DOI: 10.55643/fcaptp.2.61.2025.4718

**Roman Stadniichuk**
PhD in Economics, Doctoral Student of the Department of Management, Marketing and Public Administration, Higher Educational Institution Academician Yuriy Bugay International Scientific and Technical University, Kyiv, Ukraine;
e-mail: rstadniichuk@ukr.net
ORCID: 0009-0004-7614-231X
(Corresponding author)

**Olga Garafonova**
D.Sc. in Economics, Professor of the Department of Management, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine;
ORCID: 0000-0002-4740-7057

**Roman Yankovoi**
D.Sc. in Economics, Associate Professor of the Department of Management, Marketing and Public Administration, Higher Educational Institution Academician Yuriy Bugay International Scientific and Technical University, Kyiv, Ukraine;
ORCID: 0000-0001-5307-0991

**Hanna Zhosan**
Candidate of Economy Sciences, Associate Professor of the Department of Management, Marketing, and Information Technologies, Kherson State Agrarian and Economic University, Kherson, Ukraine;
ORCID: 0000-0002-3577-6701

**Yuliia Dzhereliuk**
D.Sc. in Economics, Professor of the Department of Management, Marketing and Tourism, Kherson National Technical University, Kherson, Ukraine;
e-mail: yulizh712@gmail.com
ORCID: 0000-0002-2213-8444

**Bogdan Stetsenko**
D.Sc. in Economics, Professor of the Department of Finance named after Viktor Fedosov, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine;
ORCID: 0000-0002-0858-2629

Received: 04/02/2025
Accepted: 10/04/2025
Published: 30/04/2025



# FINANCIAL AND ECONOMIC APPROACHES TO ASSESSING THE EFFECTIVENESS OF SOCIAL CONFLICT RESOLUTION IN MUNICIPAL GOVERNANCE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

## ABSTRACT

This article examines financial and economic approaches to evaluating the effectiveness of social conflict resolution within the municipal governance system, focusing on ensuring the sustainable development of territorial communities. The study identifies key factors influencing social tension levels, including the unequal distribution of resources, socio-economic disparities, migration processes, and the consequences of military conflicts. It highlights the necessity of integrating interdisciplinary approaches to conflict assessment and management, encompassing economic, social, political, and legal dimensions. The research substantiates the relevance of employing financial and economic instruments for assessing the efficiency of social conflict resolution in municipal governance. Specifically, cost-benefit analysis, regression modelling, and multifactor analysis are applied to optimize decision-making and enhance the efficient allocation of financial and material resources. The study also explores the potential of mathematical methods such as agent-based modelling and stochastic analysis for forecasting social conflict dynamics and developing preventive strategies. Particular attention is given to the Ukrainian context, focusing on the impact of internally displaced persons on regional social structures, economic incentives for local communities, and the integration of international experience to restore socio-economic stability. Strategic approaches to adapting global practices are examined, including mechanisms of social partnership, the development of civic initiatives, and integration programs to foster social cohesion and economic growth within municipalities. The authors emphasize the need for a comprehensive social conflict management policy integrating institutional mechanisms, economic incentives, financial development, and technological innovations. The findings of this study may be valuable for government officials, local self-government representatives, researchers, municipal governance practitioners, strategic planners, and international partners interested in supporting Ukraine's recovery and development processes.

**Keywords:** social conflict management, financial and economic approaches, mathematical modelling, changes, costs, efficiency, social tension, sustainable development, public administration, and strategic management

**JEL Classification:** H75, H77, O18, Q01, D74, C61, R58

## INTRODUCTION

Social conflicts are inherent in societal development, particularly in municipal governance, where direct interactions occur between state institutions, civil society organizations, businesses, and local communities. The dynamics of the modern world, characterized by economic crises, social polarization, and increasing urbanization, pose new challenges for local governments in managing conflict situations. In this context, financial and economic approaches to assessing the effectiveness of social conflict resolution become incredibly relevant, as they enable the development of a comprehensive management system that considers the multifactorial nature of conflicts and aims for their long-term resolution within sustainable development. As an integral part of public ad-

ministration, municipal governance plays a key role in ensuring social stability and fostering the harmonious development of territorial communities. Amid contemporary socio-economic transformations, local authorities often encounter conflicts arising from uneven resource distribution, disparities in access to public services, issues of social integration, and tensions between civic initiatives and administrative decisions. Resolving such conflicts necessitates a systematic approach that incorporates financial and economic methods for evaluating the effectiveness of conflict management policies. Recent studies confirm the necessity of applying mathematical techniques, including linear programming, agent-based modelling, and stochastic forecasting, to optimize decision-making processes in social conflict resolution. Implementing these approaches enhances resource allocation efficiency, minimizes the risk of new conflicts, and ensures a balance between community social needs and the economic feasibility of implemented measures. A crucial aspect of this research involves analyzing international experiences in municipal governance and conflict resolution strategies. For instance, models of social partnership in Germany, mechanisms of social support in Scandinavian countries, and policies for integrating internally displaced persons in Ukraine can serve as a foundation for developing financial and economic methodologies for assessing conflict management effectiveness at the local government level. Thus, this article aims to analyze contemporary financial and economic approaches to evaluating the effectiveness of social conflict resolution in municipal governance, particularly considering sustainable development principles. The study's key objectives include analyzing existing conflict management assessment methods, developing a mathematical model for optimal social conflict management, examining international best practices, and adapting them to the Ukrainian context. The findings will contribute to enhancing the efficiency of municipal governance and formulating a strategy for the stable socio-economic development of territorial communities.

