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METHODS OF OPTIMIZING FINANCIAL FLOWS OF TERRITORIAL HROMADAS USING RWA TOKENIZATION

This article analyzes the process of Real-World Asset (RWA) tokenization, which involves converting ownership rights to tangible or intangible assets into digital tokens tфhat are registered on the blockchain. Special emphasis is placed on the key advantages of tokenization, including enhanced accessibility for investors through asset division into shares, increased liquidity, the automation of operations via smart contracts, cost reduction, and transaction transparency.

In this context, RWA tokenization is positioned as an innovative tool for managing the financial resources of territorial communities (hereinafter – hromadas). The authors categorize the types of hromada assets that can be tokenized and develop methods for optimizing the financial flows of local budgets based on the tokenization of various assets and anticipated revenues. The proposed methods, particularly the tokenization of municipal real estate, future tax revenues, the creation of reserve funds through the tokenization of future revenues, and financing infrastructure projects, illustrate the potential for improving financial resource management efficiency at the local level.

Furthermore, the article presents the benefits of employing RWA tokenization by territorial hromadas to optimize local budget financial flows. Key focus areas include rapid access to funds, reduction of debt burden, establishment of reserve funds, and attraction of a broader range of investors, all of which enhance financial stability and liquidity. Utilizing tokenization as a financing tool enables the attraction of additional investments, increases asset liquidity, and ensures stable funding for hromada development. These methods could serve as the foundation for implementing modern financial mechanisms in local budget management practices, fostering economic growth and social development. However, further research is necessary to establish appropriate legislative regulations governing RWA tokenization in Ukraine.

Keywords: *RWA-tokenization, territorial hromadas, local budgets, financial flows, blockchain, token, investment.*

Fig. 7. Lit. 13.

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МЕТОДИ ОПТИМІЗАЦІЇ ФІНАНСОВИХ ПОТОКІВ ТЕРИТОРІАЛЬНИХ ГРОМАД ЗА ДОПОМОГОЮ RWA-ТОКЕНІЗАЦІЇ

У статті аналізується процес RWA-токенізації, яка полягає у перетворенні прав власності на матеріальні чи нематеріальні активи у цифрові токени, що реєструються на блокчейні. Окрему увагу приділено ключовим перевагам токенізації: доступності для інвесторів завдяки поділу активів на частки, підвищенню ліквідності, автоматизації операцій через смарт-контракти, зменшенню витрат та прозорості угод.

В межах даної статті RWA-токенізація розглядається як інноваційний інструмент управління фінансовими ресурсами територіальних громад. Зокрема, авторами систематизовано класи активів громад, які можуть бути токенізовані та розроблено методи оптимізації фінансових потоків місцевих бюджетів, що базуються на токенізації різних активів та майбутніх доходів. Запропоновані методи, зокрема токенізація комунальної нерухомості, майбутніх податкових надходжень, створення резервних фондів через токенізацію майбутніх доходів та фінансування інфраструктурних

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проєктів, демонструють потенціал для підвищення ефективності управління фінансовими ресурсами на місцевому рівні.

Також, у статті обґрунтовано переваги застосування RWA-токенізації територіальними громадами для оптимізації фінансових потоків місцевих бюджетів. Основну увагу приділено швидкому доступу до коштів, зменшенню боргового навантаження, створенню резервних фондів і залученню ширшого кола інвесторів, що покращує фінансову стабільність та ліквідність. Використання токенізації як інструменту фінансування дозволяє залучати додаткові інвестиції, підвищувати ліквідність активів та забезпечувати стабільне фінансування розвитку громад. Ці методи можуть стати основою для впровадження сучасних фінансових механізмів у практику управління місцевими бюджетами, сприяючи їх економічному зростанню та соціальному розвитку. Проте, подальших досліджень потребують питання розробки відповідного законодавчого регулювання RWA-токенізації в Україні.

Ключові слова: *RWA-токенізація, територіальні громади, місцеві бюджети, фінансові потоки, блокчейн, токен, інвестування.*

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Problem statement. In the current climate of globalization and the digital transformation of the economy, local budgets are confronting a multifaceted array of structural challenges. These challenges encompass a decrease in tax revenues, a rising demand for financing social needs, an over-reliance on inter-budgetary transfers, inadequate efficiency in financial planning and forecasting, suboptimal asset management, and constrained capabilities in attracting investment resources. The situation is significantly more challenging under conditions of martial law, necessitating the development and adoption of innovative methods to address these issues, particularly during the critical phase of post-war reconstruction in Ukraine.

