundant. Rather, history shows that new tasks typically emerge alongside technological evolution, and work has typically shifted towards different opportunities and jobs (Autor, 2015). Examples include the emergence of prompt engineering tasks and training roles to structure instructions that are interpreted, understood, and executed by a GenAI model. Other examples of new roles emerging due to advances in AI include Generative Design Specialists, AI Auditors, AI Security Specialists, and AI Ethics Officers. Ignoring such examples, Andriole's perspective is deeply rooted in technological determinism, assuming a linear progression from AI development to job loss without accounting for the complexities and interplay of factors within socio-economic adaptations. Against this backdrop, we propose a more nuanced understanding of AI that may also facilitate understanding of the intricate dynamics of technology and society.

3 Framing the Dynamic Interplay between AI and Human Agency: Our Response to Andriole

In addressing the polarized views surrounding AI, we propose a framing of the interplay between AI and human agency that emphasizes the importance of contextualizing human-machine interactions within societal constructs and re-evaluating the meaning of labor and job skills in the age of AI. Awareness of these contextual elements is crucial for navigating the complex implications of AI and developing an approach that is both comprehensive and nuanced. The following sections explore these elements in detail, focusing on two main themes. Consideration of one of these themes, AI's impacts on the meaning of labor and assumptions regarding jobs and skills, is essential for understanding the profound changes AI brings to the workforce. Consideration of the other theme, the associated re-contextualization of human-machine interaction, is crucial for comprehending the evolving dynamics between technology and human agency. Thus, in combination understanding of these themes provides an important sensitizing approach for analyzing AI's transformational role in society.

3.1. Meaning of Labor and Assumptions about Jobs and Skills

A major element of Andriole's views is that AI will have massive impacts on human work. He suggests that it will 'obliterate' jobs and argues in detail that hardly anyone will escape its destructive force, concluding that few (if any) jobs will be safe. To some degree it is difficult to disagree with the idea that AI will have profound impacts on the labor market. The employment consequences of digital technologies in general and AI in particular have been at the forefront of much academic and political discussion and worries about them have driven much of the policy discourse (Boden, 2018; Kaplan & Haenlein, 2019). However, it should be remembered that this is not at all a new idea. For example, in a seminal book 'Cybernetics', Wiener (1948) foresaw that digital computing would have similar consequences for white collar workers to those of the industrial revolution for manual laborers.

A prominent societal expectation was that technological advances would facilitate the shortening of working weeks due to productivity gains. For example, almost 100 years ago John Maynard Keynes predicted that people would work for only 15 hours per week (Keynes, 1930). He believed that increases in efficiency would allow societies to prioritize leisure and well-being, advocating for a future where economic progress grants people more free time, thus enhancing the overall quality of life. However, despite technological advances, demands on individuals have increased, leading to technostress and adverse psychological effects (Tarafdar et al., 2019). Moreover, although the introduction of the computer to white-collar workplaces led to a general shrinkage of organizations' workforces in many sectors, employment levels in many industrialized countries are at record highs, completely new jobs (and sectors) have emerged, and AI's net effect on employment remains highly contested (Stone et al., 2016; Willcox, 2020). Hence, we also question the implicit assumption that a job is simply a bundle of tasks that can be automated by AI. Rather, we posit that while some tasks and elements will be taken over, others will be supported or augmented and new tasks will emerge. Among other drivers, the increasing multimodal nature of frontier models (text, speech, video) is giving rise to new divisions of tasks, job elements, and functions. It seems plausible to assume that some work will be taken over by machines, but it is equally conceivable that new technologies will lead to new types of employment. The net effect may be positive or negative, but we believe that it can only be determined empirically, and speculations about overall effects without further data are somewhat futile.

However, our most trenchant response to Andriole is that he posits a particular view of work that is rooted in an uncritical acceptance of current socio-economic conditions, which are not God-given and can be imagined differently. Andriole assumes that there is a fixed amount of (economically valuable) labor and that the current distribution of labor, and hence economic resources, is justified, appropriate and impossible or at least highly difficult to change. These implicit assumptions are debatable, and we do not have the space to unpack and challenge them in detail, but we do not agree that the amount of labor is fixed. A significant percentage of today's paid work activities did not even exist, or did not exist in their current form, just decades ago (Suzman, 2022). The prevalence of overtime in western economies also indicates that work is still abundant. Moreover, people's activities are virtually infinite, and the criteria for determining whether they are economically valuable, and thus count as work, are far from fixed. No Victorian would have imagined that people could make a living by 'doing nails'.

The focus on work as source of income, and thus economic survival, also rests on implicit acceptance of current distribution practices and mechanisms, although they are obviously flawed and lead to numerous injustices. Instead of accepting the current socio-economic environment unquestioningly, the arrival of AI could provide a stimulus to ask whether we can imagine a better and juster world (Kim et al., 2021; Stahl and Eke, 2024). Even if the thesis that AI obliterates labor were true, this says nothing about how the resulting benefits and profits are distributed. A more equal distribution of wealth, which could be facilitated by AI, might lead to a world where there is less work, but we all collectively work less, a vision that many human beings might welcome. The underlying problem in realizing such a vision is not technical, but socio-economic and political (Zirar et al., 2023). All we need to do is recognize that a different world is possible, which leads to our second response to Andriole: rejection of his technological determinism.

