

Rethinking Social Context in Technological Responsibility

Steven Umbrello, *Technology Ethics: Responsible Innovation and Design Strategies*¹

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Abstract

This review explores Steven Umbrello's work on Technology Ethics, an interdisciplinary examination of the complex relationship between technology and society. The book critically examines foundational concepts such as technological instrumentalism, determinism, social construction, and interactional perspectives, highlighting the dynamic interplay between values, design, and ethics. Umbrello's advocacy for value-sensitive design and responsible innovation as practical frameworks for addressing emerging challenges, including AI and sociotechnical systems, is a key takeaway. While the book provides a solid foundation, it raises further unresolved questions about agency in increasingly autonomous technologies and the methodological challenges associated with empirically studying interactional perspectives. This review underscores the book's practical value for scholars, practitioners, and policymakers grappling with technological innovations' ethical and societal implications.

Keywords: Technology Ethics; Responsible Innovation; Value-Sensitive Design; Sociotechnical Systems; Interactional Perspective

Technology's influence is pervasive, touching every social sphere, and most human actions involve some form of technological mediation. While technologies can enhance individual and societal welfare, they can also pose significant risks. The potential for unforeseen consequences looms, particularly with the advent of increasingly complex, potent, and dynamic technologies capable of profoundly shaping social change and even affecting human destiny. From their inception, technologies have become integrated into society's fabric, and their functionalities are evident and concealed. They persist over time, and their cumulative functions and impacts endure within the technological structure of society. With each new generation, this complex technological structure gains more productive and intelligent power in interactions within the technological system, human actors, and society. In this sociotechnical complexity, a pivotal question emerges: Does humanity retain agency, or has technology usurped a portion of it? Each answer to this question carries profound moral implications for the human-technology relationship, compelling us to confront

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the ethical dimensions of our technological advancements. Max Weber's notion of the "rational technique" (1978) denotes a deliberate and systematic selection of means grounded in the actor's experience and reflection, epitomizing the zenith of rationality. As a result, we face a formidable contender for our agency, as we share a significant portion of our autonomy with new technologies. It raises an intractable dilemma: If technology embodies a high level of rationality, how should we define the ethical responsibility of technology? Moreover, ethical responsibility becomes increasingly intricate with the rapid development of new technology like generative AI, which possesses autonomous and generative rationality. Who is responsible: the creator of AI or AI itself as a creator?

In his latest work, "Technology Ethics: Responsible Innovation and Design Strategies," Steven Umbrello challenges conventional technological perspectives. The book is organized around the challenging relationship between technology and society. Umbrello attempts to link technology to its social origins through an interdisciplinary lens with a philosophical background referring to actual evidence and using metaphorical examples. In the initial chapters, delving into the philosophical inquiry of a classic question of 'What is technology,' the author examines two foundational assumptions: the socio-technical precepts of technology and the intrinsic connection between values and technology. As the narrative progresses, the author shifts the discourse toward the practical implications by scrutinizing a newer significant question 'how technology is.' This transition underscores the book's central theme in its subsequent chapters, which investigate the ethical dimensions of technology with a focused exploration of 'responsible technology.'

Flaws in Technological Perspectives

Umbrello commences with technological Instrumentalism, which among sociologists is attributed to the Weberian approach to technological Instrumentalism (Rafael, 2013). Within his action theory, Weber (1978) uses two concepts - "technique" or "rational technique" to distinguish the economy from technology, which leads to his definition of technology. Weber argued that 'economic action is primarily oriented to the problem of choosing the end to which a thing shall be applied; technology, to the problem, given the end, of selecting the appropriate means' (1978, pp. 66-67). The Weberian insight furnishes us with two insights into the study of technology, which echoed in Umbrello's approach to technology and its ethical responsibilities. Firstly, despite the economy's pivotal role in technological rationality, Weber acknowledges its intricate interplay with other influential variables. Weber's critique underscores the risks and implications of unchecked Instrumentalism. This perspective leads him to reject the concept of progress, presenting a bleak view of a modern society burdened by existential ennui and a pervasive sense of meaninglessness, as discussed in Torpey (2019).

In the concluding chapter of his book, Umbrello offers a nuanced view of the debate over progress and technological perfectionism, aiming for a balanced analysis.