## LITERATURE REVIEW

The literature review is based on studies that explore financial and economic approaches to managing social conflicts and ensuring sustainable development. In particular, Syniuk (2024) provides an in-depth examination of modern methods for resolving and preventing social conflicts, emphasizing the necessity of financial and economic strategies in municipal governance. The author highlights the importance of preventive measures that integrate economic and social aspects to mitigate community tensions.

Harashchuk and Kutsenko (2022) underscore the significance of social security in sustainable development, focusing on sociocultural factors. Their findings illustrate the relevance of financial and economic approaches, such as fostering social partnerships and integration programs, to ensure community stability.

Morita et al. (2019) conducted a comparative analysis of national and local governance systems for achieving the Sustainable Development Goals, using case studies from Japan and Indonesia. The authors demonstrate that the successful integration of social initiatives depends on effective local-level governance, which could serve as a foundation for adaptation in the Ukrainian context.

Alsayegh et al. (2023) examine the role of sustainable reporting and governance in achieving the Sustainable Development Goals, stressing the need for innovative technologies such as big data analytics to enhance the efficiency of social conflict management processes. Similar approaches are proposed by Yankovoi et al. (2024), who highlight the transformation of financial institutions in digitalization and its impact on conflict management.

Ilchenko (2023) explores social entrepreneurship as a tool for achieving sustainable development, emphasizing that introducing social innovations can significantly reduce conflict levels and strengthen community cohesion. Finally, O. Garafonova et al. (2023) focus on strategic models and funding sources for the post-war revitalization of agricultural enterprises, underscoring the economic dimension's crucial role in managing social conflicts and restoring affected territories. This comprehensive review emphasizes the importance of an interdisciplinary approach to resolving social conflicts based on economic, social, and technological synergy. It reaffirms that financial and economic management methods can provide social stability and foster the long-term development of local communities.

## AIMS AND OBJECTIVES

The primary objective of this study is to develop and substantiate financial and economic approaches to assessing the effectiveness of social conflict resolution in municipal governance within the context of sustainable development. Given the increasing social tensions caused by economic disparities, political instability, and the challenges of post-war recovery, the research aims to identify optimal strategies to strengthen social stability and institutional resilience.


DOI: 10.55643/fcaptp.2.61.2025.4718

## METHODS

This research is based on an interdisciplinary approach that integrates economic analysis, mathematical modelling, sociological methods, and a comparative analysis of international experiences in social conflict resolution. Several key methodological approaches were employed to comprehensively assess the effectiveness of social conflict resolution in municipal governance. The foundation of the research is economic analysis, which includes cost-benefit evaluation, budget analysis, and econometric modelling. This approach enables assessing resource allocation efficiency for conflict resolution measures, identifying financial and material constraints, and determining optimal scenarios for reducing social tensions through economic incentives.

Mathematical modelling was applied to construct predictive models, incorporating linear programming, agent-based modelling, and stochastic analysis methods. Linear programming optimized resource allocation while accounting for social and economic constraints. Agent-based models allowed for the simulation of population behaviour and forecasting reactions to conflict resolution measures. Stochastic analysis facilitated the assessment of probable scenarios under uncertainty, which is particularly crucial in municipal governance, where conflicts can arise unexpectedly due to external factors. Sociological methods played a key role in determining levels of social tension, institutional trust, and the effectiveness of implemented measures. The research utilized social survey analysis, expert interviews, and an evaluation of key social stability indicators. Data were sourced from publicly available statistical records, municipal reports, and social research conducted in communities affected by social conflicts.

In the course of this research, the SciPy library tools were used to solve optimization problems, particularly the scipy.optimize module. This module is part of the scientific SciPy library in the Python programming language and provides a wide range of methods for solving optimization problems.

The scipy.optimize module includes tools for solving both linear and nonlinear optimization problems, supports constrained and unconstrained optimization, and enables regression analysis and root-finding. Such functional flexibility allows researchers to select optimal algorithms for different types of research tasks, including economic process modelling, forecasting, parameter identification, and analysis of relationships between variables.

The use of scipy.optimize made it possible to perform numerical calculations based on gradient descent methods, quasi-Newton approaches, linear programming algorithms, and multi-objective optimization techniques. This ensured the identification of model parameters, the search for optimal indicator values, and the analysis of the influence of individual factors on the final research results.

The application of these methods in the Python environment ensured the reproducibility of results, high computational efficiency, and adaptability to changes in input data, which is particularly important when studying complex socio-economic systems and digital transformation processes.

A crucial component of the research was the comparative analysis of international experiences, which allowed for assessing conflict resolution strategies in various countries and adapting the most relevant approaches to the Ukrainian context. The research examined practices such as tripartite negotiations in Germany, social support models in Sweden, and mechanisms for integrating internally displaced persons (IDPs) in Canada. The proposed methodological approach objectively assesses the effectiveness of managerial decisions in social conflict resolution, optimizes expenditures, and minimizes social risks—essential factors for ensuring the sustainable development of territorial communities in Ukraine.