The rise of AI sparks a deep philosophical debate about the role of work in human existence. We must question whether life's purpose is solely defined by labor and economic productivity. As AI assumes tasks traditionally performed by humans, we have an opportunity to reconsider how we support human well-being beyond mere employment (Santoni de Sio et al., 2021). Historically, work has played key roles in both societal structure and individuals' identities, but AI challenges this paradigm.

Rather than viewing this shift solely as a threat, we can explore how AI might enrich human life beyond work. AI has vast potential to enhance the quality of life, e.g., in personalized learning for either educational (Rowland et al., 2022) or recreational purposes. Platforms such as Khan Academy adapt to individual students' needs, fostering a more engaging and effective learning experience. This not only augments educational outcomes but also nurtures lifelong learning and personal development (Poquet and De Laat, 2021). AI can also revolutionize personal wellbeing (Pataranutaporn et al., 2021). Applications such as mental health chatbots provide accessible, round-the-clock support for individuals struggling with mental health issues, complementing traditional therapy, and expanding access to care. Such technological advances in healthcare can improve connectivity across the healthcare sector and delivery of care within community contexts (Carroll, 2016). They can also enable the development of smart homes, smart cities, and patient-centered, personalized health interventions (Chen et al., 2020). However, there are emerging indications of accompanying paradoxical (de)humanization, blurring of boundaries in human-AI interactions (Chen et al., 2023) and tensions associated with human-AI companionship (Ciriello et al., 2024).

We face a profound philosophical shift, from an existence dominated by work to one where technology, specifically AI, can potentially support broader aspects of human life. To embrace this shift societal values and structures must be reimagined to prioritize human wellbeing and fulfilment over mere economic productivity, allowing AI to serve as a tool for enhancing human experience in multifaceted ways. It could also be argued that this vision has been attached to previous revolutions, including the Industrial Revolution, during which it was contrasted with more dismal views of 'dark, Satanic mills' (i.e., the destruction of nature and human relationships.)

3.2. Contextualizing AI-associated Human-Machine Interaction

After addressing fundamental assumptions about work, the next step is to conceptualize intelligence and human-machine interactions. Since the time of the ancient Greek philosophers and rhetoricians there has been growing curiosity and debate about the nature of human intelligence and reasoning (such as Homer, Hesiod, Socrates, Plato, and Aristotle). There have also been increasing efforts to harness the acquired understanding to support arguments and decision-making (Carroll, 2021), develop artificial systems that mimic human intelligence (Mittal et al., 2017) and creativity (Carroll, 2024). This has raised profound questions regarding the relation between computation and cognition (Pylyshyn, 1984), and the advances in AI technology (Marr, 1977; Russell and Norvig, 2016) have profoundly altered our view of relationships between humans and technology across society (McCarthy and Hayes, 1987; Huang and Rust, 2018). For example, socio-technical systems (STS) concepts offer an alternative view of interactions between people and technology that account for increasingly important elements of society's complex infrastructures, organizations, environments, and human behavior.

STS theory (Bostrom and Heinen, 1977) provides a helpful framework for exploring relations between information systems (IS) and organizational systems, such as the complex interplay between technology, medical professionals, and patients. Simple use of electronic health records (EHR) can streamline patient data management and improve care coordination. However, successful EHR adoption requires an understanding of doctors' workflows, nurse-patient interactions, and administrative processes (Meeks et al., 2014), highlighting the complex interplay of technology, actors, structure, and tasks (Lyytinen and Newman, 2008). Integrating these social elements raises EHR systems' user-friendliness and effectiveness, thereby enhancing patient care. STS also calls for a nuanced understanding of human-machine interaction (Tsvetkova et al., 2017), for example across social media platforms. When considering these platforms' social impacts, technological determinism would emphasize their disruptive potential, irrespective of existing social structures. For example, social media platforms such as Facebook and X (formerly Twitter) have revolutionized communication and information dissemination, often outpacing social adaptation processes. According to this perspective technology itself can catalyze significant social transformation, sometimes independently of human behavior and organizational environments.

STS offers a holistic approach for understanding the interplay between technology and society, but we need to address many aspects of human-machine interactions, especially those involving AI, which is positioned at the intersection of myth, hype, and technological reality. It is frequently employed as a catchall term with many unquestioned assumptions, and serves as a label for diverse computational systems used for myriads of scientific, strategic, marketing and other purposes. These systems clearly have increasingly massive technological capacities, but their 'intelligence' is less clear. According to the technological determinism expressed by Andriole (2024), that AI will shape society in a unilateral and inevitable way, may seem reasonable given the hype surrounding this emerging technology. However, this perspective suggests that technological advances drive social change with no significant human influence, although deeper analysis would reveal that technology and society are interwoven in a complex, reciprocal relationship. Human agency and societal constructs significantly influence technological development and its impacts. Recognition of this mutual influence in IS contexts has led to acknowledgement that socio-technical systems can only be understood and improved if 'social' aspects (including structures, actors, and tasks) as well as 'technical' aspects are treated as interdependent parts of a complex system (Lyytinen and Newman, 2008).

