

# Prospects for applying decentralized finance as a growth factor for population welfare in the post-soviet countries

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**Abstract:** The author puts forward the idea that decentralized finance doesn't act without managerial influence. The management moves from the external circuit to the internal one, there occurs self-ruling and "self-regulation" of the financial system. This indicates the appearance of a new type of financial intermediation—a cyber-social one. The potential of using decentralized finance in post-Soviet countries are formulated the following: freeing up the time of transaction participants due to the autonomy of transactions; a superior degree of information security compared to traditional forms of financial intermediation; financial intermediation cost saving, freeing up human resources; reduction in the speed of transactions; increasing accuracy in contractual relations due to the elimination of the human factor influence; stimulating the development of new business areas expands the competitive environment; information safety due to the constant creation of a large number of backup copies. At the same time, the author identified and substantiated the risks associated with decentralized financial flows, which may have an impact on the well-being of the population of post-Soviet countries. The purpose of this study is to determine the prospects for applying decentralized finance as a growth factor in the well-being of the population in post-Soviet countries.

**Keywords:** decentralized finance; blockchain technologies; smart contracts; public welfare; cryptocurrencies; decentralized autonomous organizations

## 1. Introduction

The development of financial intermediation is impossible without the use of modern technologies. This is already an indisputable reality since information relationships have already entered into modern reality. The problem is the speed and efficiency of using these technologies, including the financial flow management and the risks of centralized regulation of the financial market. For the developing economies of post-Soviet countries, the digital transformation of financial system management is difficult due to the lack of qualified personnel and the necessary software and hardware, weak financial capabilities, and other related problems. However, on the other hand, due to the ongoing modernization processes, which are an integral feature of the developing economic system, deep transformations of the management structure of the financial system will not be required. The difference between the management structure of the financial system of a developing economy is its flexibility, which makes it possible to accelerate the implementation of innovations, including blockchain technologies and smart contracts.

How can decentralized finance (DeFi) transform financial systems in post-Soviet economies, considering both opportunities and risks?

This research question is pertinent to the broader discourse on the potential of blockchain technology and decentralized finance to revolutionize financial intermediation. Scholars such as Tapscott (2018), Massias et al. (2019), Lee and Deng (2017) have highlighted the transformative potential of blockchain in creating transparent, efficient, and democratic financial systems. The integration of blockchain and smart contracts promises to redefine trust among counterparties, reduce transaction costs, and mitigate corruption. However, this transformative potential must be examined within the specific socio-economic contexts of post-Soviet economies, where digital transformation faces unique challenges and opportunities. Casey and Vigna (2018) discuss how blockchain technology can provide transparency and reduce corruption in financial systems by creating an immutable and transparent ledger of transactions. Catalini and Gans (2016), Pilkington (2016) explores how blockchain technology can reduce transaction costs and create more efficient and transparent markets. The authors discuss how blockchain can disintermediate financial services, leading to cost savings and improved market functioning.

Researchers note that blockchain and smart contracts are the basis of the new digital economy; with the help of these technologies, financial intermediation is being transformed in the sphere of establishing trust among counterparties.

A specialist in the field of digital economic technologies, D. Tapscott, in his work of “Blockchain Revolution” noted that the possibilities of the new tools in the financial sector are almost limitless from creating a financial market with zero costs, to the complete eradication of corruption and the implementation of democracy for the world population (Tapscott and Tapscott, 2018).

This paper aims to explore these possibilities within the context of post-Soviet economies, analyzing the technological, economic, and socio-political factors that influence the adoption and impact of DeFi.

In this study, we will:

- Examine the theoretical frameworks relevant to understanding the impact of DeFi.
- Analyze the technological and economic essentials of DeFi.
- Discuss the advantages and risks associated with DeFi, particularly in post-Soviet economies.
- Explore the implications of these findings for the future of financial intermediation in these regions.

By addressing these points, the research will contribute to a nuanced understanding of how DeFi can reshape financial systems, offering insights into both the potential benefits and the inherent risks. This is crucial for policymakers, financial institutions, and technology developers aiming to leverage DeFi for economic development in post-Soviet countries.

## **2. Materials and methods**

The methodological basis of the study is dialectics, institutional theory, system analysis, and a set of methods of financial and economic research.

To understand how decentralized finance (DeFi) can transform financial systems in post-Soviet economies, we must examine several theoretical frameworks. These frameworks provide insights into the dynamics of financial intermediation, the role of

innovation, and the mechanisms through which technological advancements impact economic systems.

Institutional theory examines the role of institutions—established laws, norms, and practices—in shaping economic behavior and outcomes. It highlights how financial systems are embedded within broader institutional contexts, which influence their development and functioning.

In post-Soviet economies, the institutional context is crucial for understanding the adoption of DeFi. The legacy of centralized financial systems and the regulatory environment will significantly impact how DeFi technologies are implemented and integrated into existing financial structures.

System analysis involves studying complex systems by examining the interactions and interdependencies of their components. It is particularly useful for understanding how different elements of a financial system work together to produce overall outcomes.

DeFi introduces new components (e.g., blockchain, smart contracts) into the financial system. System analysis helps in understanding how these components interact with traditional financial intermediaries, potentially transforming the entire financial ecosystem in post-Soviet economies.

A problem has been identified, consisting in the insufficiency of the theoretical and methodological justification for the activities of modern financial intermediaries based on existing theories.

Schumpeter's (2007) concept of "new combinations" refers to the creation of new products, processes, or business models that drive economic development. Innovation is seen as a key driver of economic change and growth. DeFi represents a "new combination" in financial intermediation. By offering innovative solutions such as decentralized exchanges and smart contracts, DeFi has the potential to disrupt traditional financial systems, fostering economic development in post-Soviet economies.

The neoclassical theory of the firm (Bell, 1999; Clark, 1961; Klein, 1961) focuses on how firms make decisions to maximize profits given their production functions and market conditions. It emphasizes efficiency and cost-minimization. DeFi can impact the efficiency and cost structures of financial intermediation. By reducing transaction costs and improving transparency, DeFi technologies can align with the profit-maximizing goals of financial firms, potentially enhancing their competitiveness.

