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# Social capital in the digital economy: Transforming hromada project financing models using RWA tokenisation

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**Abstract.** The relevance of this study lied in the implementation of innovative financing mechanisms for Ukraine's territorial hromadas in the context of post-war recovery, focusing on the significant untapped potential of household savings. This study aimed to assess the feasibility of using Real World Asset tokenisation as a tool to mobilise internal financial resources by activating social capital. According to expert estimates, Ukrainian household savings held outside the formal banking system were estimated at between 70 billion USD and 120 billion USD. Scenario modelling showed that even a conservative mobilisation of 1% of these funds (1.2 billion USD) would enable the implementation of over 2,000 infrastructure projects. Under a realistic scenario (2.5% or 3 billion USD), hromadas could carry out up to 6,000 large or 20,000 smaller initiatives, including school renovations, water supply upgrades, and solar power plants. The study proposed a conceptual framework that integrated social capital (trust, networks, and shared values), blockchain tools (tokens and smart contracts), and economic incentives (dividends, savings, governance rights). A typology of projects eligible for tokenisation was presented, along with an investment distribution structure and expected financial and social outcomes. The research also outlined a multi-level benefits system for household investors – ranging from dividends to participation in decision making through Data Access Object platforms. It emphasised the reciprocal relationship between social capital and Real World Asset tokenisation: trust and local networks enabled investment, while successful implementation reinforced civic engagement and community cohesion. The practical value of this study is that it offers territorial hromadas a replicable model for converting passive savings into active capital for sustainable development through digital infrastructure

**Keywords:** decentralised finance; blockchain; local economic development; digital infrastructure; investment instruments; sustainable development; savings

## Introduction

Attracting financial resources for territorial hromada development in Ukraine remains a major challenge amid decentralisation reforms and the pursuit of sustainable regional development. This challenge has been exacerbated by extensive war-related destruction, limited budgetary capacity, infrastructure deterioration, and the need for innovative models of local economic recovery. In this context, the mobilisation of household savings – particularly those kept outside the formal banking system – emerges as a critical strategic opportunity. Social capital, understood as networks of trust, cooperation, and shared norms, can serve as a powerful driver for

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mobilising such internal financial resources. Social capital, when conceptualised as a combination of interpersonal trust, civic engagement, and collective values, provides a foundation for community-driven investment mechanisms (Fukuyama, 2001). Converting dormant financial assets into productive investments requires innovative tools – with Real World Asset (RWA) tokenisation offering a particularly promising solution. By representing ownership rights to physical assets as blockchain-based digital tokens, RWA tokenisation democratises access to investment opportunities, enhances transparency in resource management, and creates liquidity for financing local infrastructure projects.

Academic and industry research has emphasised the transformative role of blockchain technologies in modern finance. F. Schär (2021) analysed decentralised financial markets based on blockchain and smart contracts, arguing that tokenisation enables fractional ownership, enhances transparency, and increases liquidity of traditionally illiquid assets – such as real estate and infrastructure. In the Ukrainian context, Yu. Holynskyy & V. Nuriyeva (2023) explored the financial capacity of territorial communities during the full-scale war in 2022, highlighting the growing importance of self-sufficiency and innovative funding tools. The authors argued that social capital – including trust-based networks and civic engagement – plays a vital role in sustaining local economies in times of crisis. Similarly, V. Yemets (2022) examined regional and local development aspects in Ukraine's post-war recovery, emphasising the need for investment mechanisms grounded in internal household savings and enabling greater fiscal autonomy. Digital financial inclusion was another relevant consideration. According to the State Statistics Service of Ukraine (n.d.), progress on Sustainable Development Goals remained uneven, with persistent disparities in access to financial services, particularly in rural areas. These conditions necessitated tools that bypassed traditional banking infrastructure, while preserving transparency and accountability – a role that blockchain-based tokenisation was well-suited to fulfil.

The scientific rationale of the study also drawn on both fundamental and applied publications that highlighted the conceptual foundations of decentralised finance and the role of digital technologies in transforming economic models. In particular, Y. Chen & C. Bellavitis (2020) explored the impact of blockchain technologies on the emergence of decentralised business models and the growth of the DeFi sector. J.S. Coleman's (1988) work was essential for understanding social capital as a factor in the formation of human capital, which was significant in the context of engaging communities in innovative investment mechanisms. P. De Filippi & A. Wright (2018) analysed the legal and regulatory challenges associated with the implementation of blockchain, emphasising the need to adapt legal frameworks to the notion of "code as law". These sources deepened the analysis of the institutional and social preconditions for implementing RWA tokenisation at the local level. Practical use cases further confirmed the relevance of tokenisation mechanisms. M. Riabokin & Ye. Kotukh (2024) presented a detailed conceptual model of RWA tokenisation for infrastructure development, highlighting the interaction between trust-based community structures and digital financial tools. Their research emphasised the scalability of token-based investment schemes for public projects.

