

THE ROLE OF CRYPTOCURRENCIES AND BLOCKCHAIN IN THE MODERN ECONOMY

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Annotation. This article is devoted to the contribution of cryptocurrencies and blockchain to the transformation of the world economy. It describes the basic principles of blockchain functioning, the evolution of major cryptocurrencies such as Bitcoin and Ethereum, as well as their practical application in the areas of decentralized finance, cross-border payments, and supply chain management. The study also analyzes the advantages of these technologies and their current limitations.

Keywords: cryptocurrencies, blockchain, DeFi, Bitcoin, Ethereum, smart contracts, stablecoins

Introduction. In the modern digital economy, new technologies are actively developing. One of the main innovations of the 21st century is blockchain technology. This technology was introduced by the anonymous creator Satoshi Nakamoto in 2008 in the document “Bitcoin: A Peer-to-Peer Electronic Cash System”. Blockchain is a decentralized distributed ledger that stores transactions in a transparent and immutable way. Cryptocurrencies represent digital assets based on blockchain networks [1].

These technologies allow users to avoid intermediaries and reduce costs. Their role is not limited to speculative trading: they find application in banking, trade, and management. The purpose of this article is to analyze the impact of cryptocurrencies and blockchain on economic efficiency, identify the main trends in their implementation, and assess the prospects for development in the context of modern challenges.

Main part. Blockchain operates as a chain of blocks, where each block contains a set of verified transactions, a cryptographic hash of the previous block, and a timestamp. This mechanism ensures that changing one block requires changing all subsequent ones. Consensus mechanisms, such as Proof-of-Work or Proof-of-Stake, allow network participants to agree on the validity of transactions without a central intermediary [1, 2].

Launched in 2009, Bitcoin remains the main cryptocurrency. One of Bitcoin’s distinctive features is its fixed maximum supply [1]. Ethereum, launched in 2015, supports smart contracts. Smart contracts are self-executing agreements that automatically execute when predefined conditions are met [2]. This technology forms the basis of decentralized finance (DeFi) and decentralized applications (dApps).

A critical evolution has been the emergence of stablecoins. Designed to solve the high volatility of assets like Bitcoin, these tokens are pegged to stable reserves, most commonly the US dollar. By maintaining a consistent value, they serve as a crucial bridge between traditional fiat currencies and the blockchain economy. This allows users in unstable economies to protect themselves from inflation by holding a dollar-pegged asset. However, this dual nature also exposes holders to a «double shock» risk: a stablecoin can lose value not only if its underlying fiat reserve collapses, but also if the crypto market experiences a crash or a technical failure of the issuing platform [5].

In the modern economy, cryptocurrencies play several key roles. First, they have made money transfers simpler and more accessible. Traditional money transfers can take 3–5 days and cost 5–7% in fees [3]. Crypto solutions, such as stablecoins or the Lightning Network for Bitcoin, allow almost instant transfers with low fees.

Second, blockchain increases transparency and efficiency in logistics chains and trade finance. Many large companies, such as BMW, use blockchain in logistics [4]. All stages – production, delivery, customs clearance – are recorded immutably, which reduces fraud, bureaucracy, and conflicts. This leads to faster customs clearance and lower operating costs.

Third, decentralized finance (DeFi) is capable of challenging traditional banking. As analysts of the Bank for International Settlements note, DeFi platforms such as Aave and Uniswap demonstrate steady growth, providing lending and trading without traditional intermediaries, which creates both new opportunities and possible risks for financial stability [5]. A key metric for this sector is the Total Value Locked (TVL), which represents the total assets deposited in DeFi protocols. As shown in Figure 1, the TVL has seen significant expansion, underscoring the sector's rapid growth [8].

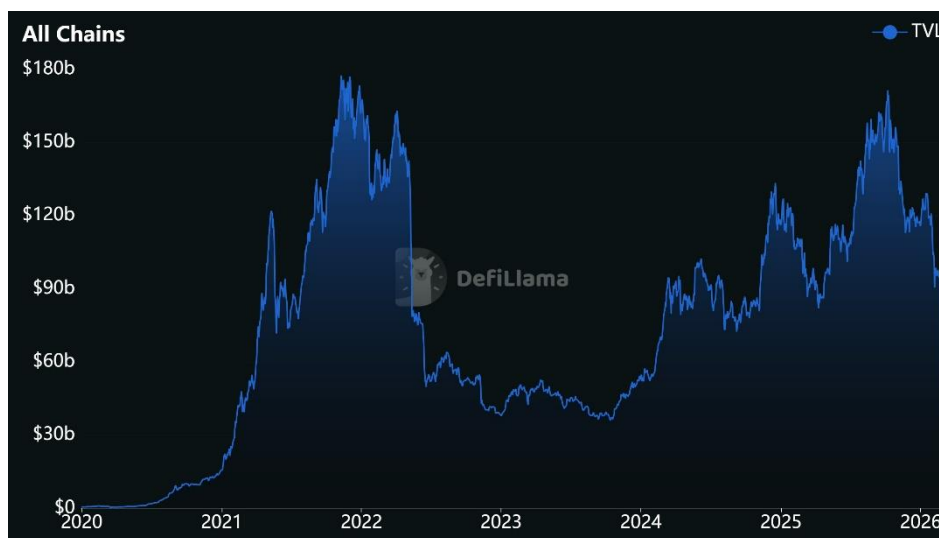


Figure 1 – Total Value Locked in DeFi, billion USD, 2020–2026.

However, blockchain and cryptocurrencies also bring new problems. Security risks, including exchange hacks and smart contract vulnerabilities, have led to losses of billions of dollars [6]. In addition, the pseudonymous nature of transactions raises concerns about money laundering and illegal financial activities, which prompts government regulators to introduce stricter “Know Your Customer” and anti-money laundering requirements [7].

Conclusion. The application of cryptocurrencies and blockchain has already significantly changed the modern economy. As technologies develop, blockchain will strengthen its role in logistics, and DeFi will pose an increasingly serious competition to traditional banks. However, further growth requires both improvements in security and legal reforms that can ensure the stability of the cryptocurrency market.

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