Portfolio theory, developed by Markowitz (1952), Cohen (1967), Sharp (1970), deals with the optimization of investment portfolios by balancing risk and return. It introduces the concept of diversification to minimize risk. DeFi offers new avenues for diversification through decentralized financial instruments. Understanding portfolio theory helps in analyzing how investors can leverage DeFi to optimize their investment strategies and manage risks more effectively.

This classical theory of financial intermediation by Gurley and Shaw (1960), Tobin and Brainard (1963) focuses on the role of financial intermediaries in facilitating transactions between savers and borrowers. It highlights the importance of reducing transaction costs and information asymmetries. DeFi challenges the traditional role of financial intermediaries by enabling direct transactions between parties. Analyzing this shift through the lens of classical financial intermediation

theory provides insights into how DeFi can alter financial dynamics in post-Soviet economies.

Transaction approach by Benston and Smith (1976) examines the costs associated with economic exchanges, including search and information costs, bargaining costs, and enforcement costs. Reducing these costs can improve economic efficiency. DeFi technologies aim to reduce transaction costs through automation and decentralization. Understanding the transaction cost approach helps in assessing the efficiency gains that DeFi can bring to the financial systems of post-Soviet economies.

Akerlof's (1970) information approach, particularly his work on the market for "lemons", explores how information asymmetries can lead to market failures. It underscores the importance of transparency and trust in economic transactions. DeFi's promise of increased transparency and trust aligns with the information approach. By reducing information asymmetries, DeFi can improve market functioning and trust in financial transactions.

The Diamond-Dybvig (Diamond and Dybvig, 1983) concepts of liquidity provision explain how banks run and the role of liquidity provision in preventing them. It emphasizes the importance of stable financial intermediaries in maintaining economic stability. DeFi introduces new mechanisms for liquidity provision that differ from traditional banking. Analyzing DeFi through the Diamond-Dybvig model helps in understanding its potential to enhance financial stability or introduce new risks in post-Soviet economies.

Risk management concepts of the Worthan School at the University of Pennsylvania focus on identifying, assessing, and managing financial risks. They include tools and frameworks for mitigating risks in financial operations. DeFi comes with its own set of risks, including technological, regulatory, and market risks. Applying risk management concepts helps in evaluating how these risks can be mitigated to ensure the successful implementation of DeFi.

By integrating these theoretical frameworks, this paper will analyze how DeFi can transform financial systems in post-Soviet economies. Each framework provides a unique lens to understand the opportunities and risks associated with DeFi, offering a comprehensive approach to addressing the research question. This analysis will contribute to a nuanced understanding of DeFi's potential impact, guiding policymakers, financial institutions, and technology developers in leveraging DeFi for economic development in these regions.

The author substantiates his own digital (cyber-social) approach in the theory of financial intermediaries. The methodological apparatus that the author's model was designed includes tools related to post-neoclassical science, which includes value-target structures, social institutions, complex systems of a qualitatively new order (cyber-social systems, objects of genetic engineering, etc.). It integrates elements from institutional theory, system analysis, and digital economic frameworks to understand how digital technologies, specifically blockchain and decentralized finance (DeFi), reshape social and economic structures. This methodology involves the active involvement of synergetic and thermodynamic methods in the research technology. This approach considers how technological innovations interact with social institutions and regulatory environments to produce new forms of financial intermediation and economic coordination.

Post-Soviet economies are characterized by unique institutional legacies and regulatory environments. Understanding how these institutions interact with and adapt to DeFi technologies is crucial for analyzing their potential impact.

The cyber-social theory allows for a detailed examination of the institutional barriers and facilitators of DeFi adoption, providing insights into how regulatory frameworks and institutional trust can be built around decentralized technologies.

Operationalizing the cyber-social approach involves:

1) Mapping out institutional barriers and facilitators for DeFi adoption in post-Soviet economies.

2) Analyzing the interaction between traditional financial intermediaries and DeFi technologies.

3) Evaluating the socio-economic impact of DeFi through case studies and empirical data.

4) Developing policy recommendations to foster a supportive environment for DeFi.

By integrating these theoretical frameworks, this paper will analyze how DeFi can transform financial systems in post-Soviet economies. Each framework provides a unique lens to understand the opportunities and risks associated with DeFi, offering a comprehensive approach to addressing the research question.

Financial systems in post-Soviet economies are often complex, with various interdependencies and interactions between traditional and emerging financial entities.

System analysis within the cyber-social framework helps to map out these complexities and understand how DeFi can be integrated into existing financial infrastructures, potentially transforming them into more efficient and transparent systems.

Post-Soviet economies are undergoing rapid digital transformation, with increasing interest in blockchain and related technologies as tools for modernization and economic development.

The digital economic component of the cyber-social theory is particularly relevant here, as it provides a lens to study how DeFi technologies can drive innovation, reduce transaction costs, and improve financial inclusion and efficiency.

The transition from centrally planned to market economies in post-Soviet states involves significant socio-economic changes. DeFi offers new opportunities for economic participation and financial democratization.

The cyber-social approach addresses the social dimensions of technological adoption, exploring how DeFi can empower individuals and communities by providing access to financial services previously unavailable to them.

DeFi inherently challenges traditional regulatory frameworks, which can be particularly rigid in post-Soviet contexts. The balance between innovation and regulation is a critical issue.

By applying institutional theory, the cyber-social framework can help analyze potential regulatory responses and develop strategies for creating supportive environments for DeFi while ensuring consumer protection and financial stability.

The cyber-social theoretical framework is well-suited for analyzing DeFi in post-Soviet economies due to its comprehensive approach that integrates institutional, systemic, and digital economic perspectives. It provides a robust structure for

examining the multifaceted interactions between technology, institutions, and socio-economic contexts, offering valuable insights into the transformative potential and challenges of DeFi in these regions. By using this framework, the analysis can address the specificities of post-Soviet economic systems and contribute to a nuanced understanding of how DeFi can drive economic modernization and financial inclusion.