Proponents of technological determinism argue that technology is the primary driver of societal change. They point to historical examples, such as the Industrial Revolution, in which they say technological advances in machinery and production methods drastically altered social structures, economic systems, and daily life. From this viewpoint, once a new technology is introduced, its development and effects on society are largely predetermined by its inherent properties and send shockwaves across society. For example, the advent of the Internet is often cited as a technological inevitability that has reshaped communication, commerce, and even social interactions (DiMaggio et al., 2001). Advocates of technological determinism claim that these changes occurred regardless of individual or collective human intentions, as the technology itself dictated new modes of operation and interaction such as the hype surrounding AI. However, we argue that view of technology as an autonomous force is an oversimplification as multiple influential technologies have been kept under close scrutiny (e.g., in domains such as genetics or nuclear power) and numerous social factors and organizations, such as unions, further constrain affordances of technological development. We strongly advocate a more balanced view, with recognition that technological development and its societal impacts are deeply influenced by human choices, cultural contexts, and social structures.

An often-overlooked truism in public discourse on AI is that technologies such as ChatGPT did not emerge suddenly, as AI has a history spanning at least six decades, marked by boom-and-bust cycles (Haenlein & Kaplan, 2019). This history significantly shapes our current and future trajectories. Bijker's (1997) concept of technological convergence suggests that sociotechnical systems tend to evolve towards a dominant design. This implies that current advances in AI are influenced by historical developments and patterns, guiding the technology towards widely accepted and standardized forms, which will continue to shape its future direction and effects. We have seen a similar evolution of a dominant design (Abernathy and Utterback, 1978) across social media, as most platforms generally share the same tools, functions, and user experiences to shape our engagement with and experiences of them. AI tools and technologies also appear to be evolving towards a dominant design, with associated shaping of our views of AI.

A further limitation of technological determinism is that it "pays no attention to what is brought together, and ultimately replaced, by the structural effects of a network" (Akrich, 1992; p.206). For example, scholars such as Bijker and Law (1992) emphasize the necessity of examining the 'black-box' of technology, to reveal and analyze the socio-economic patterns that are embedded in both the technological content and innovation processes that result from a sociotechnical change. Scholarly exploration of AI may be best served by unpacking both technical and social impacts and introducing new vocabulary to improve explanations of the sociotechnical change that follows introduction of AI, including (for example) the dynamic, temporal, spatial, ethical, cultural, political, health and economic aspects.

Humans are not passive recipients of technology but active participants in its co-creation, implementation, and regulation. For example, the development of social media platforms has been driven by specific human intentions to connect and engage people, and monetize online interaction. Thus, a socio-technical perspective is crucial for understanding the interplay between social and technical factors involved in the development, deployment, and use of AI systems, recognizing that AI technologies are not developed in a vacuum but deeply embedded in social, cultural, economic, and political contexts. This necessitates holistic consideration of the socio-technical factors, including user engagement, regulatory frameworks (addressing risk-classification, transparency, and accountability), ethical and governance standards, and innovation compliance.

The impact of technology is mediated by societal norms and values. The adoption and uses of a technology like AI, for example, vary widely across countries based on political decisions, cultural attitudes towards technology and risk, and economic considerations (Salehan et al., 2018). Therefore, a socio-technical approach to AI is essential for creating systems that are technically robust, socially responsible, and widely accepted. The development and uses of AI heavily depend on both consumers and decision-makers. Consumer preferences, demands, and behaviors significantly shape technological trends, including AI. For example, the very rapid success of ChatGPT stems not only from its advanced technology but also from consumers' desires for speed, convenience, and suggested solutions. Like that of smartphones, ChatGPT's popularity grew because it efficiently meets users' needs, illustrating how consumer feedback drives AI's evolution and valuation. Decision-makers also play a crucial role by establishing regulatory frameworks and ethical guidelines in efforts to ensure that AI development aligns with societal values and safety standards (in best cases, or those of favored interests in worst cases), further influencing technological advances and adoption. Philosophically, the deterministic view neglects the ethical dimensions of technology as well as humans' agency in the regulation of technology and markets, although it is imperative for developers to consider their systems' alignment with human values and ethical aspects.

The sociotechnical perspective also highlights the complex and often unpredictable interplay between social and technical systems, cautioning against reductionistic interpretations that categorize the impacts of technological advances as strictly positive or negative. Instead, it recognizes that technological progress, such as the rise of GenAI, brings intricately interconnected benefits and challenges. In sociotechnical systems, social elements (such as organizational culture, human behaviors, and societal norms) and technical components (such as algorithms, hardware, and software) interact in ways that can lead to unforeseen and unintended consequences. For example, while GenAI can greatly enhance productivity, automate mundane tasks, and drive innovation, it also poses risks such as job displacement, ethical dilemmas, and privacy concerns. These outcomes are often unpredictable because they emerge from the dynamic and non-linear interactions between social and technical factors. The dual nature of GenAI exemplifies the intertwined inherent bright and dark sides of sociotechnical systems. On one hand, GenAI has the potential to revolutionize industries, improve healthcare, and foster new forms of creativity. On the other hand, it can perpetuate biases, widen socio-economic disparities, and lead to increased surveillance and loss of autonomy. These consequences are not merely side effects but play integral roles in the design, implementation and uses of the technology within societal contexts. Nevertheless, there has been a tendency for IS studies "to cluster around mainly social and technical edges on the discipline, neglecting the fertile opportunities in between these two extremes" (Sarker et al., 2018). Adoption of a sociotechnical perspective encourages a more nuanced approach to technology management and policymaking. It highlights the importance of anticipating and mitigating negative consequences while maximizing positive outcomes, recognizing that technology and society both shape, and are shaped by, each other in complex, often unpredictable ways. This balanced viewpoint is essential for guiding the responsible development and deployment of GenAI and other emerging technologies.