## RESULTS

As a component of public administration, municipal governance plays a crucial role in ensuring the sustainable development of territorial communities, as social conflicts most frequently arise at this level. A distinctive feature of municipal governance is its direct interaction with local communities, leading to high levels of social tension due to residents' diverse interests, needs, and expectations. Amid socio-economic transformations and growing demands for effective decision-making, the issue of financial and economic approaches to evaluating the effectiveness of conflict resolution has become particularly relevant.

Social conflicts at the municipal level are a multidimensional phenomenon requiring a comprehensive approach to analyzing their dynamics and consequences. These conflicts may stem from unequal resource distribution, changes in local policies, tensions between civic initiatives and government authorities, and challenges related to integrating different social groups. On the one hand, conflicts can be destructive, threatening the stability of the municipal governance system. On the other

hand, they serve as catalysts for social change, driving the development of more effective solutions to socially significant issues.

Resolving social conflicts in municipal governance necessitates integrating financial and economic mechanisms for monitoring, analysis, and resolution. Academic research highlights several approaches to evaluating the effectiveness of these processes. The functional approach views conflict as a driving force for change, enabling management decisions to adapt to the community's needs. The systemic approach focuses on restoring social equilibrium by revising interaction mechanisms between authorities and citizens. The institutional approach emphasizes the need to establish effective regulatory mechanisms to minimize the risks of conflict escalation. The behavioural approach examines the motivations and interests of conflict participants, proposing negotiation and mediation tools. The conflictological approach concentrates on forecasting conflict dynamics and developing preventive strategies.

Evaluating the effectiveness of social conflict resolution in municipal governance should be based on a comprehensive approach that integrates various analytical models. Table 1 illustrates the primary methods of social conflict management and their role in shaping resolution strategies. Utilizing these approaches classifies conflicts based on their intensity and consequences and facilitates the development of targeted management decisions for their mitigation.

Applying financial and economic methods to assess the effectiveness of conflict resolution in municipal governance involves leveraging digital technologies, big data analytics, and artificial intelligence to monitor social tensions. These technologies enable the timely identification of potential conflict zones and the prompt development of adaptive management solutions tailored to the specifics of individual territorial communities. The integration of comprehensive approaches and advanced technologies enhances local governance efficiency, fosters a culture of social dialogue, and ensures the sustainable development of communities.

**Table 1. Approaches to Social Conflict Management.**

| Level | Approaches | Implementation Mechanisms | Key Objective | Application Examples |
|---|---|---|---|---|
| Theoretical | Behavioural, Conflictological | Psychological support, mediation | Analysis of conceptual approaches to conflict resolution | Scientific research, theory analysis |
| Methodological | Systemic, Structural-Functional, Institutional | Development of management models, formulation of methodological recommendations | Creation of methodological foundations for conflict resolution | Development of methodological guides, standards |
| Empirical | Experimental, Statistical | Conflict monitoring, data collection, case analysis | Study of real data and practices in conflict situations | Sociological surveys, case studies analysis |
| Applied | Practice-Oriented, Situational | Implementation of training programs applied workshops | Development and implementation of practical conflict management solutions | Mediator training, implementation of educational programs |
| Normative | Legal, Regulatory | Legislative acts development, legal support | Regulation of conflicts based on legal norms | Development of normative acts, judicial practice |
| Interdisciplinary | Integrative, Cognitive | Integration of knowledge from various fields, formation of interdisciplinary teams | Integration of knowledge and approaches for comprehensive conflict resolution | Projects combining different disciplines, inter-agency collaboration |
| Strategic | Predictive, Innovative | Development of long-term strategies, implementation of innovative solutions | Creation of strategic vision and forecasting of development | Long-term planning in organizations, strategic initiatives |
| Operational | Operational, Process-Oriented | Management of current processes, real-time coordination | Implementation of ongoing measures and conflict management on-site | Crisis management, resource coordination |

Table 1 illustrates the multidimensional assessment of the effectiveness of social conflict resolution in municipal governance through the integration of various levels of analysis. It highlights the necessity of adopting a comprehensive approach that accounts for the economic, social, and institutional aspects of conflict management, ensuring that strategies are adapted to the specific context of each community.

Given the need to ensure sustainable development, economic analysis in municipal governance has become a crucial tool for resource optimization and enhancing decision-making efficiency. One of the key methods for assessing the effectiveness of social conflict resolution is cost-benefit analysis, which helps evaluate the feasibility of implementing specific management strategies. For instance, comparing the costs of organizing negotiation processes with the potential benefits of avoiding social protests or reducing social tensions allows for an accurate assessment of the economic impact of preventive


DOI: 10.55643/fcaptp.2.61.2025.4718

measures. Visualizing these data in three-dimensional models provides insights into the balance between social stability and municipal financial expenditures.

A promising method for evaluating the effectiveness of social conflict resolution is game theory-based models, which enable the analysis of stakeholder interactions and the prediction of possible decisions, contributing to the development of effective municipal management strategies. Decision tree modelling helps simulate conflict development scenarios, assess risks, and identify the most optimal courses of action. Dynamic programming allows for formulating long-term resource management strategies in the context of persistent social conflicts, facilitating the development of adaptive management approaches. For example, circular diagrams can illustrate the optimal allocation of resources between short-term crisis response measures and long-term social development programs.

Regression analysis using geospatial data makes it possible to identify the key determinants of social conflicts in municipal governance. Interactive map visualizations allow for a comprehensive analysis of social tension factors, such as regional inequality, unemployment, or access to social services. Integrating these methods into municipal governance practices in Ukraine will help improve mechanisms for assessing the effectiveness of conflict resolution and adapting strategies to the specific needs of each community.