### **3. Results and discussion**

The dissolution of the Soviet Union in 1991 led to the appearance of multiple independent states, each transitioning from centrally planned economies to market-oriented systems. This transition was marked by significant political, economic, and social upheavals, as newly independent countries grappled with the challenges of establishing democratic institutions, market economies, and integrating into the global economic system. A key issue in post-Soviet economies is the lack of trust in financial institutions. Historical experiences of economic instability, corruption, and the failure of state-run financial entities have left a lasting legacy of skepticism towards centralized financial systems. This distrust improves the opportunity structure for DeFi, as it offers a decentralized alternative that can potentially bypass traditional financial intermediaries. A study of changes in the economy and especially its financial sphere and the impact of these changes on the well-being of the population is given in the work of Turyan (2023a, 2023b). Magyar and Madlovics (2020) work provides an in-depth exploration of the political, economic, and social structures that emerged in post-communist countries following the collapse of the Soviet Union and its satellite states. Additionally, research by scholars like Casey and Vigna (2018) and Catalini and Gans (2016) provides a foundation for understanding how blockchain technology and DeFi can offer transparency and trust, which are crucial in these contexts.

The immediate aftermath of the Soviet collapse saw severe economic contractions across the region. GDP fell sharply, industrial output declined, and inflation soared as state-controlled pricing mechanisms were dismantled. Privatization of state-owned enterprises was a common strategy, though often executed rapidly and without adequate regulatory frameworks, leading to widespread corruption and the concentration of wealth among a few individuals (oligarchs).

Post-Soviet states adopted various economic reforms aimed at stabilizing and liberalizing their economies (price liberalization, currency stabilization, and the establishment of private property rights). International financial institutions like the IMF and World Bank played significant roles, providing financial assistance and policy advice, though their prescriptions were sometimes criticized for being too strict.

The paths of post-Soviet economies have varied widely. Some countries, like the Baltic states (Estonia, Latvia, Lithuania), rapidly integrated into European and global markets, achieving significant economic growth and stability. Others, such as Russia and Ukraine, experienced more turbulent transitions with periods of economic growth interspersed with financial crises and political instability. Central Asian states and some Eastern European countries also faced unique challenges, often influenced by their geopolitical positions and resource endowments.

The initial post-independence period saw attempts to establish democratic governance structures. However, the success of these efforts varied significantly. While some countries made significant strides towards democracy, others experienced setbacks, with the emergence of authoritarian regimes or hybrid political systems combining elements of democracy and authoritarianism.

Corruption has been a pervasive issue across the region, undermining economic development and public trust in institutions. Weak governance structures and the legacy of centralized control have hindered the establishment of transparent and accountable systems. Efforts to combat corruption have been inconsistent, with some countries implementing significant reforms and others lagging behind.

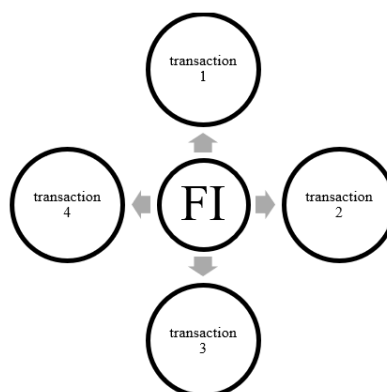
The geopolitical landscape of the post-Soviet space is complex, with various countries navigating relationships with major powers such as Russia, the European Union, and the United States. Regional conflicts and security concerns, such as the ongoing military operation in Ukraine, have also shaped the political-economic environment.

The transition to market economies has often exacerbated income inequality, with significant disparities between different regions and social groups. Poverty rates remain high in many post-Soviet states, particularly in rural areas and among vulnerable populations. Aging infrastructure and inadequate investment in public services like healthcare and education have impeded economic development. The brain drain phenomenon, where skilled workers emigrate in search of better opportunities, has further weakened human capital in the region. Many post-Soviet economies remain heavily reliant on specific sectors, such as energy exports in Russia and Kazakhstan or agriculture in Ukraine. This lack of diversification makes them vulnerable to external shocks.

Some of the consequences of the above is a change in the nature, content and instruments of savings (investments). The imposed sanctions and distrust (fear of losses and expropriations) of the population towards classical financial institutions and instruments (banks, bonds, shares, etc.) lead to the abandonment of the dollar and the use of the yuan as a means of payment (in international trade transactions). Interest has arisen in alternative investments and in the field of decentralized finance as possible substitutes for money. There has been growing interest in leveraging digital technologies to spur economic development and modernization. Blockchain and decentralized finance (DeFi) are seen as potential tools for increasing transparency, reducing transaction costs, and enhancing financial inclusion. Several post-Soviet states have shown significant interest in cryptocurrencies and blockchain technologies. Factors driving this include distrust in traditional financial institutions, the need for financial inclusion, and the desire to attract foreign investment. Regulatory approaches to crypto and blockchain vary widely, with some countries adopting supportive policies and others maintaining restrictive stances. The region's unique historical context, diverse economic trajectories, and ongoing challenges provide a complex backdrop against which the adoption and implementation of DeFi technologies must be evaluated.

### 3.1. Key differences between DeFi and CeFi and the technological and economic essentials of DeFi

The scheme of transactions carried out centrally through a financial intermediary (FI) is presented in **Figure 1**.



**Figure 1.** Scheme of centralized finance.

The key characteristics of centralized finance are:

- **Central Authority:** A central organization controls the network, making decisions, and managing operations.
- **Regulation and Compliance:** CeFi entities must comply with regulatory requirements and standards set by financial authorities, ensuring legal and security safeguards.
- **Custodial Services:** In CeFi, the central institution holds and manages user funds, offering services like custodial wallets and insurance protections.
- **User Accessibility:** Access to services may be restricted based on geographical location, regulatory status, and user verification processes (KYC/AML).

The historical and economic consequence of the above characteristics and their impact on financial relations is:

- **Regulatory oversight.** CeFi businesses are subject to strict regulatory requirements to ensure a certain level of safety and consumer protection.
- **Trust and reliability.** Centralized institutions often have reputation and trust among users, which provides trust in their services.
- **User experience.** CeFi platforms typically offer user-friendly interfaces and customer support, improving the overall user experience.
- **Limitations:** CeFi may be less inclusive due to regulatory barriers, higher transaction costs, and potential censorship or restriction of user activity.