With different viewpoints on technology, the writings of some scholars, such as White (1962), McLuhan (1962), and Ogborn (1938, 1948), articulate a variant continuum of technological determinism. This perspective posits that technology significantly influences and shapes human behaviors and social institutions. While there is a lively debate about Marx's view on the role of technology in society, those who support a technological interpretation of Marx often consider 'forces of production' as equivalent to technology (Klein, 2001). Others refer to Marx's famous quote, "The hand-mill gives you society with the feudal lord; the steam mill, society with the industrial capitalist" (Marx 1847/1963, p.109), to support this view. Technological determinism is the idea that technology develops autonomously through internal logic, resulting in prescribed social changes (Misa, 1988; Bimber, 1994), leading to the assertion that society is a technological construct. In critiquing determinism, Umbrello identifies its principal challenge as the inevitability of its outcomes and the consequent absolution of responsibility from technology designers.

The third perspective, known as the social construction of technology (SCOT) in the mid-1980s (Pinch and Bijker, 1987) that Umbrello focused on in his book, provides both a methodology and theoretical framework for investigating the reciprocal influence between society and technology, rooted in critiques of technological determinism (Bijker, 2015). It argues that the meanings and impacts of technology are socially constructed, leading to varied outcomes depending on cultural contexts and subjective interpretations. Although SCOT has undergone changes from its original version, as noted by Bijker (2015), according to Umbrello, this complex and elitist approach overlooks technology's impact on passive stakeholders and neglects societal norms.

The interactional perspective

Finally, the narrative moves from a simplistic, linear, and unidirectional orientation perspective toward understanding the complicated and interconnected relationship between technology and society. This relationship highlights the influence of prevailing social values on technology and technology's capacity to reshape social norms, emphasizing the intrinsic connection between technology and its social context. "One arguably must view technology as at least partly constructed by the values and beliefs of those scientists and engineers involved in the design process" (Umbrello, 2024, p. 37). This theoretical shift introduces the central idea—the 'interactional' perspective—to the reciprocal relationship between technology and society. This approach highlights the continuous and dynamic interplay between technologies and their socio-cultural, normative, and economic context. This 'sociotechnical interactional perspective'

suggests that technologies do not exist in isolation but are engaged in multidimensional interactions with other technologies and human actors. Umbrello goes beyond the famous binaries of human and tool or society and technology and elaborates:

There are no clear or distinct boundaries that separate human society from the systems impacting on our lives and society, and this forms the foundation of interactionism; society and technological systems must be viewed as one, as sociotechnical systems. (Umbrello, 2024, p. 52)

The dynamic nature of this framework is contemplative, as it enhances our understanding of technology as embedded within a complex system of society-technology interactions. Despite the methodological challenges I will address later in this review, Umbrello's interactional viewpoint of the sociotechnical systems presents a new landscape where human agents, technology, and society engage in a dynamic and ever-evolving interplay. In examining the "whatness of technology," Umbrello concludes the book's initial section by advocating for an interactional viewpoint. This approach aims to establish a connection between technology and its social origins, laying the foundation for exploring the primary focus: the "howness of technology" in the book's subsequent part, which seeks to reframe responsible technology.

Responsible technology design

Chapters 6-8 delve into the profound ethical responsibility of technology within the spectrum of technological endeavors. This exploration reiterates the vital nexus between values and technology, emphasizing the need to redefine the ethical obligations inherent in technological actions, explicitly focusing on the actors in the design process. The author's words, 'It is not enough to have good intentions; good design is better' (Umbrello, 2024, p. 4), serve as a stark reminder of the urgency of this task. This section of the book serves as a powerful manifesto, urging engineering and other actors in technology design to transcend the conventional and simplistic notion of 'individual responsibility.' Instead, it advocates for a perspective on design ethics that illuminates the intrinsic connection between technology and human life, as expressed:

We reframe our ethical theorizing to focus on how design choices shape the contexts in which individual decisions are made and how prior design choices expand or limit the options available to individuals (Umbrello, 2024, p. 49).

In Chapter 7, Umbrello reviews and introduces methods for pursuing responsible innovation, including global design, inclusive design, and value-sensitive design. He elucidates why value-sensitive design (VSD) predominates the literature on responsible innovation and analyzes its strengths and weaknesses. He asserts, "VSD's inclusion of many elements of the previous approaches makes it a strong default for innovating responsibly." (Umbrello, 2024, p.76) By this position, In Chapter 8, while contemplating

the ethics of technology and the ethical obligations of actors engaged in responsible innovation, he introduces an “ethicists’ toolbox” for designers and engineers. Both chapters offer critical insights into fostering ethical practices within technological development.