Traditional financing mechanisms, such as lending or state transfers, frequently prove insufficient or excessively costly to meet budgetary demands, especially amidst the limitations of state budget resources. As a potential solution, the tokenization of real assets (RWA - Real World Assets) emerges as a groundbreaking approach that can enhance the financial stability and efficiency of local budget management. This innovative strategy facilitates swift fundraising through the issuance and sale of tokens backed by tangible assets, which is essential for financing the reconstruction of vital infrastructure, housing, and social facilities.

Furthermore, tokenization has the potential to boost asset liquidity, attract international investment, and provide transparency in resource utilization-elements that are crucial for the recovery and development of local territorial communities (hereinafter – hromadas) in the aftermath of conflict. The relevance of RWA tokenization traverses both academic inquiry and practical implementation, as its application can significantly reshape the financial sector, rendering it more accessible and efficient.

Addressing these urgent issues through the lens of RWA tokenization not only provides a pathway for improved financial management but also supports the broader goals of economic revitalization and social cohesion in post-war Ukraine. The development and refinement of these methods will be essential for implementing effective public finance strategies that promote sustainable growth and resilience within local budgets.

Analysis of recent research and publications. Recent academic literature demonstrates a notable surge in interest surrounding asset tokenization, with contributions from both Ukrainian and international scholars. The body of work includes a diverse range of studies examining the theoretical foundations and practical applications of tokenization, particularly in the context of economic revitalization and investment attraction.

Prominent domestic researchers, including I. Makalyuk, M. Falko, and N. Zakharov [11], have explored specific aspects of the asset tokenization mechanism. Their studies delve into how tokenization can serve as a critical instrument for enhancing the financial landscape in Ukraine. Similarly, scholars such as Z. Pestovska [8] and the collaborative efforts of R. Dyuk, Y. Belinska, and S. Onyshko [6], highlight the innovative potential of tokenization to adjust local financial strategies, increase revenue streams, and improve budget management. Researchers in works [1-4] provides a robust examination of the theoretical principles underlying real asset tokenization, emphasizing its capacity to transform the financial sector. These studies assert that tokenization can be instrumental in attracting investment and bolstering local budget revenues, but they primarily focus on broader financial implications rather than localized applications.

Globally, the scientific discourse on asset tokenization is enriched by the contributions of scholars such as K. Feh and I. Roesti [7], E. Lim [10], and others, including J. Smith, M. Wor, H. Benedetti, K. Yoshida, Z. Vogel [12], and R. Chamri [13]. Their research tends to concentrate on analyzing economic opportunities, exploring regulatory frameworks, and delineating practical methods for implementing tokenization within global markets. While these studies provide valuable insights into the mechanics and potential benefits of tokenization, they often fall short of addressing its specific utility in local budget management or the unique challenges faced by nations like Ukraine in post-war recovery.

Despite the growing body of literature, there is a conspicuous scarcity of studies dedicated to investigating the application of Real World Asset (RWA) tokenization in local budget management, especially regarding its feasibility and effectiveness in the context of Ukraine's post-war economic recovery. This gap signals a significant opportunity for further research to explore the intersection of asset tokenization and public finance. Detailed exploration of how RWA tokenization can be tailored to meet local governance needs, improve financial transparency, enhance liquidity, and stimulate international investments is essential. Given the urgent need for innovative financial solutions in post-conflict environments, addressing these areas could provide critical insights that support sustainable economic recovery and hromada rebuilding efforts.

In conclusion, while there is a burgeoning interest in asset tokenization, the specific implications for local budget management and post-war reconstruction in Ukraine remain underexplored. This highlights a pressing need for further inquiry into this promising financial innovation, which could play a pivotal role in revitalizing local economies and strengthening financial resilience in the aftermath of conflict.

The purpose of the study is to develop practical methods for applying RWA tokenization to optimize the financial flows of local budgets in terms of solving the problems of covering time cash gaps, optimizing the balance sheet structure, attracting access to liquidity, hedging liquidity risks, and planning cash flows of local budgets.

Key findings of the study: Real asset tokenization (RWA tokenization) refers to the process of converting ownership rights to tangible or intangible assets into digital tokens on a blockchain platform. This innovative approach allows a wide range of assets, such as real estate, artwork, commodities, and financial instruments, to be represented in a digital form that can be traded and partially owned.