The financial intermediary in this case plays the role of a guarantor of the transaction, for example, the bank checks the balances in the payer's accounts before carrying out the transaction. A financial intermediary allows you to solve the problem of so-called "double spending" or double expenses associated with the lack of funds for payments.

Using a financial intermediary has certain risks in a centralized finance system:

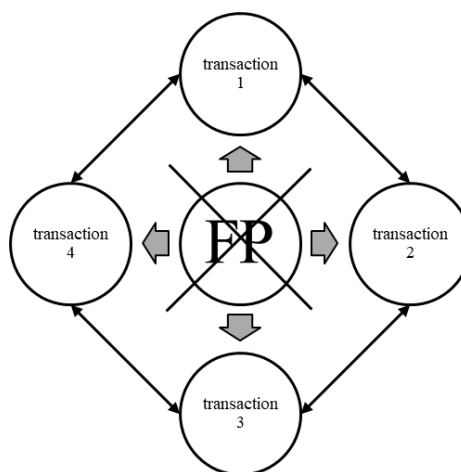
- the need to pay for services,
- the possibility of information leakage,



- fraud and theft of money from accounts,
- problems with the liquidity of the intermediary itself, which occurs in the event of bankruptcy of a credit institution.

An increase in the speed of transactions and the complexity of their determination, which is associated with the peculiarities of the technology for conducting transactions in a particular bank.

The mentioned risks can be reduced by using a blockchain, which is illustrated in the transaction diagram below (**Figure 2**).



**Figure 2.** Scheme of decentralized finance.

The key characteristics of DeFi can be called (note that due to the short historical and economic application of DeFi, each individual manifestation has its own characteristics and can deviate greatly from the norm, which in turn has not yet been fully formed):

- Decentralization: No central authority controls the network. Instead, transactions and operations are managed by a distributed network of nodes.
- Transparency: All transactions are recorded on a public ledger (blockchain), which is accessible to anyone. This ensures transparency and reduces the risk of fraud.
- Smart Contracts: Automated contracts that execute transactions based on predefined conditions, eliminating the need for manual intervention.
- Open Access: Anyone with an internet connection can access DeFi services without requiring permission from a central authority.

The forms of DeFi operations can be divided into:

- Lending and Borrowing: Platforms like Aave and Compound allow users to lend their crypto assets and earn interest or borrow assets by providing collateral.
- Decentralized Exchanges (DEXs): Platforms such as Uniswap and SushiSwap facilitate the trading of cryptocurrencies directly between users without an intermediary.
- Yield Farming and Staking: Users can earn rewards by providing liquidity to DeFi protocols or staking their assets in certain platforms.
- Tokenization: Assets, including real-world assets, can be tokenized and traded on the blockchain.

In contrast to CeFi, the influence of Defi characteristics on financial relations can be subdivided as follows:

- Financial Inclusion: DeFi provides financial services to individuals who are unbanked or underbanked, offering them access to a broader range of financial tools.
- Cost Efficiency: By removing intermediaries, DeFi reduces transaction costs and increases the efficiency of financial services.
- Innovation and Flexibility: DeFi fosters innovation through open-source protocols, allowing developers to create new financial products and services.
- Risks: The nascent stage of DeFi also presents risks, including smart contract vulnerabilities, regulatory uncertainty, and potential market manipulation.

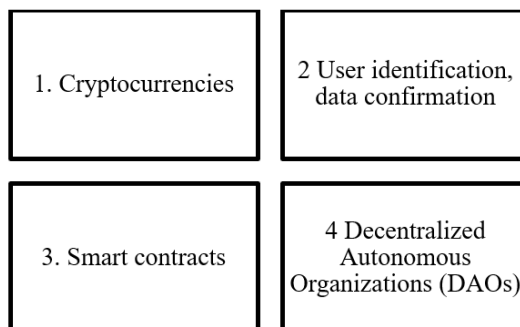
Blockchain makes financial transactions more efficient due to increased reliability, consistency, and immutability of transactions (Bocek and Stiller, 2018).

Interestingly, blockchain technologies are the essential competitors of financial intermediation in its classical sense. Blockchain technologies eliminate the central core from managing financial flows. The information accumulated in the traditional version by the financial intermediary, which was acting as the main controller of the transaction, becomes scattered and gets distributed among blocks of many participants in the system.

Such a mechanism is the opposite of the classical understanding of the essence of the financial market and the needs to accumulate data to improve the efficiency of financial flow management. The role of traditional financial intermediaries, as is shown in the first chapter of this study, is to control and manage the financial flows, which reduces the financial system's risks. At a first glance, it may seem that under the conditions of decentralization of finance, financial flows become unmanageable and uncontrollable. However, according to the author, this is not entirely true.

On the other hand, decentralized finance is not without managerial influence; it is carried out, not by a person, but by a program. Management moves from the external circuit to the internal circuit; financial system self-ruling and "self-regulation" occurs. A reasonable enquiry is about the opportunities and risks of such self-regulation, that impacts on the decentralization of the financial system, and on the well-being of the population. Next, the author will formulate his own position on these issues.

**Figure 3** shows the areas of using blockchain technologies.



**Figure 3.** Directions for using blockchain technologies.

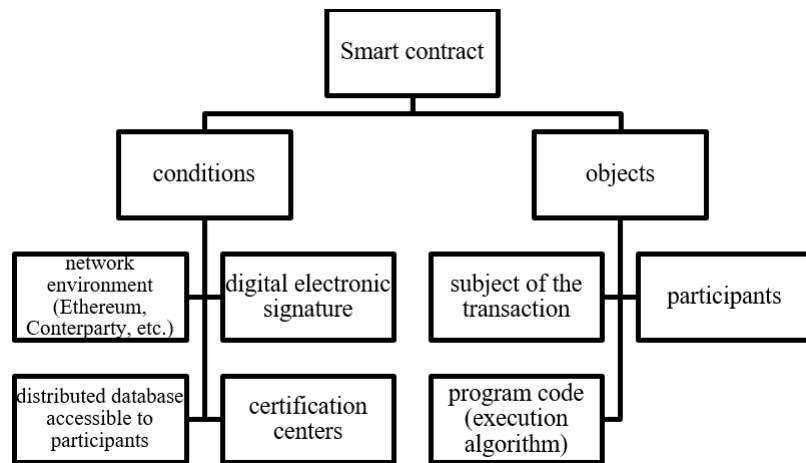
Another modern technology that can change the structure of the financial market

with the help of decentralized finance is “smart contracts” or “intelligent” contracts. The author of the particular technology is Nick Szabo, who in 1994 put forward the idea of conducting transactions by digitally representing a set of obligations between the parties, including a protocol for their execution (Szabo, 1994). In the nineties of the last century, it was technically impossible to carry out such transactions; an automated mechanism became available with the introduction of blockchain technologies.