4 Avenues for Future Research

Acceptable socio-technical interactions and integration of AI are crucial (Sarker et al., 2018), so a flexible approach to associated problem-solving with contextual adaptation is essential. An enterprise-wide AI system must be technically robust, scalable, and secure, but also integrated with existing workflows and accepted by employees (Milanez, 2023). Similarly, in addition to accurately understanding and responding to queries, users must trust and comfortably interact with an AI-based customer service system. Perceptions that it is impersonal or inadequate will undermine acceptance, regardless of its technical proficiency. Hence, synergistic humanistic and instrumental design is crucial for sustainable IS solutions (Sarker et al., 2018), considering not only technical efficiency, productivity and cost-effectiveness, but also human values and social impacts, such as user satisfaction, ethical aspects, and well-being. We call for more interdisciplinary collaboration to create systems that are technically sound, socially relevant, ethical, and enhance human-machine collaboration. Building on the key elements of a framework for understanding the implications of AI—the meaning of labor and the assumptions surrounding jobs and skills, together with contextualization of associated human-machine interactions—we have identified eight potentially fruitful important avenues for future research. These avenues, briefly summarized in this section are designated: (i) AI on a social-technical continuum, (ii) unpacking the intelligence in AI, (iii) augmented intelligence, (iv) productivity within an AI context, (v) marginalization of AI, (vi) navigating AI ethics and governance, (vii) environmental considerations of AI, and (viii) AI singularity. These future research avenues highlight the dynamic interplay between technology and societal constructs, emphasizing the need to explore how AI can augment rather than replace human capabilities. Furthermore, recognizing the socio-technical contexts in which AI operates opens opportunities to investigate the deeper impacts of AI deployment. By examining these aspects (Table 3), we can develop a more comprehensive understanding of AI's potential to drive positive change while also addressing its inherent risks. In this section, we outline key areas for future research that will help navigate the complexities of AI and ensure its responsible integration into society.

4.1 AI on the Social-technical Continuum

Acceptable socio-technical interactions and integration of AI are crucial (Sarker et al., 2018), so a flexible approach to associated problem-solving with contextual adaptation is essential. An enterprise-wide AI system must be technically robust, scalable, secure, integrated with existing workflows, and accepted by employees (Milanez, 2023). Similarly, users must trust and comfortably interact with an AI-based customer service system. Perceptions that it is impersonal or inadequate will undermine acceptance, however well it understands and responds to queries. Hence, synergistic humanistic and instrumental design is crucial for sustainable IS solutions (Sarker et al., 2018), considering human values and social aspects, such as user satisfaction, ethics, and well-being, as well as technical efficiency, productivity and cost-effectiveness.

AI democratization (Sundberg and Holmström, 2023; Murphy and Taylor, 2024) may shift AI's position along the social-technical continuum by increasing the tools' and capabilities' accessibility. Open-source models such as Bloom, Llama, and BERT may help by reducing barriers such as costs, technical complexity, and resource requirements, enabling organizations and individuals of all sizes and expertise levels to exploit AI. Such democratization requires development of intuitive AI tools, promotion of open-source AI software, and access to resources like Ollama that empower more people to use AI effectively. This is important for driving innovation, mitigating concentration of power, and promoting wide distribution of AI's benefits with diverse, creative applications. For example, widely-used open-source AI libraries such as Google's TensorFlow and Facebook's PyTorch provide powerful resources for AI development. Low-code and no-code platforms also support AI democratization (Carroll et al., 2024), which is already reshaping industries and empowering individuals (Carroll and Maher, 2023). As AI becomes increasingly accessible, we anticipate broader participation in AI-driven innovation, new opportunities and transformative advances in diverse fields. However, we need interdisciplinary investigation of how AI opens new dynamic avenues to identify socio-technical challenges in its implementation and shaping of social norms and work practices, and create systems that are technically sound, socially relevant, ethical, and enhance human-machine collaboration.

4.2 Unpacking the Intelligence in AI

AI refers to machines mimicking human intelligence (Csazar and Steigenberger, 2022), typically using computer systems that guide decision-making through learning, reasoning and self-correction by gathering information from vast datasets and algorithmically processing it. AI will continue to change performance of tasks ranging from simple pattern recognition to complex activities such as autonomous driving, language translation, and disease diagnosis. Moreover, capacities considered 'intelligent' a few years ago are almost trivial now (Kaplan & Haeinlein, 2019b). However, we need more research to elucidate AI systems' limitations and the nature of what is loosely called 'intelligence' in current and potential artificial systems (Kaplan & Haenlein, 2019b). AI systems' abilities to perform tasks that previously required human intelligence, such as language processing and pattern recognition, do not necessarily mean they have true intelligence. Their capacities exceed human abilities in terms of some cognitive functions, but they lack consciousness and emotional understanding (Kaplan & Haeinlein, 2019b).