At its core, RWA tokenization involves the creation of digital tokens that represent a share, or fraction, of ownership of real assets. These tokens are issued on a blockchain (a rule-based, continuous, sequential chain of blocks containing information) that provides a secure and transparent ledger for recording ownership and transferring tokens. Blockchain technology not only facilitates proof of ownership, but also ensures the immutability of transaction records, increasing trust between participants. [2]

One of the key benefits of asset tokenization is the ability to divide ownership into smaller pieces. In traditional asset markets, such as real estate or artwork, owning these assets typically requires significant capital investment, which significantly limits accessibility for a wide range of investors. Tokenization allows these assets to be divided into smaller, more accessible units, which significantly lowers the financial barrier to investor participation. For example, a $1 million property can be tokenized into 1 million tokens, each with a face value of $1. This allows investors to invest even in small amounts, making investing more inclusive.

Fractional ownership not only democratizes access to highly liquid assets, but also significantly increases their liquidity. Traditional assets, such as real estate or art, are characterized by low liquidity, which makes it difficult to quickly sell or exchange them for cash without significant time delays or additional costs. Tokenization changes this situation by allowing shares of assets to be traded on digital platforms, similar to trading shares on stock exchanges. Increased liquidity gives investors greater flexibility in managing their positions, facilitating easier entry and exit from investments, as well as expanding opportunities for diversification of the investment portfolio.

An important aspect of asset tokenization is the use of smart contracts – programmable agreements whose terms are embedded in code and executed automatically. Smart contracts automate the processes associated with transactions, ensuring that all terms of the agreement are met before ownership is transferred. This significantly reduces the need for intermediaries such as brokers or legal representatives, which reduces transaction costs and speeds up the transaction process. In addition, smart contracts can be programmed to implement complex scenarios, such as automatically distributing rental payments from tokenized real estate between token owners, which simplifies asset management and increases the efficiency of their use.

Blockchain technology provides a high level of transparency and security. Every transaction related to a tokenized asset is recorded in the blockchain, creating an immutable and publicly available record. This transparency eliminates information asymmetry between market participants, reducing the risk of disputes and increasing the level of trust in the system. Blockchain also ensures the system's resilience to malicious actions, as no single entity has control over the data, making it less vulnerable to cyberattacks and fraud. Thus, asset tokenization not only expands access to investment opportunities, but also ensures efficiency, transparency and security of transactions.

In the context of managing the financial resources of territorial hromadas, ensuring the timely fulfillment of all payment and settlement obligations on a daily basis is crucial. This process is regular, cyclical and regulated by the Budget Code of

Ukraine, which requires constant monitoring and control to avoid unforeseen problems. The main task is to address two key aspects:

1. Ensuring liquidity, i.e. the timely execution of scheduled payments, such as payroll, utility payments, or debt repayments. This process can be described as «financing on schedule».

2. Responding to unplanned events, such as delays in expected revenues (e.g., tax payments) or unforeseen expenses (e.g., emergency financing needs). This process can be characterized as «post-facto financing».

In conditions of uneven tax revenues, local governments are faced with the need to respond quickly to unplanned changes in cash flows, which can lead to temporary cash gaps or lack of liquidity. That is why effective management of financial resources of local budgets requires not only clear planning, but also flexibility in applying various methods in solving unforeseen situations, such as underfunding due to economic instability (especially in conditions of military operations), tax gaps, administrative and technical problems in tax administration.

Given the features and advantages of the RWA tokenization mechanism itself, it opens up wide opportunities for territorial hromadas to attract financing using a variety of assets.

The unevenness of tax revenues during the year, arising from different tax periods for local taxes, leads to the need to attract short-term borrowings to cover temporary gaps. This creates an additional financial burden on the budget system and complicates resource management. In such conditions, the use of RWA tokenization can become an effective tool for optimizing financial flows of local budgets, in particular in the context of overcoming the problem of asynchrony between revenues and expenditures. This approach will allow territorial hromadas to attract additional funds, cover budget deficits and finance various projects.

Topicality RWA tokenization for managing the financial resources of territorial hromadas is due to a number of factors, including:

1. The need to cover budget gaps, as many local budgets face temporary cash gaps caused by delays in the receipt of transfers, seasonal fluctuations in revenues, or unforeseen expenses.

2. Inefficient use of assets - hromadas own assets (real estate, land, infrastructure) that remain undervalued or are used inefficiently.

3. Limited opportunities to attract investment, as traditional sources of financing, such as bank loans or government subsidies, are often insufficient or associated with high costs.

4. The need for development, restoration and construction of infrastructure facilities and implementation of social projects, etc.

Territorial hromadas have a wide range of assets that can be tokenized to attract financing, optimize financial management, and implement strategic projects (Fig. 1). One of the most promising assets is municipal real estate, which includes administrative buildings, shopping centers, warehouses, residential buildings, and land plots.