A common example of using such technology at the present stage is auto payments, used for housing and communal services. With this type of transaction, the financial intermediaries are eliminated; they are replaced by software codes. Such a contract makes available the transactions to be carried out automatically, based on program code with the immutability characteristics (Szczerbowski, 2017). A distinctive feature of a smart contract is self-execution and self-sufficiency (Cornell and Werbach, 2017), which initially excludes traditional mediation in this form of relationship.

There is also a narrower understanding of a smart contract, which is set out in an analytical review prepared by the Central Bank of the Russian Federation (2018), where the implementation of a vending service—getting coffee from a machine—is given as an example of a smart contract. This study uses an expanded understanding of smart contracts, including the use of blockchain technologies.

The conditions and objects of a smart contract as integral components of its implementation are shown in **Figure 4**.



**Figure 4.** Components of a smart contract.

Another important characteristic of a smart contract is the use of a programming language for its implementation (Oleynik, 2018). The execution of such a contract occurs using cyber means, at the same time, it mediates relationships between people, hence we can say that smart contracts are a type of cyber-social technologies. The program acts as a financial intermediary.

Smart contracts in most cases are developed by using the Solidity language, through which the code is converted into Ethereum bytecode, and subsequently it is transformed into a transaction to which an address is assigned (Zakharkina, 2020). The language Vyper is used as well, which has a simpler technology of practice (Fedoseev,

2021).

We consider the most understandable and applicable definition of a smart contract to the financial sector to be its interpretation as an algorithm, that operates based on blockchain technologies and ensures compliance with the terms of the agreement (Genkin and Mavrina, 2017).

Smart contracts also reduce all types of risks associated with the use of centralized schemes.

Supply management shows an example of the joint use of blockchain technologies and smart contracts:

- data, related to the movement of goods, is stored on the blockchain platform;
- the smart contract ensures compliance with all conditions.

The consulting company McKinsey notes that the use of new digital technologies allows banks to increase their ROE by 4 percentage points (Dietz et al., 2017).

The areas of practicing the smart contracts as an element of financial intermediation can be grouped as follows:

a) insurance services (insurance accounting and document flow, processing of insurance claims, payment of insurance compensation in typical cases, for example, automatic compensation to customers for delayed flights based on the experience of the AXA company) (Ponomarchenko, 2022),

b) banking sector (automation of settlement processes, lending to small businesses),

c) interbank settlements similar to the SWIFT system (Biella and Zinetti, 2016),

d) settlement and clearing schemes (Grebinkina and Zubarev, 2018),

e) operations with digital assets (cryptocurrencies, tokens),

f) financial services (exchange trading, auctions, etc.).

The use of smart contracts in some cases, for instance, when concluding mortgage transactions, can eliminate the inclusion of a commercial bank as a counterparty in the agreement.

The huge potential of smart contracts in the insurance industry is actively discussed in the scientific literature (Nesterova and Kulikova, 2023; Truntsevsky and Sebalnev, 2020), the prospects for using smart contracts in health insurance, auto insurance, cargo insurance, accident insurance, and natural disasters are considered. It is difficult to disagree with this opinion, since insurance involves a large amount of paperwork, which, by automating it, can dramatically reduce operating costs.

The essence of using smart contracts as an element of financial intermediation is the digitalization of some operations within the framework of the main contract. In the future, such technologies may make it possible to abandon paper contracts. Smart contracts will act as a guarantor of the fulfillment of obligations independently.

A promising area for using smart contracts is the “sharing economy”. An example of this trend is the use of “access tokens” when renting a car or scooter.

The real estate sector represents a wide field for the use of smart contracts, with the help of which it is possible to carry out processes related to the registration of real estate automatically after approval of a mortgage loan.

### **3.2. Economic and population-inclusive advantages of DeFi**

Smart contracts, by their nature, influence the financial intermediation market by changing the mechanism for ensuring trust between the intermediaries. In the traditional version, the qualifications of intermediaries are certified through audit, licensing, and corporate governance control. Such control mechanisms have their limitations associated with insufficient qualifications of auditors, deliberate actions of the persons being audited to conceal important information, the risk of information leakage, etc. Smart contracts are free of such restrictions due to their characteristics that distinguish them from traditional mechanisms:

- cryptographic means ensure the integrity and reliability of data.
- transaction confirmation is distributed among many participants, which reduces the possibility of fraud.
- the authenticity of the transaction is ensured by a cryptographic signature.

For banks, the advantages of smart contracts are revealed in the following areas:

- expansion of the geography of remote service.
- reducing the importance of opening a branch network.
- wide competitive opportunities for small banking structures.
- increasing operational efficiency due to reduction in operating costs.

Based on the results of the review of the opportunities provided by blockchain and smart contract technologies, it is keen to note that the use of those tools can increase the satisfaction of citizens due to the “engagement effect”, which was corroborated in the previous part of the study. A smart contract allows you to avoid dependence on contacts with intermediaries and eliminates the need for online and offline communications. The “human factor” is eliminated, which mediates the risk of errors and subjective judgments when managing financial flows centrally.

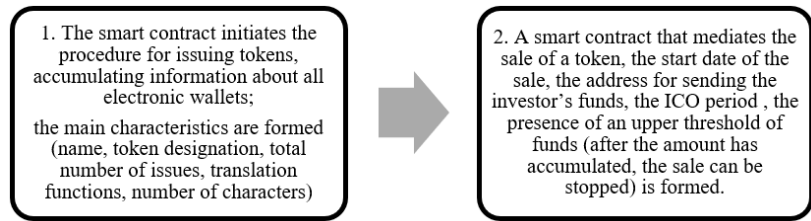
The use of automatic verification through smart contracts allows you to significantly save on costs, in addition, the costs of creating a network are also reduced (Catalini and Gans, 2016).