Thus, RWA tokenisation had the potential to become both a financial innovation and a tool for social transformation. It offered a way to convert passive household savings into active capital, aligned with principles of transparency, inclusivity, and shared ownership. However, successful implementation depended on adequate digital infrastructure, appropriate legal frameworks, and the strength of social capital – all increasingly recognised as important elements of Ukraine's post-war recovery strategy. This study aimed to assess the potential of RWA tokenisation at the level of Ukrainian territorial hromadas to attract household savings as a form of social capital for advancing community well-being and sustainable development. The central hypothesis was that blockchain-based RWA tokenisation can activate significant volumes of unused financial resources and channel them into local investment projects, thereby stimulating socio-economic growth and inclusive territorial development.

## Materials and Methods

The methodological framework of this study was grounded in the integration of social capital theory, the concept of decentralised finance (DeFi), and models of household financial behaviour in transitional economies. The first stage of the study involved estimating the potential of Ukrainian household savings held outside the banking system. Based on statistical and expert data – including reports such as "Ukrainians increased their cash savings by nearly 12 billion dollars in cash over the past year" (2024), "Population and business savings grew by almost 12 billion USD in cash over the year. Is everything so with NBU statistics" (2024), and "Ukrainians increased their savings abroad by over 8 billion USD in six months" (2024) – the estimated volume of extra-banking savings is assessed at between 70 billion USD and 120 billion USD. To simulate possible investment inflows into local development projects, three scenarios were developed: conservative (1% of total savings), realistic (2.5%), and optimistic (5%). The second stage focused on classifying typical local infrastructure projects by average implementation cost. Six basic categories were identified: renovation of educational and healthcare facilities, water supply and sewerage systems, street lighting, small-scale solar power plants, social housing and coworking spaces, and digital Data Access Object (DAO) platforms. A comparative analysis of project costs and projected investment volumes under each scenario provided estimates of the number of potential projects that could be implemented by local communities.

The third stage involved the development of a conceptual model of RWA tokenisation as a mechanism for mobilising internal financial resources of local communities, grounded in the interaction between social capital (trust, social networks, shared values) and blockchain technologies. The information base of the study included open data from international and national analytical institutions such as USAID DOBRE programme data (Kryzhanivskyi, 2022), "How to rebuild Ukraine – sociological survey of citizens and business representatives" (2023), and data from the State Statistics Service of Ukraine (n.d.). The methodological approach applied in this study aligned with prior research on decentralised finance and asset tokenisation. In particular, it reflected the modelling framework used by R. Chamria (2021) and F. Schär (2021), who applied similar simulation-based methods to assess the impact of tokenised infrastructure investment and decentralised financial mechanisms. Data processing and scenario modelling were carried out using Microsoft Excel and programming tools for statistical analysis. The proposed methodology was transparent, logically structured, and reproducible, and can be adapted to other territorial contexts with similar socio-economic structures, using equivalent data inputs, analytical instruments, and evaluation criteria.

## Results and Discussion

Social capital consists of mutual trust, social norms, horizontal networks, support mechanisms, and participation in collective initiatives. In local development contexts, it provided the foundation for collective action, reduces transaction costs, improves communication effectiveness, and created conditions for sustained commitment. This social capital was a determinative factor in local investment success, particularly in relation to internal resource mobilisation. Empirical evidence showed that hromadas with robust social capital demonstrated stronger self-organisation, cooperation, and co-financing of locally significant projects. When households perceived local initiatives as honest, competent, and transparent, they showed greater willingness to invest in tokenised assets that benefited hromadas. This investment propensity derived from confidence in purposeful resource use and stakeholder commitment fulfilment. Additionally, social networks played a crucial role in disseminating investment opportunities and fostering support for collective initiatives. Hromadas with well-developed horizontal tied facilitate the accelerated diffusion of successful investment practices and increase resident participation in collaborative projects.