Future hromada revenues, such as tax revenues, rents, utility revenues, or tourism, can also be tokenized, allowing for the raising of funds in the present to cover expenses or implement projects.

Infrastructure assets such as roads, bridges, communications, energy facilities, and social infrastructure can also be tokenized to finance their construction or modernization. For example, future toll revenues from a new road could be the basis for issuing tokens.

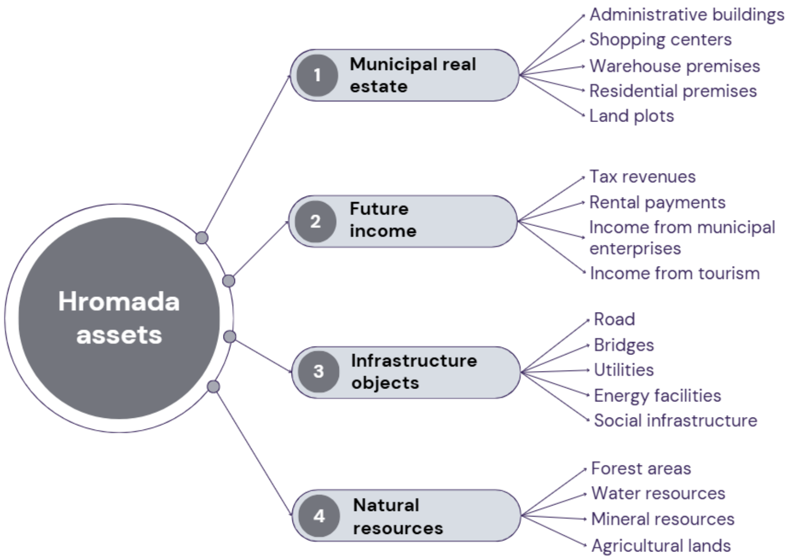


Fig. 1. **The range of assets of territorial hromadas that can be tokenized,** *developed by the authors*

Natural resources owned by the hromada, including forests, water resources, minerals, and agricultural land, can also be tokenized. For example, the right to use forest resources can be converted into tokens to raise funds for their restoration.

Having identified the types of assets of territorial hromadas that can be tokenized, it is important to focus on developing practical methods that allow using this technology to optimize the financial flows of local budgets.

Territorial hromadas face many challenges in the process of managing local budgets due to a number of objective and subjective reasons, which are exacerbated in the conditions of martial law in Ukraine. Such challenges include: the emergence of temporary cash gaps in local budgets, disruption of the optimal balance structure (balance of fiscal revenues and budget expenditures), the need to attract short-term financing to hedge liquidity risks of local budgets, problems with proper planning of cash flows of local budgets, etc.

Time gaps between revenue collection and budget commitments are one of the most common problems in the management of financial resources of territorial hromadas. These gaps arise due to uneven receipt of taxes, rent payments or other sources of income, which leads to a temporary shortage of funds to finance current expenses.

From the analysis of Fig. 2, it is clear that local budgets lack operational financial resources and are dependent on external financing from the State Budget of Ukraine to cover temporary cash gaps.

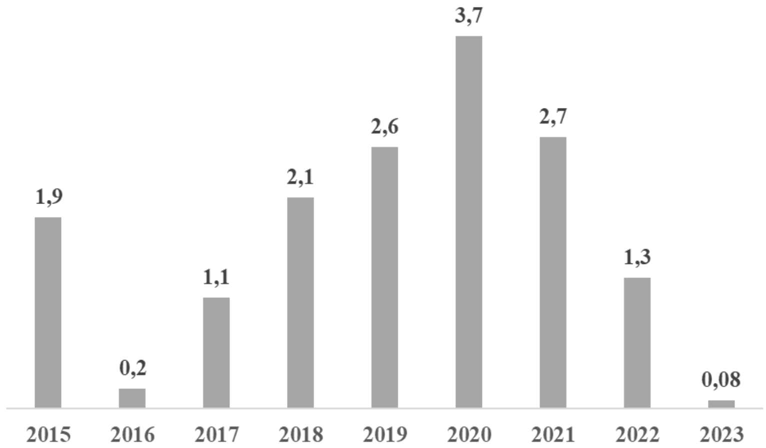
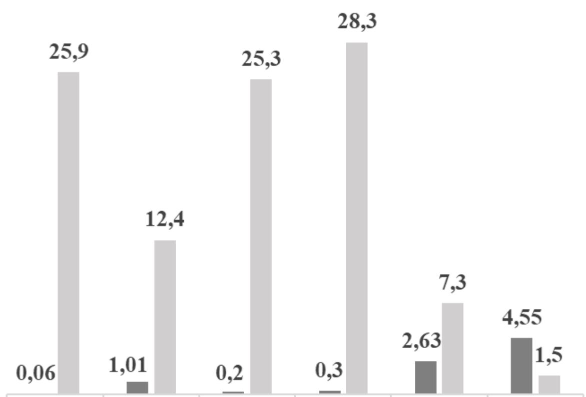