An important advantage of smart contracts is also the immutability of the records that make up the contractual terms (Buterin, 2014).

A promising area for the use of smart contracts is the initial placement of digital tokens (ICO—initial coin offering). ICO is a special way to attract investment resources. As defined by the Central Bank of the Russian Federation, a digital token is a cryptographically secure confirmation of the owner’s rights to receive values or the ability to perform agreed functions. ICOs are produced by companies primarily based on the use of distributed registries; after release, tokens can be sold to any buyers. The token issuer receives the investment. The issued tokens can be used to receive services, exchange for other tokens or fiat currency.

An ICO can be carried out in two stages (using two contracts); this scheme is used when issuing tokens on the Ethereum platform—**Figure 5**.

Another form of using blockchain technologies in financial management is decentralized autonomous organizations (DAOs), created using blockchain, which make it possible to distribute corporate rights and manage assets (Lopp, 2014), logistics (Rizzo, 2016), to form global value chains (Kirillov, 2021).

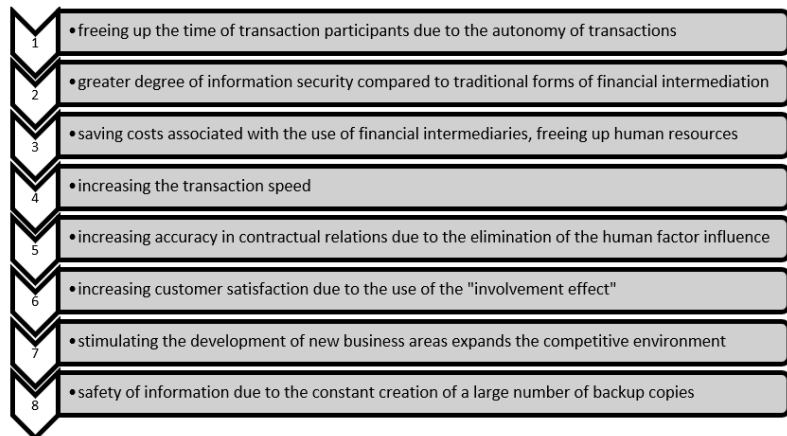


**Figure 5.** Scheme of conducting ICO on the Ethereum platform

Source: Bank of Russia, 2018.

The main characteristic of a DAO is the presence of an internal unit of account—a token. It is interesting to compare DAO with collective farms in the USSR or Chinese communes (Kirillov, 2021). Within the company, tokens have all the functions inherent in money, and, in addition, they are motivators for effective work and an element of “profit sharing.” Within the DAO, interactions are secured not by labor agreements, but by smart contracts. In connection with the activities of DAOs, a form of investment is developing called “farming”, which involves blocking investor funds in escrow accounts on the blockchain. Interest income from such a deposit goes to finance projects. The investor can return funds to his account at any time. Thus, the loss of investor in business will be equal to the amount of inflation. Management in the DAO is carried out depending on the availability of votes, which are determined in proportion to the invested funds.

Accordingly, we can group the main advantages of using smart contracts as follows (Figure 6).



**Figure 6.** Possibilities of blockchain technologies and smart contracts in managing financial flows and risks associated with centralized management.

The considered advantages of using new technologies may lead to the idea that traditional financial intermediation is at the final stage of its life cycle, since it is being replaced by new technologies that are faster and more economical. The viability of such an idea can be determined by weighing the risks associated with the use of decentralized finance.

### 3.3. Risks associated with DeFi

Considering the role and capabilities of blockchain technologies and smart contracts in managing financial flows, the author identified risks in the system of

centralized finance: the need to pay for services; the possibility of information leakage; fraud and theft of money from accounts; problems with the liquidity of the intermediary itself, which occurs in the event of bankruptcy of a credit institution; an increase in the speed of transactions and the complexity of its determination, which is associated with the peculiarities of the technology for conducting transactions in a particular bank. The mentioned risks can be reduced by using blockchain.

The author puts forward the idea that decentralized finance is not without managerial influence; it is carried out not by a person, but by a program. Management moves from the external circuit to the internal circuit, self-ruling and “self-regulation” of the financial system occurs. This indicates the emergence of a new type of financial intermediation—cyber-social.

Promising areas for the use of cyber-social systems in financial intermediation have been identified, which include cryptocurrencies, user identification, smart contracts, decentralized autonomous organizations.

The broad opportunities provided by decentralized finance have already been listed above, however, as in any financial mechanism, the effect correlates with risk. In this case, the risks of blockchain technologies are due to their short lifespan and insufficient accumulated experience in the financial system in the use.

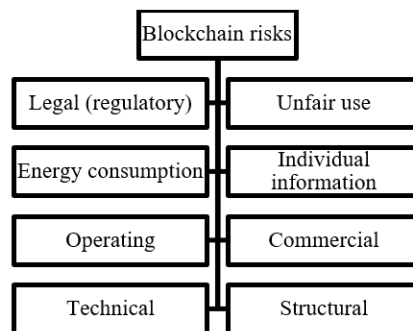
Another reason for the formation of risks in decentralized finance is the innovativeness of such technologies and their fundamental difference from traditional mechanisms. The uncertainty of the new technologies’ impact on financial flows and the welfare of the population causes increased risks.

A wary attitude towards blockchain technologies is caused by the lack of government regulation, which can reduce the level of public trust. The latter is one of the leading factors in the financial intermediation market.

Obviously, traditional financial intermediaries do not always behave in a decent manner, even solid banks can go to bankruptcy. After the collapse of the USSR, many consumers lost their savings because of the financial intermediation centralized system collapse.

However, the challenge for the new product is always sophisticated compared to the existing product. Decentralized finance embraces trust to the anonymous market players who have no legal status. All this raises many questions regarding the prospects for the active development of decentralized finance.

In the study, the author proposes a classification of risks of using blockchain in the financial intermediation market (**Figure 7**).