RWA tokenisation involved the digital representation of ownership rights to physical or non-financial assets (e.g., infrastructure, land, utilities) as blockchain-based tokens. This mechanism enabled fractional ownership, transaction transparency, simplified rights transfer, and broadens investor participation. Blockchain technology ensured immutable ownership records, automated income distribution, and provided robust safeguards against manipulation. In environments characterised by diminished trust in conventional financial institutions, such technological assurances are of particular importance. For territorial hromadas, RWA tokenisation offered a mechanism to aggregate resident funding through token issuance that represented fractional project participation. Such projects can included historical building restoration, public space development, infrastructure modernisation, and social facility establishment. A significant advantage of this approach was the democratisation of the investment process – project participation became accessible to a broad range of residents rather than being limited to institutional investors. This fosters a sense of collective ownership and responsibility for territorial development. As noted by R. Chamria (2021), tokenised assets were reshaping traditional approaches to asset management, primarily by eliminating intermediaries and enabling broader investor access to financial instruments. Among the key advantages of tokenised instruments, the author highlighted their programmability and traceability, which provided conditions for increased transparency, efficiency, and trust in investment processes. In the study by J. Cole (2024), examples were provided of tokenising "green" real-world assets to finance sustainability initiatives, demonstrating the potential to channel capital into small-scale, but high-impact environmental projects. O. Kurchenko (2021) emphasised the transformative potential of asset tokenisation for traditional capital markets, particularly in terms of opening investment opportunities to the general public and enabling direct citizen participation in financing socially significant projects.

The synergistic relationship between social capital and RWA tokenisation was manifested through mutual reinforcement. Trust among participants, the presence of opinion leaders, and established communication channels facilitate successful RWA project implementation. Social capital supported tokenisation by disseminating project information, validating initiative legitimacy through social networks, encouraging resident willingness for microinvestment, and establishing oversight mechanisms for fiscal accountability. Concurrently, successful RWA tokenisation project execution strengthens hromada social capital, raising trust levels and establishing positive precedents for collective action. An effective model for mobilising household investment through RWA tokenisation follows a sequential process, beginning with the identification of hromada infrastructure facilities (Fig. 1). Subsequent phases include comprehensive project cost evaluation, issuance of tokens linked to anticipated facility revenue, implementation of a blockchain platform to provide tokenisation infrastructure, and token distribution to household investors. Accumulated capital finances infrastructure development, followed by project execution and operational management (Herus, 2024). The

critical cycle component was revenue generation from the operational facility, enabling proportional dividend distribution to investors according to their participation stake. This created a closed economic cycle, wherein hromadas acquired essential infrastructure, while households gain stable investment returns.

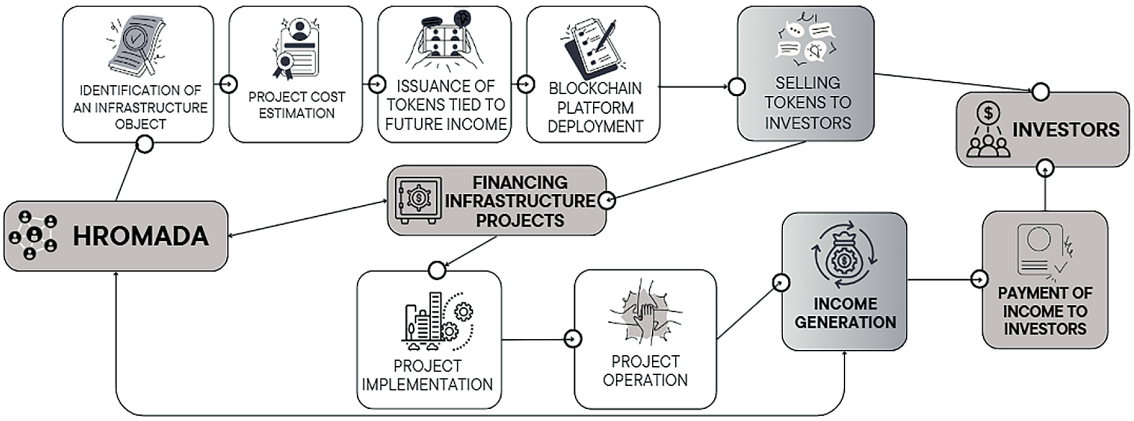


***Figure 1.*** *Method of using tokenisation to finance infrastructure projects*
***Source:*** *based on M. Riabokin et al. (2025)*

Smart contracts, as integral components of RWA tokenisation, enable automated income distribution (when stipulated by project economics), fiscal oversight, and stakeholder governance through digital voting mechanisms. This establishes a distinctive democratic asset-governance model that balances economic efficiency with social inclusivity. Resident-investors receive multifaceted benefits: financial returns, enhanced infrastructure access, and elevated social standing as hromada asset co-owners. RWA tokenisation, when grounded in hromada social capital, offers novel opportunities for mobilising latent household financial resources for local infrastructure development. Activating even minimal portions of these resources through tokenisation mechanisms can substantially accelerate hromada infrastructure modernisation, improve residents' quality of life, and create catalysts for territorial economic development. Notably, this approach transcends purely economic objectives by strengthening social cohesion, raising trust levels, and fostering civic engagement. The conceptual framework presents an integrated RWA tokenisation implementation model as a social capital activation mechanism supporting sustainable territorial hromada development (Fig. 2).