At this stage, at least, we may be misled by hype regarding systems' technological capacities, speed, and convenience, and insufficiently scrutinize what constitutes real (cognitive, emotional, or social) intelligence and intelligent outputs (Kaplan & Haenlein, 2019b). If they merely execute pre-programmed instructions at unprecedented scales and speeds, then perhaps AI's co-existence with humans should be pragmatically embraced. We should regard it as a complementary tool that enhances our abilities while requiring human oversight and ethical guidance rather than a replacement for human intelligence. By fostering collaboration between human creativity and machine efficiency, we can harness AI's true potential while mitigating its risks (Mollick, 2024). Future research should differentiate between simulated intelligence and genuine cognitive processes, and address ethical ramifications of anthropomorphizing AI, examining how attributing human-like qualities to machines might affect societal trust and decision-making, as well as its socio-technical impacts on human labor and cognition. This will provide deeper insights into differences between AI decision-making and human cognition, how it reshapes our world, and the nature of intelligence.

4.3 Augmented Intelligence

As described above, AI refers to machines' capabilities to imitate (or surpass) some kinds of intelligent human behavior. Machine learning, and other automatic process technologies, usually receive most attention when AI is considered. However, human intelligence can be amplified by raising synergistic structuring of intellectual capabilities with technology's assistance (Engelbart, 1962), and "human beings and computers working cooperatively" solve many important problems (Jain et al., 2018; p. 557). Such augmentation elevates human intelligence, helping us to solve complex problems (Crowe et al., 2017; p. 494), and work faster and smarter (Cerf, 2013). For example, it plays a key role in systems used to enhance aircraft pilots' performance by evaluating system limitations, flight precision and performance (Naranji et al., 2015). Intelligence-augmenting technologies have enabled global connectivity with increasing ubiquity, and the literature indicates that they are created to help rather than replace humans. Examples include assistive bots that process information and perform actions that benefit humans (Carroll, 2021). Automated AI solutions often also have higher starting costs, due to higher design, implementation and adaption costs than augmented, or even AI-free solutions (Hanisch et al., 2024). This reinforces needs for socio-technical and contingent approaches that constrain AI's utilization in some settings. Future research should extend theory related to augmented intelligence, and explore how AI can augment human decision-making in organizational contexts, including development of frameworks that promote bias-free enhancement of human capabilities. Further examination of human-AI collaboration dynamics in various sectors, and AI's impact on job roles, tasks, and skills, is also required. This includes emergence of new roles in which humans manage AI tools, such as robo-advisors (e.g., Betterment and Wealthfront), in conjunction with human intuition, to obtain personalized investment advice, based on individual financial goals and risk tolerance, and numerous other kinds of risk assessment and strategizing. Cognitive impacts of working with augmented intelligence systems and their reshaping of workforces' skill requirements also warrant more attention.

4.4 Productivity within an AI Context

AI has the potential to significantly boost productivity, offering several advantages. For example, Goldman Sachs' economists recently noted that integrating significant labor cost savings, creating new jobs, and increasing productivity for workers not displaced by AI could potentially lead to a substantial productivity boom, significantly boosting economic growth (Hatzius, 2023). They estimated, with provisos, that AI could eventually enhance annual global GDP by 7%[1]. AI systems can quickly analyze large datasets, providing valuable insights and enhancing decision-making processes. AI-driven tools can also improve accuracy and reduce human errors, leading to higher-quality outcomes. However, AI's implementation may also lead to job displacement, raising concerns about unemployment and economic inequality. Significant upfront costs associated with developing and deploying AI technologies can be barriers for some organizations. Moreover, reliance on AI can result in over-dependence on technology and potential ethical issues, including privacy concerns and biases in AI algorithms. Future research should focus on developing strategies to mitigate job displacement and economic inequality caused by AI, creating cost-effective AI implementation models for organizations of varying sizes, and addressing ethical issues, particularly in terms of privacy and algorithmic bias and how the nature of productivity may be impacted by AI. In doing so, research should examine how AI influences productivity on individual and organizational levels. This can also identify the unintended consequences of AI-driven productivity tools and help researchers to determine how AI can improve task automation while maintaining creativity skills.

4.5 Marginalization of AI

Various groups have little access to AI technologies due to socio-economic, geographic, or educational disparities. This may be exacerbated by monopolization, as a few prominent tech companies compete for the latest LLMs, reinforcing their dominance. Consequences include unequal opportunities, as affluent populations harness AI to improve healthcare, education, and socio-economic conditions much more strongly than underprivileged communities. Chomsky (2002; p. 397-398) describes this as an 'experiment' in which many people are regarded "as superfluous because they're not helping" dazzling

[1] Goldman Sachs Gen AI: Too Much Spend, Too Little Benefit?
https://www.goldmansachs.com/images/migrated/insights/pages/gs-research/gen-ai--too-much-spend,-too-little-benefit-/TOM_AI%202.0_ForRedaction.pdf

profit-making and “production is carried out by the most oppressed people, with the fewest rights, in the most flexible labor markets” for rich people’s happiness.