The analysis of international experience (Table 2) confirms the effectiveness of comprehensive approaches to social conflict management at the municipal level. The tripartite negotiation model involving government agencies, employers, and trade unions is widely used in Germany, enabling compromises in labour relations and preventing mass protests. This process can visually represent an interaction scheme between government institutions, businesses, and civil society. The Scandinavian countries demonstrate high efficiency in social policies that minimize social inequality and prevent conflicts through a developed system of state support. Given the increasing number of internally displaced persons in Ukraine, the issue of their integration into communities is particularly relevant, requiring new approaches to evaluating the effectiveness of municipal programs and developing mechanisms for their improvement.

**Table 2. Comparative Table of International Experience in Social Conflict Resolution.**

| Country | Period of Application | Main Approach | Expected Outcomes | Implementation Mechanisms | Main Challenges |
|---|---|---|---|---|---|
| Germany | From the 1950s to present | Social partnership and tripartite negotiations | Reduction of strikes increased productivity | Collective agreements, trade union support | Balancing the interests of all parties |
| Sweden | From the 1960s to present | State regulation of social equality | Reduction of social inequality, stability | Social programs, income redistribution | High costs of social programs |
| Ukraine | From 2014 to present | Integration of IDPs through social initiatives | Reduction of tensions, support for integration | Community initiatives, mediation training | Limited resources for implementation |
| USA | From the 1980s to present | Civic engagement and mediation | Strengthening democracy, reducing polarization | Mediation laws, funding of initiatives | Strong political polarization |
| Japan | Activation since the 1990s | Cultural-traditional conflict resolution | Intergenerational harmony, social cohesion | Elder council system, traditional rituals | Difficulty in adapting traditions |
| Canada | From the 1970s to present | Legal reconciliation with historical minorities | Reduction of discrimination, cultural unity | Legal reforms, multiculturalism policies | Slow implementation of reforms |

Analysis of international experience in social conflict resolution is essential for developing universal and adaptive governance models. The approaches applied in different countries illustrate the diversity of strategies and implementation mechanisms considering society's political, economic, and cultural characteristics. The comparative table below highlights the specific features of social conflict resolution in various countries, allowing for the identification of key patterns and challenges that influence the effectiveness of implemented measures.

Developing a mathematical model for analyzing and managing social processes is crucial for ensuring social stability. Such models enable formalizing relationships between variables, evaluating policy effectiveness, and predicting outcomes resulting from management decisions. Key optimization tools include linear programming, agent-based models, and stochastic modelling. However, these methods' effectiveness largely depends on each country's specific social environment, legal framework, and economic system.

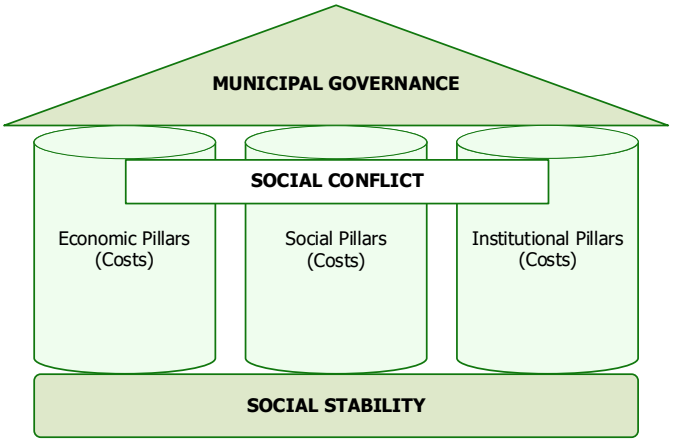


**Figure 1. The social conflict management model is a tool for ensuring social stability.**

The conceptual model for assessing the effectiveness of social conflict resolution in municipal governance is closely linked to achieving sustainable development goals, as it aims to ensure social stability, economic growth, and the strengthening of institutional capacity in local self-governance (Figure 1). In this model, social conflict is the central element, shaped by economic, social, and institutional factors. A comprehensive approach to evaluating conflict resolution effectiveness minimizes its negative consequences and promotes the long-term development of municipal entities in accordance with sustainable development principles.

A crucial aspect of this model is the integration of three key pillars that reflect the fundamental dimensions of sustainable development. The economic pillar involves the efficient allocation of resources, financing of social rehabilitation programs, and compensation mechanisms for affected groups, alongside economic stimulation that fosters job creation and reduces social inequality. The social pillar focuses on integrating vulnerable groups, such as internally displaced persons, establishing communication platforms for dialogue, and building trust between different social strata. This contributes to the development of social capital, which is an essential component of sustainable community growth. The institutional pillar ensures effective legal regulation, mediation mechanisms, and citizen participation in conflict resolution processes, aligning with creating peaceful and inclusive societies with strong governance institutions.

This governance model is a triangular structure, symbolizing the interconnection between strategic management, resource coordination, and political mechanisms. The upper level of this structure shapes governance policies aimed at transforming conflicts into constructive social dialogue and strengthening public trust in municipal and state institutions. The result of this approach is not only the effective resolution of disputes but also the sustainable development of municipal territories through reduced social tensions, increased inclusivity, and an overall improvement in the quality of life. Assessing the effectiveness of social conflict resolution in municipal governance is directly tied to the concept of sustainable development. Integrating economic, social, and institutional mechanisms into a unified governance system creates an adaptive model that prevents conflict escalation and fosters long-term community development. This approach supports the achievement of global sustainable development goals, particularly by ensuring peaceful coexistence, social cohesion, and economic stability at the local level.

