

**THE SEVENTH INTERNATIONAL
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"CHALLENGES OF MODERN ECONOMY
AND SOCIETY THROUGH THE PRISM
OF GREEN ECONOMY AND
SUSTAINABLE DEVELOPMENT"
– CESGED 2026**

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SMART CONTRACTS AS A TOOL FOR REDUCING TAX EVASION IN THE DIGITAL ECONOMY

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ABSTRACT:

The aim of the paper is to present a model based on smart contracts that reduce the possibility of tax evasion. By increasing transparency and automating various business processes, it is possible to greatly reduce tax evasion and thereby increase the trust of all participants in business. The benefits of this model are multiple, on the one hand, we have participants in the business venture who are able to plan more accurately, on the other hand representatives of the tax authorities have easy access to vital information.

Keywords: *smart contracts, tax control, blockchain technologies, fight against tax evasion, transparency.*

1. INTRODUCTION

The aim of the paper is to present a model that monitors tax liabilities in business ventures with the aim of reducing or even preventing tax evasion. It often happens that due to the failure to pay tax liabilities of one participant in a business venture, negative fiscal and business consequences

begin to spill over to other participants. In extreme cases, tax liabilities not only paralyze a business venture, but can also create a series of negative effects.

New technologies for recording and storing data can greatly form a relatively powerful business model that reduces the possibility of tax evasion. Blockchain technologies and smart contracts are ideal candidates for the foundation of a new model for monitoring a business venture. Non-destructive data storage with automation of business processes increases the level of trust in business, creating a positive environment. Business partners can redirect their energy and time from monitoring the business process to planning new business ventures.

2. BLOCKCHAIN

„Blockchain constitutes a database, in which the data is stored on individual blocks, which are linked and secured together (i.e. “chained” together) using cryptography“ [1]. The blockchain system operates on the principle of bookkeeping, each new transaction is recorded separately. Blocks are connected via a hash code, each subsequent block has the hash code of the previous block in its header except for the first (genesis) block. This prevents unauthorized changes to information in previous blocks. Any unauthorized change to the previous block essentially breaks the chain because the hash codes of one block do not match the previous block.

“A hash function is usually transformed functions, which converts or transform data or features from one form to another” [2]. A hash function is a mathematical algorithm that transforms an arbitrarily large input data set into a fixed-length output, known as a hash value or digital fingerprint. The key feature of this function is that the size of the input data is not limited in advance the input can be a single word, an entire document, a database, or a continuous stream of information — while the output remains standardized and always the same length within the framework of a particular hash function. For example, the SHA-256 algorithm produces an output of 256 bits regardless of whether the input is a single character or a file of several gigabytes in size. It is this feature that allows for efficient processing and integrity checking of large amounts of data.

In addition to blockchain systems, hash functions have wide applications in digital signatures, user authentication, and password protection. Their

ability to process unlimited input and generate standardized output enables efficient storage, verification, and protection of data in modern information systems. For this reason, hash functions represent one of the fundamental mechanisms of modern cryptography and digital security.

New blocks are added to the chain through a consensus mechanism, which ensures that all network participants reach an agreement on the validity of the data before their permanent entry. Depending on the specific implementation, this process may require solving cryptographic puzzles, as in Proof of Work, or validating transactions through selected participants whose influence is determined by committed resources, as in Proof of Stake. When a block is validated, it is cryptographically linked to the previous block via a hash function, thus forming a continuous and difficult-to-change data chain. „Blockchain transactions can be considered as user actions on a cryptocurrency platform. When a new transaction is initiated by a user, it is broadcast to all nodes in the Peer-to-Peer (P2P) network and can be added to a new block in the blockchain after verification“ [3].

One of the most frequently highlighted features of blockchain technology is its high level of data transparency. In public blockchain networks, such as Bitcoin and Ethereum, all confirmed transactions remain permanently recorded in a distributed ledger that can be accessed by a large number of network participants. Although the identity of the user often remains pseudonymous through the use of cryptographic addresses, the transaction flows, execution times, and interconnections between addresses can be subject to detailed analysis. Such transparency significantly complicates the subsequent concealment of transaction traces, because once entered, the data remains visible and verifiable.

Increased transparency directly contributes to the development of advanced data analysis methods. „With the advancement of technology, data sharing in various systems has made information analysis more convenient and diversified“ [4]. Large amounts of transaction records enable the application of tools from the fields of Data Science, Machine Learning, and Financial Forensics to identify behavioral patterns, suspicious transactions, and potential irregularities.

3. SMART CONTRACTS

Smart contract are not legal contracts in the traditional sense; instead, they function as technological mechanisms designed to automate and enforce predefined contractual terms. „While public blockchains are capable of providing true decentralization and could be used when there is no trust between parties, private and consortium blockchains have the advantage of lowering validation time and costs, as network nodes are known and trusted“ [5]. This is where Smart contract play a significant role, as predefined rules established through the mutual consent of all parties can be encoded and automatically executed through these mechanisms. „The fact that smart contracts run decentrally on the blockchain and are self-executing, has many consequences for the trust required when concluding a contract“ [6].

"Traditional systems, which often use centralized architectures, face several vulnerabilities and limitations that make them susceptible to various cyber threats and cyber attacks" [7]. The nature of blockchain is reflected in a higher degree of resistance to cyber attacks. On the other hand the formation of "meme coins" is the best example of flexibility of smart contracts. „Most notably, programmers were able to create their own crypto-based blockchain assets on the platform. It featured smart contracts, which contain code that provides a blockchain application with business logic, giving developers more control over when and under what conditions a block would be written to the blockchain“ [8].