Umbrello delves into the ethics of technology, aiming to establish a framework for the development and responsible utilization of technology. For this reason, he focuses on two pivotal concepts: “value-sensitive design” and “progress, not perfection.” Value-sensitive design entails considering the values and needs of diverse stakeholders throughout the technology design process. In the final chapter, he emphasizes “progress,” not “perfection,” and advocates continuous efforts to enhance technology while acknowledging potential imperfections. Finally, the author underscores the dynamic nature of technology, reminding readers that humans and their technological innovations are in a constant process of co-creation. As a result, it is essential to remember that humans are continuously obligated to take responsibility.

Interactional approach to responsibility

From my sociological perspective, this well-crafted and valuable book presents considerable contributions and commendable creative achievements in technology studies, particularly in technology ethics. Its organized and easily digestible approach makes it accessible to a diverse readership, extending beyond the specialized domains of the philosophy of technology. Integrating real examples, metaphors, and dialogues from fictional movies enhances the text’s comprehension and readability. Notably, with a keen logical awareness, Umbrello knows that the ‘howness of technology’ is contingent upon grasping the ‘whatness of technology.’

The first and most central topic of technology studies has been the relationship between society and technology. The book’s noteworthy achievements in contextualizing technology within its social background during design and development and its interactional perspective on society-technology relations merit attention for its comprehensive, collaborative, sustainable approach. Beyond grappling with the inherent complexities and challenges of operationalizing Umbrello’s idea in practice, assessing its resilience in pursuing power dynamics, mitigating bias, and consistency is crucial. The framework should strive to account for power differentials within sociotechnical systems, acknowledging how certain actors or institutions may exert disproportionate influence. It should also be capable of identifying and addressing social, cultural, or organizational biases. Given the rapid pace of technological advancement, the framework’s adaptability to emerging technologies, such as AI, and its responsiveness to shifting social values and norms are of paramount importance. This ensures its relevance and effectiveness in addressing new ethical challenges and

enhances its robustness as a framework for analyzing the complex interplay between technology and society.

Furthermore, it addresses the critical issue of technological responsibility, a fundamental topic in technology-related debates. The interactional approach proposes an interdisciplinary dialogue on technology's ethical aspects by highlighting technology design's often-overlooked ethical and social implications. Historically, conventional perspectives on technology have neglected to examine the roles of developers and consumers and their collaborative technological initiatives. A cooperative and interdisciplinary approach is vital for advocating responsible innovation and design and highlighting the potential oversight of these crucial elements when focusing solely on technological advancement.

The Issue of Agency

Having a solid enforcement guarantee to hold the actors involved in technology design accountable has always been a challenge. Moreover, although technology ethics codes are a good guide for responsible action in technology design, they are not a guarantee for implementing technology ethics. Ethical responsibility becomes particularly complex with generative and dynamic new technologies such as AI. The critical question arises: To what extent does human responsibility extend? Moreover, as these new generative technologies are in a constant state of transformation, reshaping human society at an unprecedented pace, will the responsibility for technology's impacts revert to humans? The Issue of agency, mentioned initially, is relevant here, prompting the recurrent inquiry: Who holds the responsibility? The challenge escalates when the subject is not just a simple tool or a single technology but a sophisticated technological system that arises from the fusion of emerging technologies, each building on the cumulative effects of its predecessors, in Agburn's classical words, the convergence of the influences of many different inventions (Ogborn, 1947, p.88). In simpler technological models, tracing accountability back to the designers was feasible. However, with more complex technologies, we are confronted with a combined intertwined and even abandoned responsibility, underscoring the peril of an untransparent and uncontrollable technological system. It remains to be seen what outcomes the interactional approach, emphasizing responsibility in technology design, will yield in practice.

An Invitation to Responsible Technology Collaboration

Steven Umbrello's *Technology Ethics* offers a compelling framework for addressing the ethical complexities of technology in today's rapidly evolving world. The book redefines the relationship between society and technology through its interactional perspective,

emphasizing their interconnectedness as sociotechnical systems while acknowledging the shifting agency dynamics between humans and intelligent technologies.

Umbrello highlights the need for interdisciplinary collaboration—particularly from sociology and related fields—better to understand the social origins and impacts of technology. He calls on designers, developers, researchers, policymakers, and consumers to work together to address the ethical challenges posed by technologies like generative AI, which increasingly operate beyond direct human oversight.

Important questions remain regarding the distribution of responsibility in techno-human systems where technology starts to exhibit agency. The book emphasizes the necessity of maintaining human accountability while adjusting to the evolving role of autonomous technologies.

Technology Ethics is a timely contribution to ethical discourse, offering a balance of theoretical insights and practical applications. It serves as a roadmap for prioritizing social equity, sustainability, and human agency in shaping our technological future, making it an essential read for academics, practitioners, and policymakers alike.

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