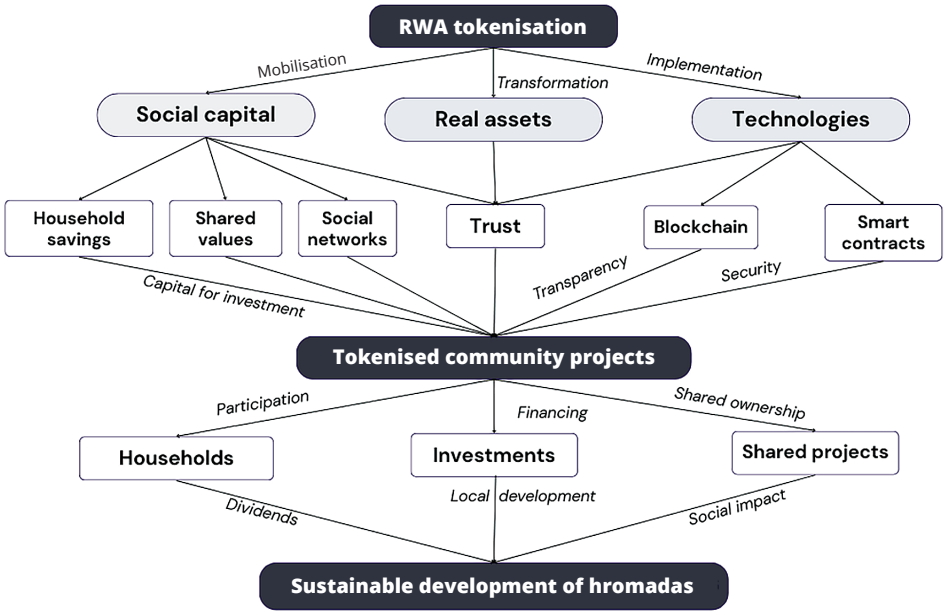


***Figure 2.*** *Conceptual model for implementing RWA tokenisation as a mechanism for activating social capital for sustainable hromada development*
***Source:*** *developed by the authors*

This model's central element – RWA tokenisation – exerts a tripartite influence on local socioeconomic system components. It mobilised social capital, encompassing material elements (household savings), axiological components (communal values), and structural dimensions (social networks). Simultaneously, it converted hromada's physical assets into digital tokens, ensuring transparent accounting and property rights documentation. The third critical process was practical implementation through technological instruments, particularly blockchain as the infrastructural foundation and smart contracts as automated obligation-fulfilment mechanisms. Trust functions as the integrative element across system components, established through shared values and social networks, and enhanced by blockchain transparency and smart contract security. This convergence of social, material, and technological factors creates an environment conducive to tokenised hromada project development. Population savings played a pivotal role, transitioning through tokenisation from passive resources to active investment capital (Osisanwo *et al*., 2024). This transformation ensured more efficient utilisation of existing hromada financial resources, while establishing a novel financial interaction model based on transparency, inclusivity, and decentralisation principles.

Tokenised hromada projects operate through a tripartite mechanism: household participation, investment financing, and collective ownership formation. This approach resolves the traditional individual-collective interest dichotomy, creating a model where personal benefit aligns with collective welfare. The resultant synergistic effect is evident in sustainable hromada development through interconnected processes: households receive project dividends, investments stimulate local economic development, and collective projects generate positive social externalities. This conceptual model demonstrates a paradigmatic shift in local development financing, marking a transition from centralised resource allocation mechanisms to a decentralised system, wherein social capital, amplified by technological innovation, serves as the critical factor transforming latent household savings into an instrument for sustainable territorial hromada development.

A multi-scenario approach was employed to assess the investment potential of RWA tokenisation, accounting for socioeconomic process variability and differing social capital activation capacity. The model's fundamental parameter was Ukrainians' extra-banking savings, estimated at approximately 70-120 billion USD. Considering the complex interaction of factors influencing household investment behaviour, three RWA tokenisation fund attraction scenarios were developed. Economic data analysis revealed substantial household savings outside formal banking systems. Over 70 per cent of individual savings remain outside savings and credit institutions, predominantly in physical currency. According to sociological data presented by G. Lopushnyak & A. Shandar (2020), 33 per cent of citizens avoided banking institutions for savings, 49 per cent maintained minimal bank deposits, 7 per cent allocated half their savings to bank accounts, and 11 per cent entrusted most savings to banks. Households capable of generating savings increased to 11.2 per cent in 2019.