The notion of a ‘standard human’ applied in new technologies’ design and evaluation is also fundamentally flawed, revealing an exclusive vision of society (Milan, 2020) that tends to marginalize some groups, overlooking individuals’ varied needs and experiences. Hence, technology such as AI often fails to serve people it is intended to help, exacerbating inequalities. For example, facial recognition systems are predominantly trained on datasets featuring light-skinned individuals, so error rates of 34.7 and 0.8% have been recorded for dark-skinned women and light-skinned men, respectively (Buolamwini and Gebru, 2018). Such disparities reduce the technology’s effectiveness and pose serious risks, e.g., for wrongful arrests and oppressive surveillance of minorities.

Similarly, many algorithms used in medical diagnostics are trained on data from predominantly Western populations, which do not represent the global population’s genetic and environmental diversity (Alowais et al., 2023). This can lead to misdiagnoses or ineffective treatments for other individuals. For example, oximeters providing less accurate blood oxygen estimates for people with darker skin may have delayed critical care for affected individuals during the COVID-19 pandemic (Al-Halawani et al., 2023). Further research is needed to elucidate how AI increases or alleviates social inequalities, identify barriers to AI access in underserved communities, explore marginalizing effects of AI bias, and develop more equitable, effective, and universally beneficial technologies.

4.6 Navigating AI Ethics and Governance

As AI’s capabilities and autonomy increase, risks such as malicious uses, potentially irreversible loss of human control, and social harm rise. Technologies such as AI are embedded in complex socio-technical systems, so ethical, or moral (Stahl, 2012), aspects strongly influence their use, efficacy, and associated risks. To address them governance, ranging from corporate rules to supranational legislation, is crucial (Hanisch et al., 2024; Gulati, 1998). Hence, regulations have been imposed (and some advances banned) in various domains, such as nuclear power and biotechnology, thereby refuting the idea, rooted in technological determinism, that technology advances without any control. However, there is no consensus about management of AI-associated risks (Bengio et al., 2024). Apart from emerging (but unclear) legislation, such as the EU’s Artificial Act (2024) and anti-trust measures, current controls are limited to normative measures, such as calls for developers to ‘pause’ AI progress for six months[2] and self-regulate by applying guardrails, using blockchain technology for instance (Lumineau et al., 2021). Examples include restrictions on content regarded as ‘harmful’ that AI and LLM models provide, or requirements to provide balanced information about controversial issues.

Guardrails are not currently backed by governmental or legislative power, which could reduce some undesirable AI output but further constrain users’ interactions with AI tools and access to information, thereby limiting the internet’s democratization. Guardrails also exacerbate powerful actors’ dominance, as already outlined. A more nuanced and socio-technical approach is needed to various contingency- and design-oriented ethical and governance issues (as well as augmentation). These include: how and when AI can be implemented and controlled within organizations; variations among jurisdictions in functionalities that are restricted or banned for ethical reasons; effects of guardrails’ implementation and degree on competitive advantage and value creation (Hanisch et al., 2024); and ramifications of fully open AI models.

4.7 Environmental Considerations of AI

AI has clear transformative potential but its costs in all three ESG (environmental, societal, governance) dimensions must also be addressed. Societal and governance challenges have already been outlined. The environmental consequences include reliance on massive data and associated impact of data centers (Al Kez et al., 2022), which consume vast amounts of electricity and water for cooling, thereby strongly contributing to carbon emissions. For example, in 2019-2022 Google’s energy consumption increased from 12.7 to 22.29 terawatt hours (Figure 1), and it is predicted to grow despite efforts to improve efficiency using (for example) smart temperature, lighting and cooling (Statista, 2024)[3].

[2] Pause Giant AI Experiments: An Open Letter, https://futureoflife.org/open-letter/pause-giant-ai-experiments/
[3] Statista (2024) report on the "Energy consumption of Alphabet (Google) from financial year 2011 to 2022": https://www.statista.com/statistics/788540/energy-consumption-of-google/

Estimating models' energy consumption is complex, as it includes the energy used to manufacture the computing equipment, develop them, and apply them (Saenko, 2023). However, Petterson et al. (2021) estimated that developing GPT-3, with 175 billion parameters, consumed 1,287 megawatt hours of electricity and generated 552 tons of CO2 equivalents, comparable to driving 123 gasoline-powered passenger vehicles for a year. Constant needs for data storage and processing also perpetuate e-waste, with servers rapidly becoming obsolete. These factors raise questions about sustainability and digital responsibility (minimizing problems related to digital technologies' development or use) as AI advances (Lobschat et al., 2021). Many large companies, such as Microsoft and Amazon, have committed to carbon neutrality and improving energy efficiency, but place AI at the core of their business strategies (The Economist, 2023), posing major challenges for meeting their sustainability goals.