Ensuring the effective resolution of social conflicts in municipal governance requires a comprehensive approach that integrates economic, social, and institutional mechanisms and the application of financial and economic methods for evaluating the effectiveness of adopted decisions. These financial approaches are essential for assessing the costs and benefits of conflict resolution measures, determining resource allocation, and ensuring the efficient use of public funds. Mathematical models play a crucial role in this process, allowing for the formalization of relationships between variables, the prediction of potential outcomes, and the optimization of management decisions.

One of the key mathematical tools for modelling the effectiveness of social conflict resolution is linear programming. This method is widely used to determine optimal management strategies to achieve social stability and the sustainable development of territorial communities. The foundation of this approach is the formulation of an objective function, which can reflect various aspects of municipal governance, such as minimizing costs for conflict resolution measures, maximizing the efficiency of social programs, or increasing the level of social integration.

Alongside the objective function, a system of constraints is considered, including key socio-economic parameters such as budgetary limitations, employment levels, demographic factors, access to social services, and other variables affecting the conflict resolution process.


DOI: 10.55643/fcaptp.2.61.2025.4718

The objective function in a linear programming problem for social conflict management can be expressed as a mathematical equation that accounts for the interdependencies between key parameters, such as expenditures on social programs, the economic efficiency of interventions, and the level of social stability.

$$CCZ = \sum_{i=1}^{n} c_i x_i$$

*where: $Z$ - the total cost of implementing measures that need to be minimized; $c_i$ - the cost of implementing the i-th measure, considering the expenses on material, human, and organizational resources; $x_i$ - the amount of resources allocated to the i-th measure; $n$ - the total number of measures aimed at managing social conflicts.*

The constraint system is formulated considering resource availability and socially acceptable parameters. In particular, resource usage constraints are defined as:

$$\sum_{i=1}^{n} a_i x_i \leq R$$

*where $a_i$ is the resources required to implement the i-th measure, and $R$ is the total volume of available resources, such as finances, time, or labour.*

Another critical constraint is ensuring social stability by controlling social tension. This constraint can be formulated as follows:

$$\sum_{i=1}^{n} b_i x_i \leq T$$

*where $b_i$ represents the impact of the i-th measure on social tension, and $T$ is the maximum allowable level of social tension determined by political or social indicators.*

To ensure the realism of the model, a non-negativity constraint is also introduced:

xi≥0, ∀i∈{1, 2, ..., n}

This condition ensures that the allocated resource volumes cannot be negative.

Applying linear programming methods in social conflict resolution within municipal governance allows for optimal solutions in resource allocation, considering socially acceptable limits. This approach aims to balance economic efficiency and social stability, which is crucial for the sustainable development of territorial communities. In times of social tension, effective resource management helps minimize costs and builds public trust in municipal institutions, fostering favourable conditions for long-term peace and societal harmony.

Alongside linear programming, agent-based models have become an essential tool for analyzing social conflicts, as they account for individual actors' behaviour within the system and their interactions. Specifically, modelling how different social groups respond to state or municipal programs helps identify the most effective strategies for reducing conflict levels. This approach provides a quantitative assessment of decision-making effectiveness and considers factors related to public adaptation to new socio-economic conditions.

Stochastic modelling, in turn, allows for assessing random factors affecting social conflict dynamics. Economic crises, political instability, or changes in legislation can significantly influence policy effectiveness, making probabilistic models essential for risk analysis and predicting potential future scenarios. This is particularly relevant in municipal governance, where decision-making occurs under high uncertainty.

It is essential to define the key variables characterizing social processes to construct a mathematical model for assessing the effectiveness of social conflict resolution. The primary variables include costs, social tension levels, policy effectiveness, and social risks. Costs comprise direct and indirect expenses, such as funding programs, mediation efforts, support for vulnerable groups, and administrative expenditures. Social tension levels are determined through social indicators, including the number of conflicts, strikes, or protests and public satisfaction with municipal governance policies. The effectiveness of measures is evaluated based on the number of resolved conflicts, their long-term impact on social stability, and the

level of civic engagement in resolution processes. Social risks reflect the likelihood of new conflicts emerging due to unequal resource distribution, social polarization, or ineffective governance mechanisms.

The combination of linear programming methods, agent-based approaches, and stochastic modelling enables the development of a comprehensive system for assessing the effectiveness of social conflict resolution in municipal governance. The integration of these approaches facilitates strategic decision-making that minimizes social risks and ensures the sustainable long-term development of local communities.

Figure 2 illustrates the conceptual model of social conflict management based on a systemic approach that incorporates three key pillars: economic, social, and institutional. Each of these pillars consists of interconnected variables that describe the mechanisms influencing the management process and contribute to achieving social stability. The interaction of these components determines the effectiveness of conflict resolution strategies and ensures a comprehensive approach to fostering sustainable development in territorial communities.