Key determinants of non-bank savings included: diminished trust in institutional banking, macroeconomic and political instability, and limited accessibility of financial instruments, particularly in rural and small urban areas. These factors led to a concentration of savings in physical currency. This reflected reduced institutional trust, counterbalanced by elevated interpersonal trust, consistent with R.D. Putnam's (2000) bonding-bridging social capital equilibrium concept. Expert estimates of extrabanking savings vary significantly: from 120 billion USD to 60 billion USD, according to Shapran, with 10-20 billion USD (Ukrainians increased their cash savings..., 2024) attributed to individual households. Additionally, approximately 716 billion UAH (19 billion USD) remained outside banking institutions. Consequently, aggregate Ukrainian extra-banking savings are estimated to range between 70-120 billion USD (Population and business savings grew by almost..., 2024). Taking into account the available empirical data and theoretical concepts of social capital, three basic scenarios for the potential mobilisation of savings through RWA tokenisation mechanisms were developed: conservative scenario – projects the mobilisation of 1 per cent of total household savings, equivalent to 1.2 billion USD. This estimate was derived from the research of A. Barba & M. Pivetti (2009), which examined the initial phases of innovative financial instrument implementation in Eastern and Central European contexts, complemented by an analysis of Ukrainian technological readiness and financial inclusion. Distributing this sum across 1,460 Ukrainian territorial hromadas yields an average potential hromada investment of approximately 822,000 USD. Infrastructure cost analysis at the small-hromada scale indicated that this magnitude suffices for relatively low capital-intensity local initiatives: renovation of educational and healthcare facilities, modernisation of street lighting, development of co-working spaces, and implementation of localised energy-efficiency projects. The efficacy of such investments was validated by analysis of DOBRE and U-LEAD projects in Ukraine (Kryzhanivskyi, 2022), where successful local initiatives averaged between 500,000 USD and 900,000 USD.

Realistic scenario – anticipates the mobilisation of 2.5 per cent of total savings, equivalent to 3 billion USD. This projection was substantiated through analysis of successful blockchain implementation cases in public utility and infrastructure financing across EU member states (Fernandez-Vazquez *et al.*, 2019), coupled with the projected enhancement of trust in decentralised financial instruments amid gradual regulatory framework development and pilot project implementation. Under

this scenario, the average potential hromada investment would approximate 2 million USD, substantially expanding the viable project scope. According to data from Regional development funding (2025), this investment magnitude facilitated medium-capital project implementation, including local road reconstruction, integrated public space development, water supply system modernisation, and support for municipal innovation initiatives. The socioeconomic efficacy of such investments was confirmed by infrastructure project impact studies conducted in Visegrad Group communities (Nyikos *et al*., 2020). These studies demonstrated that community-driven infrastructure initiatives – co-financed through local and external sources – contributed to measurable improvements in quality of life, increased local business activity, and strengthened citizen trust in municipal governance structures. The experience of Visegrad Group communities highlighted the importance of participatory financing models and decentralised decision-making mechanisms in achieving sustainable local development outcomes. The optimistic scenario projects the mobilisation of 5% of total savings, equivalent to 6 billion USD. This scenario's theoretical foundation drew on research on the long-term effects of financial market institutional transformation (Acemoglu & Robinson, 2013) and analysed of blockchain technology's potential to enhance trust in the medium term (Schär, 2021). Under this scenario, the estimated average potential investment per hromada was approximately 4.1 million USD, establishing prerequisites for the implementation of comprehensive territorial modernisation programmes. According to the regional development investment potential assessment methodology, such an investment magnitude would enable not only the resolution of local infrastructure deficiencies, but also the development of territorial strategic competitive advantages: industrial park construction, modern social infrastructure establishment, and large-scale environmental modernisation – interventions collectively enhancing business conditions and mitigating outmigration. Based on the integration of data on savings volume and differentiated attraction scenarios through RWA tokenisation, a generalised table of potential investments was developed (Table 1).