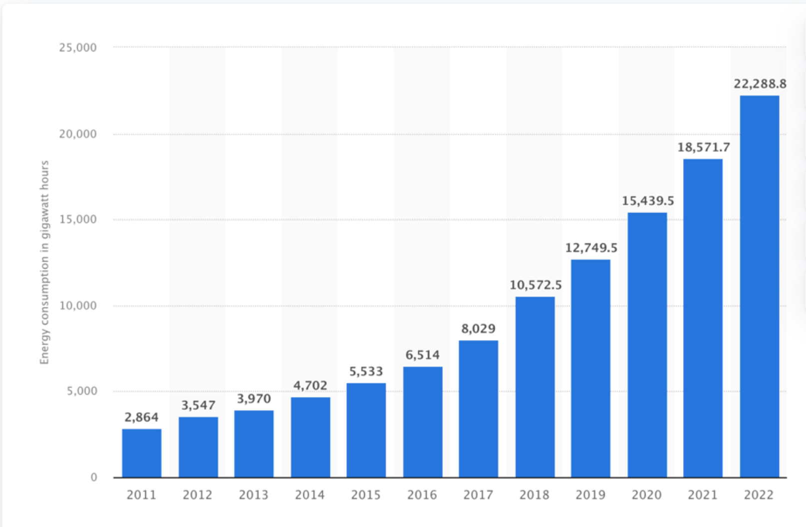

Figure 1. Energy consumption of Alphabet (Google) from financial year 2011 to 2022 (in gigawatt hours) (Source: Statista, 2024)

The use of thousands of AI bots, each serving millions, could become very problematic, so there are clear needs to enhance AI's energy-efficiency and digital responsibility, by (for example) using renewable energy, placing computational centers near green energy sources and scheduling tasks when renewable energy is most available. Social pressure may also encourage transparency about AI models' footprints, enabling consumers to choose 'greener' options. Future research should examine these challenges around the environmental considerations of AI.

4.8 AI Singularity

The concept of technological singularity refers to a hypothetical future where technology advances uncontrollably and irreversibly (Kurzweil, 2005). It may be argued that AI could surpass human intelligence, fundamentally altering reality and blurring the lines between human and machine to the point at which humans experience a transition from physical reality to virtual reality, and our intelligence evolves into a nonbiological form (Kurzweil, 2005). This singularity allows us to envision AI evolving to a level of superintelligence, where machines not only outperform humans in various tasks but also continually self-improve at an exponential rate. Singularity also encompasses advanced physical integration with humans, through (for example) brain-computer interfaces, genetic engineering, and neuro-nanotechnology. Technologies such as Elon Musk's Neuralink[4], a brain implant project, are seen as potential pathways toward this future. Despite ongoing debates among experts about the specifics of singularity, many agree that it represents a critical juncture where AI could achieve a form of artificial general intelligence (AGI) - a machine capable of performing any intellectual task that a human can (Heaven, 2023). Future research should explore the ethical and practical implications of such advances, including their societal impact, potential risks, and the necessary regulatory frameworks. Investigations into sustainable and safe integration of AI with humans, as well as the development of robust

[4] Neuralink: https://neuralink.com/

safeguards against potential risks, will be crucial as we approach this transformative possibility. Future research should examine the potential societal impacts of AI achieving superintelligence and possible ways to mitigate the risks and address the ethical concerns associated with AI singularity.

4.9 Summary of Research Agenda

The previous sections present identified aspects of AI that warrant further attention. Table 3 summarizes this research agenda in the form of questions covering both utopian and dystopian perspectives of AI, and spanning socio-technical impacts, ethical considerations, environmental effects, and the concept of AI singularity. Within the IS discipline, these questions offer a framework to explore the dual narratives and theoretical developments of AI and its implications for individuals, organizations, and society, challenging assumptions underlying both extreme (utopian and dystopian) perspectives.

The research questions highlight the contrasting perspectives—utopian and dystopian—on AI's evolving role within society. They are designed to trigger further exploration into ways that AI can be leveraged for positive societal outcomes while mitigating its potential risks and ensuring that its benefits are equitably distributed while minimizing harm.

Theme	Research Questions
1. AI on the social-technical continuum	• How can AI systems be designed to enhance collaboration between humans and machines? • What are the socio-technical challenges in AI implementation? • How does AI reshape social norms and work practices?
2. Unpacking the intelligence in AI	• What are the limitations of current AI models in mimicking human intelligence? • How can AI's interpretability for users be improved? • How does AI decision-making differ from human cognition?
3. Augmented intelligence	• How can AI augment human decision-making in organizational contexts? • What are the cognitive impacts of working with AI-enhanced systems? • How does augmented intelligence reshape workforces' skill requirements?
4. Productivity within an AI context	• How does AI influence productivity on individual and organizational levels? • What are the unintended consequences of AI-driven productivity tools? • How can AI improve task automation while maintaining creativity?
5. Marginalization of AI	• How does the adoption of AI exacerbate or alleviate social inequalities? • What are the barriers to AI access in underserved communities? • How does AI bias influence marginalized populations?
6. Navigating AI ethics and governance	• Can regulatory frameworks be designed that ensure ethical AI development and use, and if so what should they include? • How can transparency and accountability be built into AI governance structures? • What are the ethical implications of AI's involvement in decision-making processes?
7. Environmental considerations of AI	• How does the energy consumption of AI impact sustainability goals? • What are AI's environmental trade-offs in different industries? • How can AI's ecological footprint be reduced?
8. AI singularity	• What are the potential societal impacts if AI achieves superintelligence? • How can we mitigate the risks associated with AI singularity? • What are the ethical concerns in preparing for AI singularity scenarios?