Fig. 2. **Volumes of loans provided to cover temporary cash gaps of local budgets at the expense of the ECR funds during 2015-2023 (bn UAH),** *constructed by the authors based on data from https://www.treasury.gov.ua.*

Fig. 3. shows the volumes of placement of temporarily free funds of local budgets on deposits in state banks and their investments in government securities. During periods of surplus revenues, local budgets place temporarily free funds on deposit accounts or in government securities. For example, in 2021, the volume of such placements amounted to UAH 28.3 billion. This indicates that local budgets have resources that are not used optimally during periods of their surplus, while in other periods they face an acute shortage of funds. This situation indicates the need for a more flexible and effective mechanism for managing financial flows.



	2018	2019	2020	2021	2022	2023
Purchase of government securities	0,06	1,01	0,2	0,3	2,63	4,55
Deposits in state-owned banks	25,9	12,4	25,3	28,3	7,3	1,5

Fig. 3. **Information on the placement of temporarily free funds of local budgets on deposit accounts in state banks and through the purchase of government securities in 2018-2023,** *UAH billion*

Optimizing the balance sheet structure is an important element of managing the financial resources of territorial hromadas, as it directly affects their financial stability and solvency. The balance of fiscal revenues and budget expenditures is often uneven, which leads to temporary deficits or surpluses of funds. Tokenization, as an innovative financial instrument, allows you to effectively balance these indicators by converting assets or future revenues into liquid digital tokens. This mechanism provides additional sources of financing without increasing the debt burden, which is especially important for hromadas with limited access to traditional credit resources.

The liquidity of local budgets is one of the key elements of the financial stability of territorial hromadas. It determines the ability of a hromada to meet its financial obligations in a timely manner, even in the event of unforeseen expenses or temporary cash gaps. Traditional methods of attracting short-term financing, such as bank loans, are often accompanied by high interest rates and complex approval procedures. Tokenization offers an alternative mechanism that allows hromadas to quickly raise funds through the issuance of digital tokens secured by future revenues or assets. This approach provides flexibility, transparency and efficiency in the management of financial resources.

RWA tokenization offers an innovative mechanism for hedging liquidity risks, allowing hromadas to create reserve funds or attract additional sources of financing by converting assets or future revenues into digital tokens. This approach provides a financial «safety cushion» that allows the hromada to effectively withstand adverse external conditions and ensure stable functioning.

Effective cash flow planning is one of the defining elements of financial management of territorial hromadas. It allows to ensure stable financing of current expenses, strategic projects and fulfillment of budget obligations. However, uneven income receipts, unforeseen expenses or external economic factors often complicate this process, creating the risk of cash gaps. Tokenization offers an innovative approach to optimizing cash flow planning, allowing to convert future income or assets into liquid digital tokens. This mechanism provides a stable flow of funds, which allows the hromada to effectively manage its financial resources and implement long-term projects.

The above gives reason to argue that for territorial hromadas, RWA tokenization can become a tool for attracting investment, covering budget deficits, and financing development. Proposed methods of applying RWA tokenization at the level of territorial hromadas.

The first method is to use the tokenization process of municipal real estate to finance a temporary budget deficit (Fig. 4). At the initial stage, municipal property objects, such as administrative buildings, shopping complexes or warehouses, are selected that can be tokenized. The value of these objects is determined by independent expert appraisers, after which digital tokens are issued that represent a share in the ownership or the right to receive income from these assets. For example, one token can be equivalent to 1 square meter of the object's area. Digital tokens are placed on specialized blockchain platforms, where they can be purchased by both individuals and legal entities. The funds received from the sale of tokens are used to eliminate the budget deficit or finance the current needs of the municipality. Investors have the right to receive income generated from rent or the sale of real estate, or the hromada can redeem the tokens after a certain period of time. Among the main advantages of this approach are the rapid attraction of financial resources without the need for complete alienation of assets, the preservation of control over real estate by the hromada, as well as the possibility of attracting investors at the international level.

