Chapter 9
The Legal Nature of Smart Contracts:
Addressing Errors, Breach, and the Intersection of Blockchain and Contract Law

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ABSTRACT

Blockchain's smart contracts—self-executing, code-driven agreements—challenge traditional contract law by introducing immutability and coding vulnerabilities. This chapter examines whether such errors constitute breaches of contract, analyzing their classification and consequences under common and civil law frameworks. It explores the intersection of blockchain, AI, and contract law, assessing how principles like good faith, consideration, and anticipatory breach apply to automated agreements. The chapter evaluates the EU AI Act and Directive 2019/770, identifying gaps in addressing oracle failures, defective performance, and liability—especially in hybrid AI-blockchain environments. Through case studies, it argues for legal adaptation to align smart contracts with contractual intent, ensuring accountability and trust in automated systems.

1. INTRODUCTION

The dawn of the twenty-first century has witnessed transformative technologies like cloud computing (Qian et al., 2009), big data (Bhadani & Jothimani, 2016), the

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Internet of Things (Weber & Weber, 2010), augmented reality (Bezbakh & Frolova, 2021), and blockchain profoundly reshaping the data-driven economy (Batte, 2025). Among these, blockchain—originally conceived as the foundation for cryptocurrencies like Bitcoin—has evolved into a standalone innovation with far-reaching potential (Bolotaeva et al., 2019). Governments and corporations globally are actively exploring its applications beyond digital currencies, with one of the most promising implementations being the creation of fully automated "smart" contracts (Bocek & Stiller, 2017). These self-executing agreements, designed to operate without human intervention, promise to revolutionize transactional efficiency and trust across diverse sectors, from supply chains to legal frameworks, by embedding immutable, transparent logic into digital interactions (Savelyev, 2017).

Contracts play a central role in regulating market relationships and are therefore of indispensable importance to societies and economic markets (Farnsworth, 2016). As a result, contract law has become perhaps the most significant system of private law (Pratt, 1988), continually evolving to adapt to the emergence of new contract models. In today's world, where the Fourth Industrial Revolution is permeating nearly all sectors, contract law faces the challenge of digitalization. Alongside the analysis of big data and artificial intelligence (AI), the new challenge of smart contracts paves the way for a new era in the formation and execution of contracts (Kanellos, 2023), marking a significant shift in broader legal systems.

Smart contracts are traditionally defined as programs that operate on blockchain technology, requiring a decentralized virtual machine capable of programming and data processing (Destefanis et al., 2018). Consequently, the intersection of artificial intelligence and contract law represents one of the most significant challenges facing contemporary legal systems. Blockchain technology is often heralded as one of the most disruptive technologies of our time. While previous research has addressed errors in smart contracts and their treatment under traditional contract law frameworks, the broader implications of AI integration into contractual relationships remain underexplored.

While smart contracts could make numerous transactions cheaper and more efficient, parties must consider that redress in the face of bugs and errors could render the contract inoperable. In a speech on financial technology, Lord Hodge of the UK Supreme Court made the following comments:

> *"But the law has to address how to provide a remedy if contractual consent has been vitiated, for example, by misrepresentation or fraud. Smart contracts are self-executing as the terms of the agreement between a buyer and a seller are written into lines of code which exist in a blockchain. When the coded conditions are met, a product is released or a payment made. No-one, including a court, can stop the performance of a smart contract. The courts will not be able to cancel the performance of the contract. But a remedy may lie in the law of unjust*