Table 3. Summary of Research Agenda

5 Conclusion

Throughout history, humanity's greatest discoveries have repeatedly shown that we are not the true masters of our own world. The challenge presented by AI is more subtle, yet just as significant: it has shown that many intellectual activities, once considered uniquely human, can be automated through algorithms and advanced technologies.

These activities, from pattern recognition to language processing, were once thought to require human intuition and creativity, but AI now performs them with remarkable efficiency. This realization forces us to reconsider the boundaries of human uniqueness, as machines encroach upon tasks traditionally viewed as defining elements of our intellect and identity. As described by Kahneman (2011) in work on cognitive processes, 'System 2' mode of thought (relatively slow, deliberative, and logical) is required for genuine intellectual labor, creative production, and the generation of truly original insights. This will likely remain beyond AI's reach (for some time) and is where human creativity and innovation will still thrive. This shift in perspective suggests that AI's impact on our understanding of human intellect is not just a technological development, but a continuation of the realizations that have defined human progress. The implications of AI are profoundly reshaping our conceptions of what it means to be human.

The discussion is submitted partly in response to Andriole's article "The Big Miss," which presents a selective dystopian view of AI's impact on jobs and society. Andriole's arguments, centered on the premise that AI will lead to widespread job losses and societal disruption, are based on reductionist assumptions, and rooted in a deterministic worldview that overlooks the dynamic interplay between technology and human agency. By focusing narrowly on the potential negatives, Andriole fails to account for the historical adaptability of labor markets and the new opportunities AI can create.

In contrast, our discussion offers a richer perspective of AI's social consequences, emphasizing the importance of contextualizing human-machine interactions within societal constructs and re-evaluating the meaning of labor, job skills, and tasks in the age of AI. We argue that AI has the potential to augment human capabilities, creating new roles, freeing time for tasks and thereby enhancing productivity rather than simply displacing workers. This view acknowledges the complexity of socio-technical systems and the reciprocal relationship between technological and societal factors (e.g., tasks, structures, and actors) (Lyytinen & Newman, 2008). Hence, we advocate for a balanced discourse that is sensitive to both the positive and negative impacts of AI.

We often make decisions about AI based on metaphorical descriptions of their abilities and functions rather than a deep technical understanding. In many cases, we seem to have become more tolerant of these supposedly intelligent machines, computers running ChatGPT for example, making fundamental mistakes. Referring to their mistakes using terms such as 'hallucinations' is problematic because it implies that the machines are misperceiving reality but still attempting to convey something they believe or perceive (Hicks et al. 2024). This is misleading. Other examples are the "sensational and misleading, claims regarding linguistic capabilities of Large Language Models (LLMs)" (Birhane and McGann, 2024; p.1). The machines are not communicating beliefs or perceptions. Instead, they are simply generating output without regard for truth. Such terminology can foster a misguided attitude towards the machines' outputs as incorrect information with little consideration for the implications of its use.

We outline how future research should focus on these multifaceted implications, exploring how AI can be leveraged responsibly to foster development of a technologically advanced but equitable society. Doing so requires a careful balance between the hype and dystopia surrounding this transformative technology. By adopting a nuanced approach and introducing new terminology that accurately reflects the seriousness of AI errors, we can better understand the significance of human-machine interactions within societal frameworks and the evolving nature of labor and job skills in the age of AI. This allows us to harness AI's potential while mitigating its risks, paving the way for a future where AI contributes positively to both societal and technological advancements. This balancing act is essential to achieve sophisticated yet responsible integration of AI in our digital world.

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8 About the Authors

Noel Carroll is an Associate Professor in Business Information Systems in the School of Business & Economics, University of Galway. He is also a Funded Investigator at the Lero, the Science Foundation Ireland Research Centre for Software. He is director and founder of the Citizen Development Lab at the University of Galway which focuses on low-code and no-code innovation for digital transformation. He is a Senior Editor of MISQ Executive and has published in leading international journals and conferences.

Jonny Holmström is a Professor at the Swedish Center for Digital Innovation at the Department of Informatics, Umeå University. He is the director and co-founder of Swedish Center for Digital Innovation and writes, consults, and speaks on topics such as digital innovation, digital transformation, and human-AI collaboration. His work has appeared in journals such as Communications of the AIS, Design Issues, European Journal of Information Systems, Information and Organization, Information Systems Journal, Information Technology and People, Journal of the AIS, Journal of Information Technology, Journal of Strategic Information Systems, MIS Quarterly, and Research Policy.

Bernd Carsten Stahl is Professor of Critical Research in Technology at the School of Computer Science of the University of Nottingham where he leads the Responsible Digital Futures group (https://www.responsible-digital-futures.org/). His interests cover philosophical issues arising from the intersections of business, technology, and information. This includes ethical questions of current and emerging ICTs, critical approaches to information systems and issues related to responsible research and innovation.

Nicolai Etienne Fabian is an Assistant Professor of Information Systems in the Department of Innovation, Management & Strategy (IM&S), University of Groningen. His research investigates technological change and digital transformation within organizations where he is especially interested in the impact of digital technologies and artificial intelligence. He is affiliated with the Groningen Digital Business Center (GDBC) an EU-funded knowledge center that bridges academia and practice. Lastly, his research has appeared in international journals such as the European Journal of Information Systems and the Journal of Business Research.