The economic pillar focuses on managing resources necessary for preventing, mitigating, and resolving social conflicts. Its key variables include costs, resource availability, and investment impact. Costs encompass financial and administrative resources used in implementing governance measures, assessed through budget analysis and econometric modelling. Resource availability defines the volume of financial, material, and human resources allocated for conflict resolution, while investment impact reflects the potential for economic stimulation in regions experiencing social tensions. Strategic management of these variables strengthens local economies, reducing social risks accordingly.

The social pillar of the model is oriented toward supporting social cohesion, monitoring tension levels, and evaluating the effectiveness of measures. A critical element is social risks, representing the likelihood of new conflicts emerging due to socio-economic factors. For instance, social cohesion is determined by indicators of population group interactions and trust in governmental institutions, analyzed through sociological research and specialized indices. The level of social tension is assessed based on social indicators such as the number of registered conflicts, strikes, or protests, as well as public satisfaction with local authorities' actions. The effectiveness of governance measures is evaluated by the number of prevented or resolved conflicts and long-term changes in the community's social structure.

The institutional pillar encompasses legal regulation, institutional trust, and international organization involvement. Legal regulation is assessed through the effectiveness of legislative and regulatory frameworks to prevent and resolve conflicts. Institutional trust is a critical factor in the legitimacy of adopted decisions and is measured by public support for government institutions, as determined through sociological research. International organization participation is essential for securing additional resources, expert knowledge, and best global practices in conflict resolution, which is particularly relevant for municipal governance in contexts of high social tension.

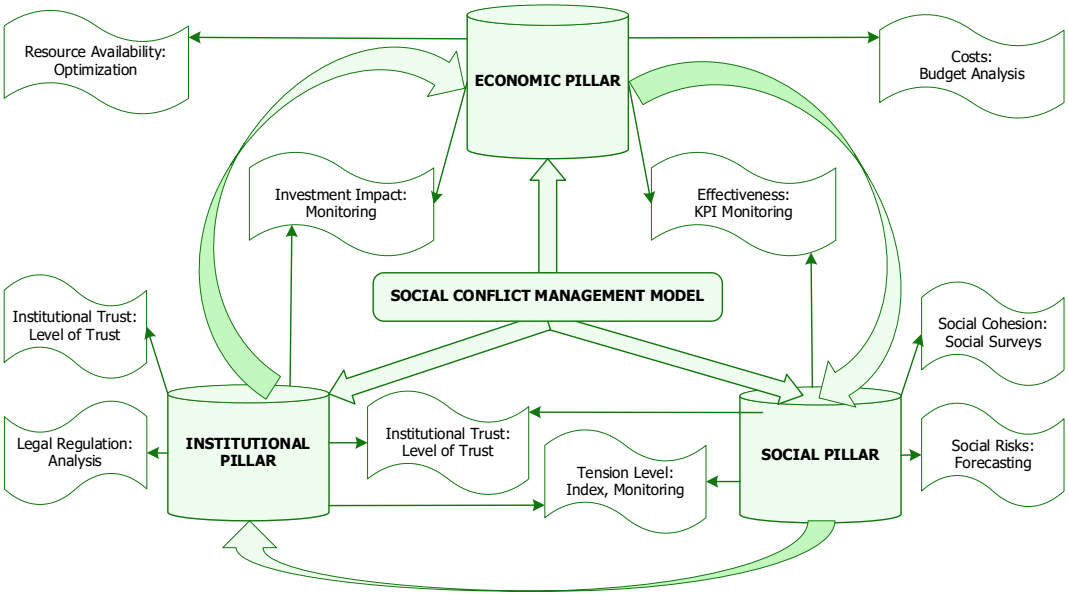


**Figure 2. Three-Pillar Model of Social Conflict Management.**


DOI: 10.55643/fcaptp.2.61.2025.4718

The proposed relationship structure demonstrates the impact of each variable on the overall governance system and illustrates the integration of social, economic, and institutional factors into a unified framework. This approach allows for the separate analysis of each variable while ensuring their interaction and coordination within a comprehensive model for social conflict resolution.

The assessment of intervention impacts on social stability within this systemic model relies on multi-criteria functions that account for the values of variables across each pillar and their influence on the resilience of the social system. Integrating these variables into a single optimization function enables informed decision-making aimed at minimizing social risks and achieving long-term stability in municipal governance.

Within the proposed systemic model for social conflict management, a multi-criteria function is employed to formalize the relationships between key variables and optimize governance decisions. This function balances the effectiveness of measures, associated costs, and levels of social risk, which are critical parameters for ensuring long-term municipal stability.

We now formalize the general function for assessing the effectiveness of social conflict resolution in municipal governance, incorporating all indicators of the model:

$$F=w1E-w2C-w3R+w4A-w5D+w6I$$

*Where: E (Effectiveness of Measures) - evaluates the overall effectiveness of implemented programs and is a component of the social pillar. It includes social cohesion levels, group trust, and the number of successfully resolved conflicts; C (Costs) - belongs to the economic pillar and reflects the total financial, material, and administrative resources required for implementing measures; R (Social Risks) - integrates indicators from the social and institutional pillars, characterizing the likelihood of new conflicts arising due to social or economic imbalances and the level of future threats; A (Resource Availability) - represents the accessibility of financial, material, and human resources within the economic pillar. Optimizing this factor allows for expanding the implementation potential of measures without increasing total costs; D (Institutional Trust) - reflects the level of public support for government and municipal bodies and is part of the institutional pillar. High trust in state institutions enhances the legitimacy of governance decisions and the effectiveness of measures; I (Investment Impact) - represents the level of economic stimulation in conflict-affected regions and is part of the economic pillar. Increased investment fosters local economic development, reduces social tension, and creates job opportunities.*

The function incorporates weight coefficients w1, w2 ..., and w6, which determine the importance of each indicator based on municipal governance priorities. For example, if the primary goal is to reduce social tension, the weight coefficient w3 (social risks) should be the highest. Conversely, during periods of economic growth, investments (w6) and the effectiveness of measures (w1) may become more significant.