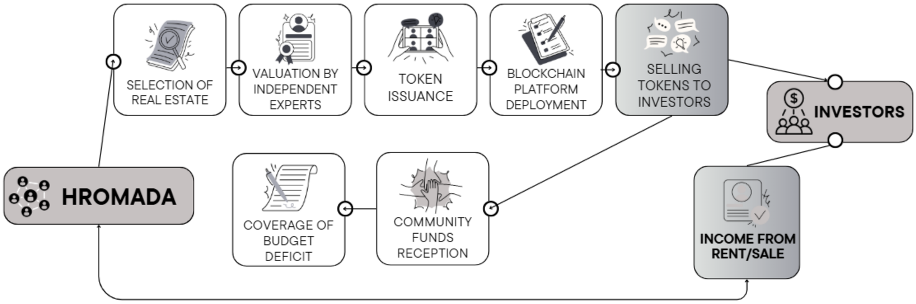


Fig. 4. **Schematic representation of the hromada financing method through tokenization of municipal real estate,** *developed by the authors*

For example: a hromada owns an administrative building that is not fully utilized. Independent appraisers set the market value of the property at 10 million hryvnias. Based on this valuation, the hromada issues 10,000 digital tokens, each of which corresponds to the ownership right to 1 square meter of the building's area. The tokens are offered to investors at a price of 1,000 hryvnias per unit. The total amount received from the sale of tokens is 10 million hryvnias, which are used to finance the reconstruction of the hromada's infrastructure. Investors who purchased tokens receive the right to income generated from rent for the use of the building's area. At the same time, the hromada retains full control over the property, which allows it to ensure effective asset management and use of funds for the implementation of socially significant projects.

The second method is to use the mechanism of tokenization of future tax revenues to eliminate the temporary cash gap of the local budget and optimize the balance sheet structure (Fig. 5). In this case, the hromada is faced with the need to finance current expenses, such as paying salaries to employees and paying for utilities, but the expected revenue from real estate taxes in the amount of 5 million hryvnias will be received only in 6 months. To solve this problem, the hromada can tokenize future tax revenues by issuing 5,000 digital tokens, each of which represents the right to receive 1,000 hryvnias from future revenues. These tokens are offered to investors at a price of 900 hryvnias per unit, which allows raising 4.5 million hryvnias to cover current financial needs. After tax payments are received in 6 months, investors receive the full value of the tokens in the amount of 1,000 hryvnias per unit.

Such a mechanism will allow the hromada to effectively manage temporary cash gaps, ensuring stable fulfillment of current financial obligations. At the same time, it provides investors with an attractive investment opportunity, as they receive income in the form of the difference between the nominal value of the tokens and their purchase price. This approach will contribute to increasing the financial sustainability of the hromada and optimizing its budget management.

The third method is based on the creation of reserve funds by tokenizing future revenues (Fig. 6). Under this approach, the hromada identifies stable sources of future financial revenues, such as tax payments, rent payments for municipal real estate, or revenues from the activities of municipal enterprises. Based on these sources, digital tokens are issued that represent the right to a portion of future revenues. These tokens are offered to investors who invest in the hromada reserve fund. The funds raised are directed to the reserve fund, which can be used to finance emergencies, strategic projects, or other priority needs of the hromada.

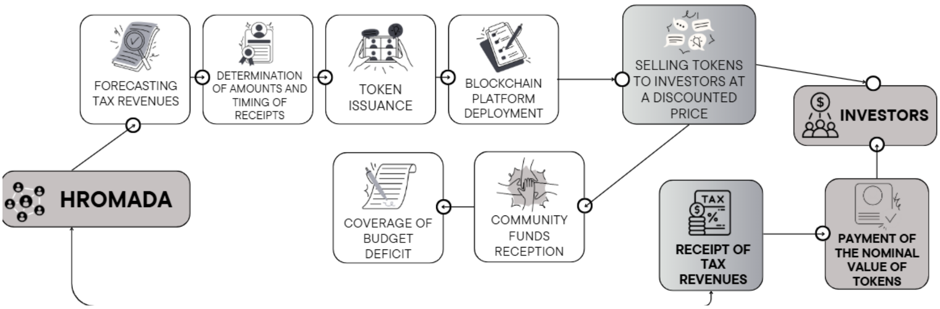


Fig. 5. **Schematic representation of the method of hromada financing through tokenization of future tax revenues,** *developed by the authors*

Investors who purchase tokens receive income in the form of interest or a share of future revenues, which makes such a mechanism attractive for long-term investments. This approach allows you to create a financial "safety cushion" for the hromada, providing it with the opportunity to quickly respond to crisis situations or finance strategic initiatives. In addition, it helps attract investors who are interested in stable and predictable income, which increases the financial stability and solvency of the hromada in the long term.