***Table 1.*** *Scenarios for investment attraction through RWA tokenisation*

| Scenario | Total amount (billion USD) | Fraction | Potential investments (billion USD) |
|---|---|---|---|
| Optimistic | 120 | 5% | 6 |
| Realistic | 120 | 2.5% | 3 |
| Conservative | 120 | 1% | 1.2 |

***Source:*** *based on Population and business savings grew by almost 12 billion USD in cash over the year. Is everything so with NBU statistics (2024), Ukrainians increased their savings abroad by over 8 billion USD in six months (2024)*

The results obtained align with data from sociological surveys on the willingness of the population to participate in local development projects. In particular, the study "How to rebuild Ukraine – sociological survey of citizens and business representatives" (2023) showed that 94% of Ukrainians believed the government should consult the public and business in reconstruction processes, while 79% emphasised the importance of maximum transparency in all stages of the country's recovery. From a social capital theoretical perspective, the proposed RWA tokenisation model enabled the transformation of passive social capital components (household savings) into active forms through collective participation and joint investment governance mechanisms. This transformation occurred through the formation of institutional trust in blockchain-based decentralised financing instruments. Social capital, as conceptualised by R.D. Putnam (2000), constituted a determinative factor in successful collective action toward shared objectives. Within RWA tokenisation contexts, social capital manifested in two dimensions: as a prerequisite for project initiation (through established trust networks and communication channels) and as an implementation outcome (through enhanced social cohesion and the emergence of novel collective action paradigms).

RWA tokenisation established a "digital infrastructure of trust", transforming traditional local development financing models (Tapscott & Tapscott, 2016). This marked a shift from centralised resource redistribution toward distributed participation mechanisms, repositioning residents from passive service recipients to active co-investors and co-owners of public assets. This model enhanced the efficiency of financial resource utilisation, while establishing sustainable civic participation practices – a foundational prerequisite for democratic development at the local level. Research by Z. Liu *et al*. (2022), analysing user incentive mechanisms in a blockchain-based online community, demonstrated how decentralised reward structures can effectively stimulate active participation and content generation. These findings highlighted the potential of blockchain-based systems to foster user engagement, trust, and sustained collaboration – factors that may be transferable to local development contexts, particularly in designing token-based community financing models. To systematise potential investment areas, an analysis of typical local development projects, their cost characteristics, and their correlation with the volume of potential investments was carried out. This analysis enabled the development of a typology of infrastructure projects of local importance with corresponding cost characteristics (Table 2).

***Table 2.*** *Local project types and average cost analysis*

| Project type | Average cost (USD) | Note |
|---|---|---|
| School/hospital major renovation | 500,000 | Medium facility for 1,000-3,000 people |
| Street lighting in the hromada | 150,000 | LED, self-powered |
| Water supply/sewerage system | 300,000 | A small village/settlement |
| Grid-connected solar power plant (SPP) | 250,000 | 50-70 kW for infrastructure facilities |
| Social housing/coworking | 70,000 | Modular or renovation |
| Creating a digital hromada platform | 50,000 | DAO, RWA registry, dashboard |

***Source:*** *developed by the authors*

The typology presented in Table 2 identifies six priority project types relevant to the development of Ukrainian hromadas. These comprise: school and hospital renovations, estimated at 500,000 USD per facility, targeting institutions serving 1,000-3,000 residents; street lighting modernisation, with an average cost of 150,000 USD using self-powered LED systems; water supply and sewerage networks, typically requiring 300,000 USD for full coverage in a small village; grid-connected solar power plants, estimated at 250,000 USD for 50-70 kW installations supporting critical infrastructure; social housing and coworking spaces, which may be developed or renovated for 70,000 USD on average; and digital community platforms, such as DAO tools and RWA registries, estimated at 50,000 USD per deployment. These categories reflected both basic service needs and the integration of innovative, participatory governance tools. Comparing the volumes of potential investments with the cost characteristics of typical projects made it possible to estimate the number of feasible projects under different scenarios (Table 3).

***Table 3.*** *Quantitative assessment of project implementation potential under different scenarios*

| Scenario | Available volume (USD million) | Number of projects at 500,000 USD each | Number of small projects at 150,000 USD each | Combined option (60% large/40% small) |
|---|---|---|---|---|
| Optimistic (6 billion USD) | 6,000 | 12,000 | 40,000 | ~7,200 large/~16,000 small |
| Realistic (3 billion USD) | 3,000 | 6,000 | 20,000 | ~3,600 large/~8,000 small |
| Conservative (1.2 billion USD) | 1,200 | 2,400 | 8,000 | ~1,440 large/~3,200 small |

***Source:*** *based on G. Lopushnyak & A. Shandar (2020), R. Chamria (2021), Ukrainians increased their cash savings by nearly 12 billion dollars in cash over the past year (2024), Population and business savings grew by almost 12 billion USD in cash over the year. Is everything so with NBU statistics (2024), Ukrainians increased their savings abroad by over 8 billion USD in six months (2024)*

