Chapter 8
Smart Contracts and Web 3:
From Automated Transactions to DAOs

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ABSTRACT

This chapter delves into the burgeoning world of smart contracts and their critical role in powering decentralized autonomous organizations (DAOs). Beginning with an exploration of the logical foundations of smart contracts, it underscores the parallels between smart contract creation and traditional contract formulation, with a keen emphasis on the concept of conditional execution. It further elucidates the integral role of smart contracts in underpinning DAOs, illuminating how these automated, transparent, and immutable constructs facilitate the decentralization and autonomy of such organizations. A rigorous examination of the complex interplay between technology, law, and economy in DAO operations is also undertaken. The chapter additionally navigates the challenging regulatory landscape, drawing on international legal frameworks and proposed regulations. Throughout, it maintains a balanced perspective on the transformative potential of smart contracts and DAOs in reshaping societal structures, alongside the profound challenges their implementation presents.

INTRODUCTION

Throughout the course of human history, societies have established various organizational forms to govern societal life. The evolution of these structures, influenced by factors such as population growth, industrial revolutions, and technological advancements, has transitioned societies from autocratic regimes to diverse democratic systems. Presently, the continuous development of technology introduces a transformative influence on society, affecting governance, economic, and labor organization. Widespread

access to information, combined with the capacity for instantaneous, long-distance communication, provides new opportunities for societal cooperation and grassroots formation, independent of state control. However, for these organizations to function effectively, they need a set of privileges and operational rules. Without such rules, their activities could be confined to expressing demands, or they could be susceptible to control by a select group of individuals or a single authority.

In recent years, the emergence of blockchain technology has introduced a novel organizational form: the Decentralized Autonomous Organization (DAO). Enabled by smart contracts—computer programs that autonomously execute transactions upon predefined conditions—DAOs offer a structure where decision-making processes are automated, and rules are both transparent and immutable (Mougayar, 2016). DAOs signify a radical shift in organizational structures, echoing the transition from autocracies to democracies but now within a digital context. Considering the exponential growth of blockchain technology—evidenced by a transaction value nearing 1.4 trillion U.S. dollars in 2021 alone (Statista, 2022)—the implications of DAOs are far-reaching.

This chapter aims to present a comprehensive understanding of smart contracts and their pivotal role in the construction and operation of DAOs. Additionally, we explore the degree of autonomy these decentralized structures have from state control, a pertinent topic in an increasingly digital world. Operating on the peripheries of traditional governmental regulation, DAOs present unique challenges, including issues of legal recognition, security, governance, and user trust. Simultaneously, they provide opportunities for the reformation of societal cooperation and economic models.

By examining real-world examples and current research, we endeavor to offer a balanced perspective on DAOs and their enabling technology: smart contracts. Our goal is to promote critical thinking about the opportunities and challenges inherent to these emerging organizational forms. Such understanding is crucial in guiding the evolution of DAOs to maximize their potential, overcome challenges, and contribute positively to society. In sum, this exploration into the symbiotic relationship between smart contracts and DAOs seeks to enhance comprehension of their history, potential obstacles, and their capacity to reshape societal structures in the digital age. Such knowledge is increasingly important in a world where technology, law, economics, and sociology converge, and effectively navigating these intersections is vital for societal advancement.

SMART CONTRACTS

Smart Contract: General Information

The rise of blockchain technology has ushered in a new class of contracts, referred to as "smart contracts." These contracts are known for their inherent features of irreversibility and automation. Once activated, these contracts adhere to predetermined outcomes and resist any modifications or premature terminations, except under certain predefined conditions (Tapscott, 2016).

This section intends to outline the progressive evolution, structural design, and operational mechanisms of smart contracts. It aims to shed light on how these digital contracts interact synergistically with blockchain technology, an advanced record-keeping system that stores transactions in individual blocks (Mougayar, 2016b).

An in-depth examination of smart contracts includes exploring their practical applications across various sectors, insurance being a prime example. The implementation of blockchain technology and

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