For example: A hromada intends to create a reserve fund by tokenizing future revenues, including property taxes, expected to be 10 million hryvnias in a year. The hromada issues 10,000 digital tokens, each representing the right to receive 1,000 hryvnias from future tax revenues. The tokens are offered to investors at a price of 900 hryvnias per unit, which allows raising 9 million hryvnias. The funds raised are directed to a reserve fund, which can be used to cover unforeseen expenses in the event of an economic crisis

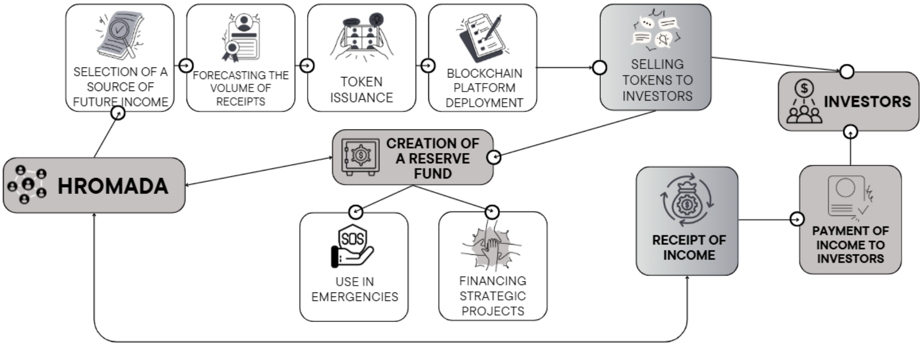


Fig. 6. **Schematic representation of the method of creating reserve funds through tokenization of future revenues for hromada financing,** *developed by the authors*

A year later, after tax payments are received, investors receive the full value of the tokens in the amount of 1,000 hryvnias per unit. This method allows the hromada to form a financial reserve in advance, ensuring its readiness for economic shocks, while providing investors with an attractive investment opportunity with a guarantee of future return and contributing to increasing the hromada's financial stability and effective management of budgetary risks.

The fourth method involves using a tokenization mechanism to finance infrastructure projects. In this case, the hromada identifies a specific infrastructure project, such as the construction of roads, schools, hospitals, or the modernization of utility networks (Fig. 7). To attract the necessary funds, digital tokens are issued that represent the right to participate in the financing of the project. These tokens can be tied to future revenues generated by the project, such as tolls, rent for premises, or other sources. The hromada conducts an information campaign, attracting investors through specialized online platforms. Investors who have purchased tokens provide financing for the project, and the funds received are directed to the construction or reconstruction of facilities. Investors subsequently receive income from the operation of the facilities or a return of funds after a certain period of time.

For example: A hromada plans to implement a long-term project to build a new school, the cost of which is estimated at 20 million hryvnias. The expected revenues from property taxes will be received over the next 2 years. To finance the project, the hromada decides to tokenize future tax revenues by issuing 20,000 digital tokens, each representing the right to 1,000 hryvnias of future revenues. The tokens are offered to investors at a price of 950 hryvnias per unit, which allows raising 19 million hryvnias. The funds received are used to build the school. Over 2 years, investors receive 1,000 hryvnias for each token from future tax revenues.

This approach has a number of advantages, in particular, it allows you to raise funds without increasing the debt burden, ensures transparency in the use of funds through the use of blockchain technologies, and also opens up the possibility of attracting investors at the international level.

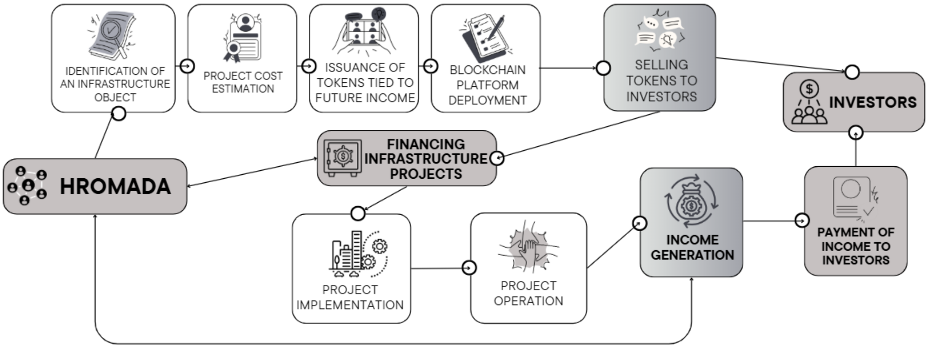


Fig. 7. **Schematic representation of the method of using tokenization to finance infrastructure projects,** *developed by the authors*

Summarizing the advantages of using RWA tokenization by territorial hromadas to optimize financial flows of local budgets, it is worth noting that such methods include a number of key aspects that contribute to increasing the efficiency of financial resource management and ensuring the stability of local budgets, namely:

1. Quick access to funds, as tokenization allows you to raise funds in a short time, which is critically important for covering temporary cash gaps and allows the hromada to better plan and control cash flows.