This multi-criteria function allows for adaptive adjustments of governance priorities, focusing on the socio-economic situation and the level of institutional resilience. Optimizing this function ensures strategically justified decision-making, minimizing costs, reducing social risks, and enhancing the effectiveness of conflict resolution measures.

Thus, using this expanded multi-criteria function enables the evaluation of implemented measures and the prediction of potential impacts of different governance strategies on social stability, economic efficiency, and institutional trust, which are key parameters for sustainable municipal governance.

All variables are normalized to ensure comparability of values, achieved through the following formula:

$$X_i = \frac{x_i - x_{min}}{x_{max} - x_{min}}$$

*$x_i$ Is the variable's normalized value, and $x_{min}$ and $x_{max}$ represent its minimum and maximum values within the dataset.*
The constraint system of the model ensures that governance decisions align with actual social and economic conditions. For example, the budget constraint, which is associated with the economic pillar, is formulated as follows:

$$\sum_{i=1}^{n} c_i x_i \leq B,$$

*where B represents the total available budget, the social pillar is incorporated through the social tension constraint, formulated as:*

$\sum_{i=1}^{n} b_i x_i \leq T,$

*where $T$ represents the maximum allowable level of social tension, the institutional pillar sets the minimum acceptable level of measure effectiveness, formulated as:*

$E_i \leq E_{min}$

This constraint ensures the achievement of socially significant outcomes.

Within this model, each pillar is crucial in achieving social stability. The economic pillar provides the resource base for implementing measures, the social pillar supports cohesion and minimizes risks, and the institutional pillar guarantees legitimacy and trust in governance decisions.

Thus, the multi-criteria function not only accounts for the key variables of the model but also integrates them into a comprehensive decision-making system. The evaluation results enable resource optimization, identifying the most effective measures, and reducing social risks, which are fundamental to achieving sustainable development and social stability.

Continuous monitoring of results is critically important to ensure model effectiveness. This process utilizes big data collected through sociological surveys, media analysis, and other sources. For example, machine learning algorithms can predict potential conflicts or assess the outcomes of implemented measures.

As a result, applying a mathematical model combined with optimization tools facilitates data-driven decision-making, enhances the efficiency of social stability management, and minimizes risks.

An optimal resource allocation model for social conflict management has been developed in this scientific research. The model is based on cost-benefit optimization principles, enabling an assessment of the effectiveness of governance measures within the constraints of available resources and social limitations. The mathematical formulation of the problem includes an objective function that maximizes the balance between benefits and costs, along with a constraint system that reflects budgetary and social limitations.

The objective function of the model is formulated as:

$$Z = max\left(\sum_{i=1}^{n}(B_i - C_i)x_i\right)$$

*Where: $Z$ - the total benefit function; $B_i$ - the benefit derived from implementing the i-th measure; $C_i$ - the cost of implementing the i-th measure; $x_i$ [0,1] - a variable indicating the degree of implementation of the i-th measure; $n$ - the total number of measures.*

***Model Constraints***

*1. Budget Constraint:*

$\sum_{i=1}^{n} C_i x_i \leq B,$

*where $B$ represents the total available budget.*

*2. Social Tension Constraint:*

This constraint ensures that the level of social tension does not exceed the maximum allowable threshold, which is formulated as:

$\sum_{i=1}^{n} R_i x_i \leq T,$

*$R_i$ representing the social risks associated with implementing i-th measure, and $T$ , which is the maximum permissible level of* social tension.

To solve the optimization problem, the scipy.optimize library in Python was used. The code optimizes the xi variables, representing each measure's degree of implementation. Below are the key steps of the code:


DOI: 10.55643/fcaptp.2.61.2025.4718

1. *Input Data Specification*

   n = 5 - number of measures.

   C - cost vector for each measure.

   B - benefit (effectiveness) vector of the measures.

   R - social risk vector of the measures.

   budget_limit = 100 - total available budget.

   risk_limit = 50 - maximum allowable level of social tension.

2. *Objective Function Formation: Optimization is performed by maximizing the difference between the benefits and costs of the measures*

   Since prog minimizes the function, the transformation c = -(B - C) is used.

3. *Constraint System Formation*

   Budget constraint: $\sum C_i x_i \leq 100$

   Social tension constraint: $\sum R_i x_i \leq 50$

4. *Decision Variable Bounds*

   Each variable $x_i$ is constrained within the range [0, 1], meaning partial or full implementation of measures is allowed.