**Figure 7.** Classification of risks of decentralized finance.

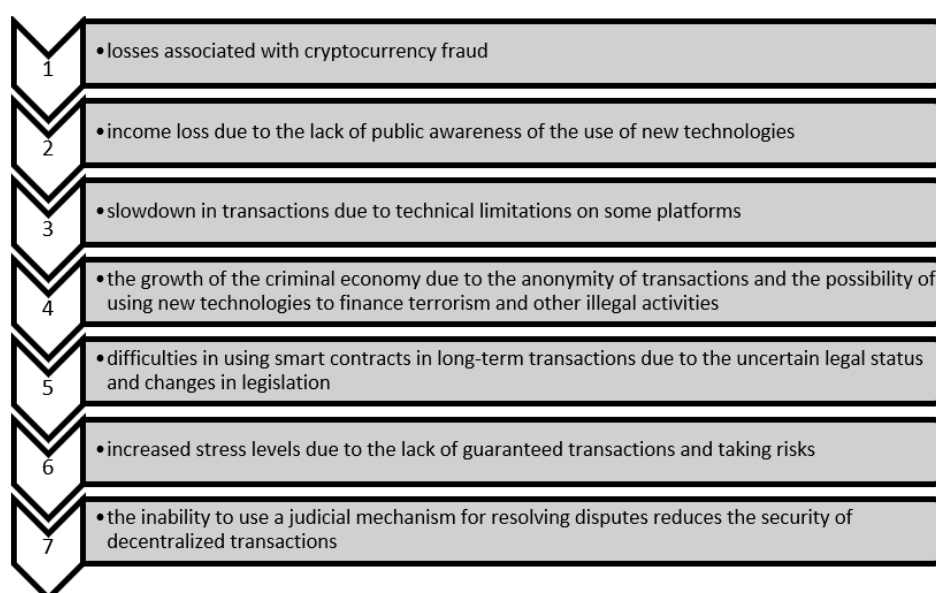
Some of the risks presented are quite amenable to correction, such as commercial and individual information. Others (legal, energy costs) are very difficult to adjust.

The growth of innovative projects funded through ICOs is constantly growing. The consequences of a situation where many market participants want to monetize their funds are difficult to predict. The demand for innovative projects is in many cases irrational and therefore uncontrollable, so there are no short-term measures that will help smooth out the shocks caused by sharp fluctuations in demand and supply.

Some researchers (Godin and Terekhova, 2019) give quite logical arguments indicating the presence of restrictions in the use of cryptocurrencies as a means of payment, talking about high energy consumption and lack of assets.

The Central Bank of the Russian Federation, in its Report “Cryptocurrencies: Trends, Risks, Measures” (Central Bank of the Russian Federation, 2022), draws attention to the existence of serious risks of using cryptocurrencies for the well-being of the population, among which the regulator identifies the following:

- difficulties to predict exchange rate fluctuations and fraud associated with cryptocurrencies can lead to capital loss and bankruptcy,
- promoting the withdrawal of money from the country’s financial system entails a reduction in opportunities for investment in the real sector of the economy, reducing the opportunities for economic growth, the creation of new jobs and growth in incomes of the population in the future,
- the active introduction of cryptocurrencies into the financial sector reduces the possibility of containing inflation, which leads to an increase in the key rate and reduces the possibility of lending to the population,
- indirect stimulation of the development of criminal activity due to the uncontrollability of financial flows leads to a decrease in national security.



**Figure 8.** Risks of using decentralized finance related to the welfare of the population.

On the one hand, the listed risks are quite logical and take place in the conditions of active integration into the financial system of a developing economy. The listed



threats certainly need to be considered when developing areas for regulating new financial technologies. On the other hand, such a tough view of cryptocurrency on the part of government authorities in the Russian Federation can be partly explained by the current geopolitical situation of the country and the need to implement anti-crisis measures and comply with all parameters of national security, including financial security. Several arguments of the Russian national regulator can be disputed, for example, the relationship between the use of cryptocurrencies and the withdrawal of funds from the country. This approach undermines the basis of a market economy - free competition in all markets, including financial ones. In the real sector of the economy, favorable conditions for investment must be provided that will make investments in real projects more attractive than in the field of cryptocurrencies.

**Figure 8** shows areas that can negatively affect the well-being of the population.

#### **4. Discussion**

Experts do not predict a revolutionary transition from Web 2.0 principles to the principles of Web 3.0. Progressive interpenetration of basic concepts is expected, however, smart contracts and blockchain technologies are an integral part of the financial market in the future. Decentralization of the financial intermediation market is the future for which we need to be prepared to avoid risks. It is no coincidence that the EDB strategy among seven priority approaches includes the development of digital competencies using digital platform solutions at three levels: corporate, country and interstate (Eurasian Development Bank, 2022).

According to the rating of global adoption of cryptocurrencies “The 2022 Global Crypto Adoption Index (2022)”, the following post-Soviet states are among the leading countries in which consumers are ready to send and accept cryptocurrencies:

- Ukraine (3rd place),
- Russia (9th place),
- Belarus (25th place),
- Georgia (37th place),
- Kazakhstan (61st place),
- Armenia (75th place),
- Kyrgyz Republic (77th place),
- Estonia (82nd place),
- Uzbekistan (87th place),
- Latvia (92nd place),
- Lithuania (102nd place),
- Azerbaijan (109th place).

In general, as can be seen from the rating list, the countries of the post-Soviet territory are involved in the decentralized finance market.

Given the difficulty of access to centralized global markets, the population actively participates in the cryptocurrency markets, which can indirectly be confirmed by the leaders of the post-Soviet countries in the ranking of the use of cryptocurrencies. Thus, in 2022, Russia was in second place in the international market for cryptocurrency mining; experts reasonably attribute this to the growth of domestic demand (Forbs, 2023). Interestingly, in 2021 the USA and Kazakhstan were ahead of

Russia, and at the end of 2020—Russia was behind of China and the USA. However, in the author’s opinion, it is not advisable for the state to strive for leadership in mining since this process is extremely energy consuming.

In those states where the problem of energy consumption is not so acute, blockchain can be more actively used. For instance, the spreading of blockchain in Georgia is associated with low energy prices. Some experts claim that 10% of the country’s electricity consumption comes from mining (Chepkova, 2019). A positive example of the use of blockchain in Georgia is the work of the state land registry with 1.5 million property rights. The process of operating the registry is completed using the blockchain in 10 minutes, so operating costs are reduced by 90%.