One of the most important platforms for developing smart contracts is Ethereum, which introduced the concept of a programmable blockchain. The Solidity programming language was developed within this platform, which has become the de facto standard for creating smart contracts. "Solidity is by far the most popular language for EVM ("Ethereum Virtual Machine")" [9].

4. DIGITAL ECONOMY AND TAX EVASION

The digital economy has changed the way economic value is created, exchanged and recorded. "Digital maturity pertains to a capability to use digital technologies to improve processes, engage talent across the organization, and drive new value-generating business models" [10]. E-

commerce platforms, digital services, cryptocurrencies and globally networked business models have enabled faster and more efficient transactions, but at the same time have opened up new spaces for tax evasion. "Digital transformation is the integration of digital technology into all areas of a business, fundamentally changing how they operate and deliver value to customers" [11]. In such an environment, traditional tax systems, which are mainly designed for physically located activities and clearly defined jurisdictions, face challenges in tracking digital money flows and identifying the real tax base.

One of the key problems of the digital economy is the dematerialization of business. Companies can generate income in one country, while servers, legal entities and tax residency are located in other jurisdictions. Such fragmentation allows for tax optimization, but also potential abuses through transfer pricing, the presentation of artificially low income or the redirection of profits to more tax-favorable countries. In extreme cases, this can lead to a situation in which real economic activity takes place in one system, while tax obligations are formally declared in another.

An additional challenge is the use of digital means of payment and cryptocurrencies, where transactions can be partially pseudonymized and difficult to trace without specialized analysis tools. Although technologies based on Bitcoin and similar systems leave traces of transactions in a distributed ledger, identifying the real actors behind the addresses often requires advanced analytical methods and cooperation between different regulatory bodies.

Tax evasion in the digital economy not only affects national budgets, but also the balance of market competition. "Tax evasion is an inherently illegal activity that is punishable by criminal sanctions. It is an action by a taxpayer which entails breaking the law and which moreover can be shown to have been taken with the intention of escaping payment of tax." [12] Taxpayers may be at a disadvantage compared to actors who exploit regulatory loopholes or inconsistencies in international tax systems. This can lead to market distortions, reduced investment certainty and increased regulatory intervention.

5. MODEL

For the purposes of this paper, a model written in the Solidity programming language that tracks tax payments in a business venture will be presented. The code itself is simplified and reflects the authors' intention to demonstrate the power of smart contracts in preventing tax evasion, not the technique of writing a smart contract. The paper has a limited number of pages, and code details that do not address the topic of the paper would be redundant.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.20;

contract SimpleTaxModel {

    address public authority;

    mapping(address => uint256) public taxDue;
    mapping(address => uint256) public taxPaid;

    constructor() {
        authority = msg.sender;
    }

    modifier onlyAuthority() {
        require(msg.sender == authority, "Not authorized");
        _;
    }

    // Definisanje poreske obaveze
    function setTax(address user, uint256 amount) external onlyAuthority
    {
        taxDue[user] = amount;
    }

    // Evidentiranje uplate poreza
    function payTax() external payable {
        taxPaid[msg.sender] += msg.value;
    }
}
```

```
// Provera statusa obaveze  
function isFullyPaid(address user) external view returns (bool) {  
    return taxPaid[user] >= taxDue[user];  
}  
}
```

Fig. 1. A smart contract model that tracks tax payments

The code represents a simplified Smart Contract model that illustrates the basic logic of tracking tax liabilities in a digital environment. The idea is to use a decentralized record instead of a classic administrative system, where data is kept in a centralized database, in which tax liabilities and their settlement are automatically recorded through predefined rules.

The contract first defines an “authority”, i.e. an address that has a controlling role and represents a tax administration or regulatory body. This entity has the ability to set tax liabilities for individual users. In this way, an institutional framework is modeled in which one party determines the amount of tax liability, while the other party has the obligation to settle it.

The data structure is based on two basic maps: one stores the total established tax that each user owes, while the other records the total payments of that user. This approach allows for simple and transparent tracking of the relationship between the liability and the payments made, without the need for complex external record systems.

The tax payment function allows users to directly deposit funds into the contract, with each payment automatically added to their existing balance of tax paid. This ensures a permanent and indelible record of all transactions, which is one of the key features of the blockchain environment.

Finally, a function has been introduced that checks whether the tax liability has been fully settled. By comparing the total amount owed and the total amount paid, the system can easily determine the status of the taxpayer. This part of the model shows how automatic control of the fulfillment of obligations can be achieved through Smart contracts without the need for intermediaries or manual verification.

6. CONCLUSION

Modern technological and regulatory techniques, especially those based on digital systems and blockchain infrastructure, cannot completely eliminate tax evasion, but they can significantly reduce its scope and impact. The reason for this lies in the fact that tax evasion is not only a technical problem, but also an economic, legal and institutional phenomenon that depends on the behavior of participants, the quality of regulations and the degree of international coordination.

The application of mechanisms based on Smart contracts, as well as systems for digital transaction monitoring, enables the automatic recording and execution of certain obligations, thereby reducing the scope for data manipulation and avoidance of fiscal obligations. Although these systems cannot prevent all forms of evasion, especially those that take place off-chain or through complex cross-border structures, they significantly increase the level of control and make it more difficult to conceal financial flows.

Transparency is of particular importance in this context. Systems that provide insight into transaction flows in real or near real time contribute to greater visibility of business processes and reduce information asymmetry between participants. This transparency has not only a repressive effect, through easier detection of irregularities, but also a preventive effect, because the very possibility of control influences the behavior of participants towards greater respect for the rules.

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