Based on the average costs outlined in Table 2, a scenario-based modelling approach was applied to estimate the number of projects that could be implemented under varying levels of household savings mobilisation. The values presented in Table 3 were calculated by dividing hypothetical investment volumes – 1.2 billion USD (conservative), 3 billion USD (realistic), and 6 billion USD (optimistic) – by the unit costs of large projects (500,000 USD) and small projects (150,000 USD). These scenarios reflected potential outcomes derived from expert estimates of extra-banking savings volumes (Ukrainians increased their cash savings..., 2024; Population and business savings grew by almost..., 2024). Prior research on household investment behaviour also supported these assumptions, particularly the analysis of the dynamics and challenges of household savings in the context of the new socio-economic reality presented by G. Lopushnyak & A. Shandar (2020). For the realistic scenario of 3 billion USD, a diversified investment distribution was prepared based on the structure of typical local projects relevant to hromadas. Table 4 presented the projected allocation of funds across infrastructure and digital initiatives. The quantity of each project type was determined by dividing the available budget share by the respective unit cost, using the values established in Table 2. An additional 21% was allocated for audit, risk reserve, and programme management, in line with standard practice in donor-funded municipal development programmes.

***Table 4.*** *Detailed investment distribution analysis under the realistic scenario*

| Project | Quantity | Average cost (USD) | Total budget (USD) |
|---|---|---|---|
| 2,000 schools/hospitals | 2,000 | 500,000 | 1 billion |
| 1,300 water supply systems | 1,300 | 300,000 | 390 million |
| 2,000 solar stations | 2,000 | 250,000 | 500 million |
| 1,000 social housing units | 1,000 | 70,000 | 70 million |

*Table 4, Continued*

| Project | Quantity | Average cost (USD) | Total budget (USD) |
|---|---|---|---|
| 2,400 street lights | 2,400 | 150,000 | 360 million |
| 1,000 digital DAO platforms | 1,000 | 50,000 | 50 million |
| **Total** | — | — | **2,370 billion** |
| **Audit/management/risk reserve (21%)** | — | — | **630 million** |

***Source:*** *based on V. Kryzhanivskyi (2022), NBU sustainable finance development policy 2025 (n.d.)*

This distribution illustrated significant potential for comprehensive local infrastructure modernisation even within realistic investment attraction parameters. The proposed investment allocation in the realistic scenario laid the foundations for systematic infrastructure modernisation. However, sustainable development required not only effective resource distribution, but also robust mechanisms for invested capital recovery. A diversified project portfolio amounting to 2.37 billion USD, complemented by a 630 million USD audit, governance, and risk mitigation reserve, formed a structured investment strategy. The viability of this strategy depended directly on stable cash flow generation capacity and adequate investment return provision. Consequently, the logical analytical progression was to examine economic mechanisms that ensured investment returns and profitability, thus facilitating the transformation of one-off capital injections into self-perpetuating local development financing systems. To ensure the economic efficiency of investments and create incentives for households to participate in financing local projects, a diversified system of sources of benefits for investors was developed (Table 5).

***Table 5.*** *Sources of benefit for investors within the framework of RWA tokenisation*

| Source of benefit | Implementation mechanism through tokenisation |
|---|---|
| Financial profitability | Receiving dividends from project income (e.g., fees for using solar power plants, coworking space rental) |
| Savings on utility bills | Discounts or cost compensation based on token volume (e.g., energy from solar power plants is 20% cheaper) |
| Token value growth | Tokens with limited issuance may increase in price on the secondary market |
| Social benefit | Improvement of local infrastructure → increase in real estate value, comfort of living |
| Participation in management | DAO voting mechanisms, collaborative decision-making |
| Guaranteed buyback | The hromada redeems tokens at a fixed rate after 3-5 years |

