

# A Review of 6G and Next-Generation Internet, Under Blockchain Web3 Economy

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First received 7 November 2025. First published online 14 November 2025.

## Abstract

The sixth generation (6G) wireless cellular networks are anticipated to include the most recent advancements in network infrastructure and new technological discoveries. In addition to exploring more spectrum at high-frequency bands, it will bring together cutting-edge technical trends like blockchain, artificial intelligence (AI), and connected robotics. *6G and Next-Generation Internet: Under Blockchain Web3 Economy* by Abdeljalil Beniiche explores the human-centeredness of blockchain and Web3 economy for the 6G era. Abdeljalil Beniiche received his PhD in telecommunications from the Institut National de la Recherche Scientifique (INRS), Montréal, Canada. His research focuses on 6G networks, Tactile Internet, blockchain, information security, behavioral economics, and Society 5.0. His research findings have been published in many prestigious journals, such as *IEEE Network*, *IEEE Wireless Communications*, *IEEE Communications Magazine*, and *IEEE/OSA Journal of Optical Communications and Networking*. He has served and continues to serve on the technical program committees and is a reviewer of numerous major international conferences, journals, and magazines. Currently, he is a Security Architect in the financial industry.

DOI: 10.62478/UFGH7567

IPNS: k2k4r8l4ttvpb84u87fscelh9rqj92xuakbv0mrdd90uoei46a3ckcm2

The first chapter serves as the introduction for the rest of the book chapters. The author discusses the idea of blockchain and distributed ledger technology while providing a quick overview of the development of mobile networks and the Internet. Furthermore, the author examines earlier studies on cutting-edge blockchain technology and, after dividing them into three distinct but connected groups, goes into further depth about each. The classification's primary branches are decentralized autonomous organizations (DAO), blockchain oracles, and token engineering.

Chapter 2 investigates blockchain technologies with respect to their ability to develop new models of distributed ownership such as the Tactile Internet. The potential of blockchain technology to create novel distributed ownership models, like the Tactile Internet, is investigated. The author examines the parallels and discrepancies between the Ethereum and Bitcoin blockchains and claims Ethereum is a better blockchain platform option due to several noteworthy characteristics, including DAO, the ability to collaborate with AI and robotics, and the high compatibility with decentralized edge computing solutions. Based on the studies, the author argues that DAO creates a new hybrid type of cooperation where humans work at the periphery and automation and intelligence are at the core.

Chapter 3 mainly analyzes the potential of DAO to assist in decentralizing the Tactile Internet as a future 6G application. In order to decentralize the Tactile Internet and improve the speed and functionality of mobile applications, the author suggests utilizing blockchain technology, especially the idea of DAO. In order to accomplish this goal, a variety of approaches were proposed, including crowdsourcing human knowledge to carry out tasks that teleoperated robots find difficult to accomplish consistently as well as harnessing partially or totally decentralized end-user equipment and edge computing server solutions. Furthermore, the idea of a blockchain nudge contract was presented to enhance the decentralized DAO's

inexperienced members' ability to complete tasks. The author explains the nudge contract encourages reliable skill transfers by changing human behavior through an appropriate compensation system (rather than punishment).

In Chapter 4, the well-researched trust game of behavioral economics is examined in a blockchain setting, focusing on the significance of creating effective coordination and collaboration strategies. Following the identification of open research challenges for blockchain-enabled implementations of the trust game, the author initially generates a smart contract that puts the experimenter in the middle of the trustor-trustee relationship and experimentally shows that using deposits to increase trustworthiness and trust can result in a social efficiency of up to 100 percent. Afterwards, the author introduces an on-chaining block-chain oracle architecture for a networked N-player trust game that incorporates observers, a third class of human agents that monitor the participants' reciprocity and investment. Even in the absence of a deposit, the existence of third-party reward and penalty choices contributes to the average normalized reciprocity exceeding 80 percent. Additionally, the author concentrates on the new area of robonomics in the 6G era, which examines behavioral economics for the social integration of robots into human society as well as the socio-technical effects of blockchain technologies on social human-robot interaction. Lastly, the author empirically illustrates that mixed logical-affective persuasion tactics for social robotism considerably increase the trustees' reciprocity and credibility.

Chapter 5 explores future 6G mobile networks and their anticipated shift to become more human-centered, thereby enabling the so-called Society 5.0 vision. Further, the author builds on the recent work on robonomics in the 6G era. The author mentions robonomics investigates social human-robot interaction and its socio-technical impact as well as blockchain technologies and cryptocurrencies, not only coins but also tokens. Specifically, the author studies the tokenization process of creating tokenized digital twins of assets and access rights in the physical and digital world, paying close attention to its central role in the future Web3 and its underlying token economy, the successor of today's information and platform economies.

Enabling the so-called Society 5.0 vision, Chapter 5 examines upcoming 6G mobile networks and their expected transition to become more human-centered. The author expands on his team's recent research on robonomics in the context of 6G. Emphasizing the crucial role in the future Web3 and underlying token economy that could replace today's information and platform economies, the author examines the tokenization process of creating tokenized digital twins of assets and access rights in the physical and digital world. Following the introduction of the bottom-up multilayer token engineering framework for Society 5.0, which is based on CPSS, the author experimentally shows how purpose-driven tokens may be used to improve the collective human intelligence of a blockchain-enabled DAO. Chapter 6 wraps up the book by providing a summary of its main conclusions.

The book focuses on the Tactile Internet for increased human-to-machine interaction and places the numerous researched ideas and concepts into the context of the future Super Smart Society 5.0 by concentrating on the field of robonomics research in the 6G Era. The author critically investigates the social integration of robots into the economy and human society. This book will be invaluable for graduate students, network and blockchain researchers, professionals, engineers, and practitioners who want to explore how blockchain may function in tandem with other important technologies like artificial intelligence and robots.