The launch of a nuclear power plant in the Republic of Belarus also made it possible to reduce the cost of mining in this state (Tadviser, 2023).

We believe that more promising technologies in the field of economic integration of legal entities, the households, and the state, based on decentralized financial flows, are platforms for recording rights to securities, the so-called e-voting. Such tools are already used in Russia by the National Settlement Depository (NSD) and the DataArt company (Mikhailov and Shpak, 2020).

The Republic of Armenia is actively using blockchain technologies to attract foreign investment, for which the ECOS Hrazdan free economic zone was created, which has already actively attracted investments from South Korea, the UAE, and China (Savenuk, 2022). Similar technologies are also used by Uzbekistan, where preferential conditions have been created for investors in large mining structures (Polivach, 2021).

In our opinion, one of the goals of integration of legal entities, the households, and the state based on blockchain can be the expansion of “green investments”. Alternative energy could become an important part of such investments (Eurasian Development Bank, 2022).

## **5. Conclusion**

As a socio-economic process, financial relations must be considered in the context of dialectical development. Historically, financial relationships started in a decentralized manner. Subsequently, with the increase in labor productivity, the processes of capitalization and monopolization of the market proceeded. This in turn required increased control and centralization of decision making. With the continuing growth of labor productivity engineering knowhows and IT technologies have created the prerequisites for the next breakthrough in the development. We currently are witnessing this breakthrough in the development of financial relations; decentralization of financial relations, and increasing competition among the largest financial institutions. DeFi fundamentally challenges traditional centralized systems by promoting transparency, open access, and reduced transaction costs through blockchain and smart contracts.

It should be noted that the above phenomena are proven by the process of dialectical development and provides a foundational understanding of how contradictions and their resolutions drive historical and social progress (Hegel, 2010; Lefebvre, 2009; Marx, 1867). Schumpeter’s (2007) concept of “creative destruction”

aligns with a dialectical approach, explaining how innovation disrupts and transforms economic structures, leading to new configurations such as DeFi. Marcuse (1964) and Harvey's (2006) works on the dialectical processes within capitalism explores how economic crises and technological changes lead to new forms of economic organization, relevant for understanding DeFi's potential impact. Negri and Hardt (2000) in their book "Empire" provides a contemporary dialectical analysis of globalization and technological change, offering insights into how decentralized technologies like blockchain can alter global economic dynamics.

In general, it can certainly be stated that decentralized finance is necessary for the development of post-Soviet countries, especially considering the current external conditions. However, this transformation is not without significant ideological differences and practical considerations that must be carefully navigated.

DeFi fundamentally challenges the traditional centralized financial systems by promoting a decentralized, transparent, and open-access model. This ideological shift towards decentralization aims to democratize finance, reduce transaction costs, and increase financial inclusion. It promises a financial ecosystem free from the control of centralized authorities, thereby enhancing trust and efficiency through blockchain technology and smart contracts.

On the other hand, the practical implementation of DeFi in post-Soviet economies faces numerous challenges. These economies have unique institutional legacies and regulatory environments that can either facilitate or hinder the adoption of DeFi. The legacy of centralized control and the current regulatory frameworks may not be fully equipped to handle the decentralized nature of DeFi, necessitating thoughtful and adaptive regulatory measures.

Moreover, while DeFi offers numerous benefits, including lower transaction costs and increased financial inclusion, it also introduces risks such as smart contract vulnerabilities, regulatory uncertainty, and potential market manipulation. These risks are particularly pertinent in the context of post-Soviet economies, where regulatory oversight and technological infrastructure may still be developing.

Each market participant can use new technologies to increase their own efficiency, as well as create an integration effect.

It should be noted that the author, even though realizes the vast opportunities for using decentralized finance, considers it necessary to use a "cautious" approach in developing incentives for their development.

It seems essential to use certain extents of government regulation, which can be expressed as follows:

- 1) Formation of legislation in the field of decentralized finance, which will consolidate the legal status of new financial instruments and determine the legal regime for their use.
- 2) Creation of regulatory mechanisms that will provide guarantees for the population when using decentralized financial instruments.
- 3) Promoting the growth of financial literacy of the population, as well as the development of education in the field of digital technologies.

The particular importance of the third point of the proposed goals of state policy in the field of regulation of the decentralized finance market should be emphasized.

The formation of specialized personnel for the IT industry will help reduce the technical and operational risks of using blockchain, which will increase the level of investor confidence and increase the attractiveness of such investment.

The inclusion of a digital education block, as a mandatory element in all educational institutions will reduce individual information risks.

Under the conditions of the described government policy, the households will have the opportunity to use their own finances in an alternative way, which will create an impetus for reducing prices for the services of conventional financial intermediaries and generally increase the effectiveness of competition in this market.

The suggestion for stricter regulation of DeFi, as presented in the paper, must be balanced with the core principles of decentralization. While regulation is essential to protect consumers and ensure financial stability, it should not stifle the innovation and inclusivity that DeFi brings. A hybrid approach, combining elements of DeFi with traditional regulatory oversight (akin to Centralized Finance or CeFi), might be necessary to achieve a balance between innovation and security. This would involve creating a regulatory framework that allows for the benefits of decentralization while ensuring that necessary safeguards are in place.

Additionally, the concept of “cyber-social technology” underscores that code, while a powerful tool, is not neutral and carries normative implications. As Lawrence Lessig (1999) argued, “code is law,” reflecting the values and intentions of its creators. DeFi’s decentralized ethics emphasize that code itself should be subject to contestation and adaptation, as seen in blockchain forks and the evolving nature of smart contracts.

In conclusion, while DeFi holds significant promise for transforming financial systems in post-Soviet economies, realizing this potential requires a nuanced approach that considers both ideological aspirations and practical realities. Policymakers, financial institutions, and technology developers must work together to create a supportive environment for DeFi that promotes innovation, ensures regulatory compliance, and safeguards consumer interests. By addressing these challenges thoughtfully, post-Soviet economies can harness the transformative power of DeFi to drive economic modernization and financial inclusion.

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