Chapter 11
The Future of Web Technologies and Their Implications for the Digital Society

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ABSTRACT

The development of web technology from Web 1.0 to Web 5.0 has revolutionized the way humans interact digitally, influencing identity, autonomy, employment, government, education, and culture. The modern web is now intelligent, contextual, and emotional, powered by AI, IoT, blockchain, and quantum computing. Digital identities are evolving towards decentralized models such as Self-Sovereign Identity (SSI), while governance is beginning to implement Decentralized Autonomous Organizations (DAOs). The world of work is changing through the gig economy and the token economy, although it comes with challenges in the form of digital divides and algorithmic manipulation. Education and cultural preservation are also digitized through adaptive learning and immersive technology. With this great opportunity also arises the issue of ethics, digital rights, and the need for inclusive and visionary policies. The web of the future must be not only smart, but also fair, ethical, and humane.

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1. INTRODUCTION

The rapid evolution of web technologies is reshaping the way societies function across all levels, encompassing the economic, social, cultural, political, and educational domains. The internet, once a passive tool for accessing static information, is now emerging as an intelligent, context-aware, and emotionally responsive ecosystem. From the early foundations of Web 1.0 to the current and anticipated developments of Web 4.0 and Web 5.0, the web has undergone a profound metamorphosis. This shift is not merely technical but represents a transformation in human experience and agency in the digital space. The future of the internet lies in its ability to understand, interpret, and even empathize with human intention, creating a space that is not just informative but intuitive and emotionally intelligent. This paper explains how data taken from dislocation dynamics simulations can be changed or modified using semantic web technology through data annotation with ontology (Ihsan et al., 2025)

The transition from Web 2.0 to Web 3.0, and further into Web 4.0 and Web 5.0, marks a significant progression in web capability and human-computer interaction. Web 2.0 introduced a participatory culture where users became active contributors through blogs, social media, and collaborative platforms such as Wikipedia. However, Web 3.0 expanded upon this by introducing the Semantic Web, where data is machine-readable and contextually meaningful, thus enabling personalized services, intelligent agents, and AI-driven applications. Research conducted in the long-term development of Web technology is conducted in a theoretically and empirically grounded manner (Priestley et al., 2020). Web 4.0, sometimes referred to as the "symbiotic web," is characterized by real-time decision-making capabilities using data from IoT devices, while Web 5.0 is conceptualized as an empathetic and human-centric web. Here, digital platforms not only respond to data but to the user's emotions, thoughts, and consciousness. In digital platforms, an abnormal event involves multiple data sources and complex types of information, and the difficulty of tracking it increases due to the similarity and interaction between components, operations, and user behaviour (Zhou et al., 2025).

The impact of this web evolution extends deeply into digital society. However, the next generation of Web evolution (Web 3.0) is here and shaping our lives. Web 3.0 is a decentralized Web architecture that is smarter and more secure than previous versions (Gan et al., 2023). Digital identity, for instance, has transformed from simple login credentials to complex, decentralized systems that emphasize user control and privacy. Self-Sovereign Identity (SSI) models are now enabling individuals to manage their identity data across platforms without relying on centralized authorities. This transformation aligns with the increasing emphasis on autonomy, data ownership, and digital dignity in a surveillance-prone era. Additionally, virtual and augmented reality are converging with AI to produce digital twins—virtual representations of