2. Reducing the debt burden on local budgets by avoiding the need to take out short-term loans, which are often accompanied by high interest rates and additional costs. Tokenization allows you to raise funds without the need to take out loans, which reduces financial risks and debt servicing costs.

3. Effective financial management. Tokenization allows the hromada to better plan and control cash flows, reducing the risk of shortages.

4. Improving financial performance - raising additional funds through tokenization improves the liquidity and solvency of the hromada, which is important for obtaining positive credit ratings.

5. Creating a financial "safety cushion", as tokenization allows you to form a reserve fund that can be used to cover unforeseen expenses or temporary cash gaps.

6. A stable flow of funds that allows tokenization to finance current expenses and strategic projects, reducing the risk of cash gaps.

7. Effective use of hromada assets, as tokenization allows you to "revive" assets that were previously not used to their full capacity, such as vacant real estate or underfunded infrastructure projects.

8. Attracting a wider range of investors due to the fact that digital tokens lower barriers to entry and attract a wide range of investors, including international ones, which expands funding opportunities.

9. Transparency and trust, as the use of blockchain technology ensures transparency of transactions, which increases trust from investors and citizens.

However, along with significant benefits, RWA tokenization for local budgets is accompanied by certain risks and challenges that require attention and careful analysis. One of the key aspects is the lack of a clear regulatory environment, which can complicate the tokenization process and create legal uncertainty. Without clearly defined norms and standards, there is a risk of inconsistency in the interpretation of legislation, which can affect investor confidence and the effectiveness of project implementation.

Technological aspects also pose a certain threat. Blockchain technologies, which are the basis of tokenization, although considered secure and transparent, are not immune to errors and cyberattacks. This requires a high level of technical training and constant monitoring to minimize potential risks.

Another important factor is market volatility, which can affect the price of tokens and their attractiveness to investors. Fluctuations in market conditions, changes in the economic situation, or unpredictable external factors can lead to a decrease in the value of tokens, which creates additional financial risks for all participants in the process. This is especially true for investors who expect a stable income from their investments.

Despite these challenges, tokenization remains a promising tool for local budgets that can significantly improve the management of financial resources and ensure sustainable development of regions. It opens up new opportunities for attracting investments, increases transparency in the use of funds, and allows hromadas to respond more effectively to modern challenges.

For effective implementation of methods for optimizing financial flows of territorial hromadas through RWA tokenization, it is necessary to create clear and comprehensive legislative regulation, which should regulate both the technical aspects of tokenization and ensure legal security for all participants in the process. It is also necessary to ensure the reliability of technological solutions and take into account market conditions, which will minimize risks and maximize the potential of tokenization for the development of territorial hromadas.

Conclusions. RWA tokenization is an effective financial management tool that can be used by territorial hromadas to solve various problems. It allows covering time gaps, optimizing the balance sheet structure, attracting liquidity, hedging risks and planning cash flows. The use of tokenization contributes to increasing the financial stability of hromadas, reduces dependence on external borrowing and ensures more efficient use of available resources. For the successful implementation of this mechanism, it is necessary to take into account legal, technical and financial aspects, as well as ensure transparency and trust from investors.

In general, RWA tokenization helps attract investors who are focused on stable and predictable sources of income. The tokenization mechanism provides that investors who have purchased digital tokens receive the right to a share of future financial revenues associated with specific assets or projects. This investment model is attractive to market participants because it provides a clear mechanism for returning invested funds and allows minimizing risks associated with uncertainty. This aspect is especially important in the context of implementing large-scale infrastructure projects that require significant financial resources and long-term investments. Tokenization allows you to distribute the financial burden among numerous investors who receive income from the operation of facilities or other sources associated with the project.

It is extremely important that RWA tokenization can become an effective tool in the post-war reconstruction of hromadas and the restoration of the economy of Ukraine, providing access to additional financial resources and creating conditions for the formation of long-term partnerships between hromadas and investors. This will allow not only to restore critical infrastructure, but also to stimulate economic activity in the regions, which is an important factor for sustainable development in the conditions of post-war reconstruction. The social effect of RWA tokenization will be manifested through improving the quality of life of residents, as it will contribute to the implementation of projects aimed at restoring housing, transport, energy and other key areas.

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