***Source:*** *developed by the authors*

This diversified benefit structure established an attractive value proposition across investor categories, from financially oriented households seeking monetary returns to civic-minded hromada members primarily motivated by social externalities. M. Riabokin & Ye. Kotukh (2024) noted that, despite RWA tokenisation's promising potential, several implementation barriers exist in Ukraine: digital literacy deficiencies, particularly in small hromadas and among elderly demographics; widespread scepticism towards innovative financial technologies; inadequate tokenisation regulatory frameworks; and insufficient institutional support from local government. Overcoming these obstacles requires a comprehensive approach integrating educational initiatives, regulatory framework development, and demonstration projects to prove the efficacy of these mechanisms. For the practical implementation of RWA tokenisation at the hromada level, a coherent strategy should be developed and followed. This begins with the identification of socially valuable assets that possess strong tokenisation potential. Once such assets are selected, it is essential to conduct a comprehensive audit and prepare their digital representation. This includes compiling technical documentation, analysing utilisation history, and performing a detailed value assessment. On this basis, a transparent tokenomics model must be developed – one that aligns with the interests of all stakeholders and incorporates effective incentive mechanisms to engage citizeninvestors. To support implementation and ensure trust, decentralised information platforms should be established, enabling transparent communication and active interaction among participants. Finally, the success of the initiative depends on initiating a structured multi-stakeholder dialogue involving hromada representatives, local authorities, and regulatory bodies to coordinate project execution and develop the necessary legal frameworks.

## Conclusions

The analysis confirmed the high potential of RWA tokenisation as an innovative mechanism for mobilising internal household savings to finance local development projects in Ukraine. Even under the conservative scenario (1.2 billion USD), the model enabled the implementation of approximately 1,440 large-scale projects (500,000 USD each) or 3,200 smaller initiatives (150,000 USD each). The realistic scenario (3 billion USD) allowed for 6,000 large or 20,000 small projects, ranging from school and hospital renovations to the installation of street lighting, solar power plants, water systems, and

DAO-based digital governance tools. The key advantage of the proposed approach lies in its ability to transform social capital into real investment flows through a transparent, decentralised, and participatory financing infrastructure. This met the public demand for transparency (79%) and inclusive engagement (94%). The model also provided a diversified system of financial and non-financial incentives – such as dividends, reduced utility costs, and participatory governance rights – forming a sustainable motivational basis for civic coinvestment. The developed methodology not only illustrated the technical feasibility of implementing RWA tokenisation, but also aligned with modern theoretical concepts of economic decentralisation, trustbased financing, and digital transformation. Social capital, when activated through tokenised instruments, became both a developmental and institutional resource for hromadas, enhancing fiscal autonomy and resilience. It was worth piloting this model in selected communities, assessing legal integration pathways, and quantifying the long-term socio-economic impacts of tokenised local finance mechanisms. The findings suggested a promising avenue for accelerating reconstruction, fostering innovation, and strengthening civic ownership in Ukraine's post-war recovery strategy.

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## Conflict of Interest

None.

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# Соціальний капітал в цифровій економіці: трансформація моделей фінансування проектів громад за допомогою RWA-токенізації

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**Анотація.** Актуальність цього дослідження полягала у впровадженні інноваційних механізмів фінансування для територіальних громад України в контексті післявоєнного відновлення, з акцентом на значний нереалізований потенціал заощаджень домогосподарств. Метою дослідження стала оцінка доцільності використання токенізації реальних активів як інструменту мобілізації внутрішніх фінансових ресурсів шляхом активізації соціального капіталу. За експертними оцінками, обсяг заощаджень українських домогосподарств, що перебували поза межами формальної банківської системи, становив від 70 до 120 млрд дол. США. Моделювання сценаріїв показало, що навіть консервативна мобілізація 1 % цих коштів (1,2 млрд дол. США) уможливить реалізацію понад 2,000 інфраструктурних проєктів. За реалістичного сценарію (2,5 % або 3 млрд дол. США) громади зможуть здійснити до 6,000 масштабних або 20,000 дрібніших ініціатив, включаючи реконструкцію шкіл, модернізацію водопостачання та будівництво сонячних електростанцій. У дослідженні запропоновано концептуальну модель, яка інтегрувала соціальний капітал (довіра, мережі та спільні цінності), блокчейн-інструменти (токени та смарт-контракти) та економічні стимули (дивіденди, заощадження, права участі в управлінні). Представлено типологію проєктів, придатних до токенізації, структуру розподілу інвестицій та очікувані фінансові й соціальні результати. Також окреслено багаторівневу систему вигод для домогосподарств-інвесторів – від дивідендів до участі у прийнятті рішень через платформи Data Access Object. Підкреслено взаємозв'язок між соціальним капіталом і токенізацією реальних активів: довіра та локальні мережі стимулювали інвестиційну активність, а успішна реалізація проєктів посилила громадянську залученість і згуртованість спільноти. Практичне значення дослідження полягає у запропонуванні для територіальних громад відтворюваної моделі трансформації пасивних заощаджень у активний капітал для сталого розвитку за допомогою цифрової інфраструктури

**Ключові слова:** децентралізовані фінанси; блокчейн; місцевий економічний розвиток; цифрова інфраструктура; інвестиційні інструменти; сталий розвиток; заощадження