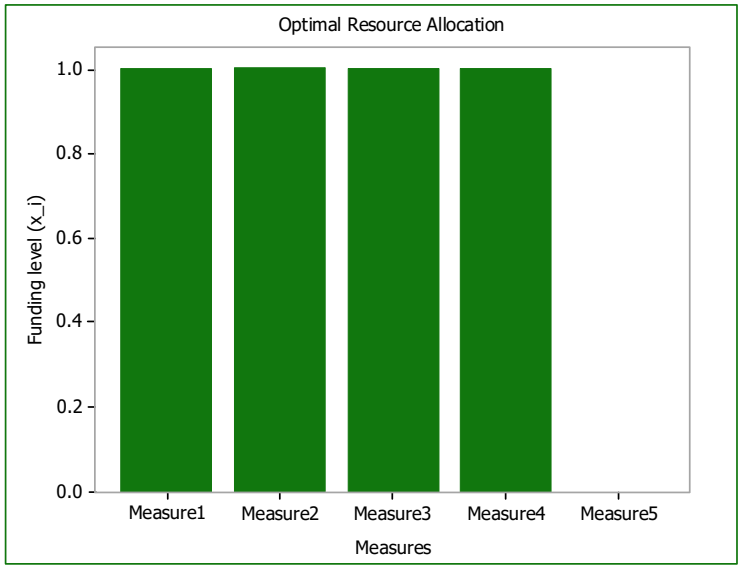


**Figure 3. Visualization of Optimal Resource Allocation Results for Management.**

The optimization results demonstrate that all measures received full funding ($x_i = 1$), and the total benefit function reached a value of 170.0. This indicates that the available budget (B = 100) and social constraints (T = 50) allow for the full implementation of all measures, ensuring the maximum balance between costs and benefits.

The full implementation of all measures highlights the efficiency of the available resources in achieving the set objectives. The maximized benefit value of 170.0 reflects a significant positive impact of the measures on social stability. The balance between costs and benefits ensures the optimal utilization of resources within the given constraints.

In this case (Figure 3), the measures that received full funding may include initiatives such as conflict mediation programs at the community level, support for social integration of vulnerable groups, creation of new jobs, promotion of professional training and retraining, as well as expanding access to basic social services. Each of these measures is crucial for ensuring social stability and community development, with all receiving equal funding, which allows for optimal resource utilization to achieve the maximum impact. The proposed model demonstrates how economic and social variables can be integrated

into a decision-making system to manage social conflicts. Implementing the model in Python allows for rapid and efficient adaptation to various scenarios by adjusting input parameters. The results can be used for:

1. Planning national or regional programs to reduce social tension.
2. Optimizing resource allocation in crises.
3. Empirical analysis of the effectiveness of governance decisions.

This integration of mathematical modelling, software applications, and socio-economic analysis enhances the rationality of governance decisions and contributes to social stability. A correlation analysis assessed the relationships between the model's key variables: costs, benefits, social risks, and social tension levels. The results indicate a strong positive correlation between benefits (Bi) and costs (C) (r=0.95), suggesting that benefits proportionally increase with higher spending on measures. Similarly, social risks (R) show a high correlation with social tension (T) (r=0.92), indicating that risk reduction measures directly impact stability.

This analysis clarifies the dependencies between variables, identifies key influencing factors, and determines their role in shaping effective governance decisions. A heatmap visualization enhances the results, clearly representing the identified relationships.

**Table 3. Correlation matrix of key model variables: costs, benefits, social risks, and social tension levels.**

| | Costs (C) | Benefits (B_i) | Social Risks (R) | Tension Level (T) |
|---|---|---|---|---|
| Costs (C) | 1.000 | 0.866 | 0.785 | 0.564 |
| Benefits (B_i) | 0.866 | 1.000 | 0.990 | 0.901 |
| Social Risks (R) | 0.786 | 0.990 | 1.000 | 0.954 |
| Tension Level (T) | 0.564 | 0.901 | 0.954 | 1.000 |

The correlation matrix presented in Table 3 provides a quantitative assessment of the relationships between key model variables. To enhance interpretability, Figure 4 visualizes these correlations, allowing for a clearer understanding of the strength and direction of associations between costs, benefits, social risks, and social tension levels.

Costs (C) and Benefits (B_i): r = 0.866. A high positive correlation coefficient indicates a strong relationship between costs and benefits. This suggests that more excellent benefits accompany increased financial investments in measures. Such a dependency confirms the economic feasibility of investing in programs to reduce social tension. Benefits (B_i) and Social Risks (R): r = 0.990. An almost perfect positive correlation indicates that the benefits of implementing measures critically impact reducing social risks. This underscores the effectiveness of risk reduction measures as a key tool for ensuring social stability. Social Risks (R) and Tension Level (T): r = 0.954. A very high correlation between these variables demonstrates that reducing social risks directly affects decreasing social tension levels. This confirms the importance of addressing risks in strategic management. Costs (C) and Tension Level (T): r = 0.564. A moderate level of correlation suggests that financial expenditures have a limited impact on social tension. Simply increasing funding without a strategic approach to resource allocation does not significantly reduce tension. Benefits (B_i) and Tension Level (T): r = 0.901. A high positive correlation indicates the effectiveness of measures to enhance social cohesion and trust in reducing social tension.

The correlation analysis of relationships between key variables in the social conflict management model highlights critical dependencies that allow for the evaluation of the strength and direction of each variable's influence on social stability. Specifically, a high correlation was found between the benefits of implemented measures, social risks, and social tension levels. This indicates that measures to reduce risks significantly influence societal stability by directly affecting expected benefits and creating conditions for lowering tension.


DOI: 10.55643/fcaptp.2.61.2025.4718

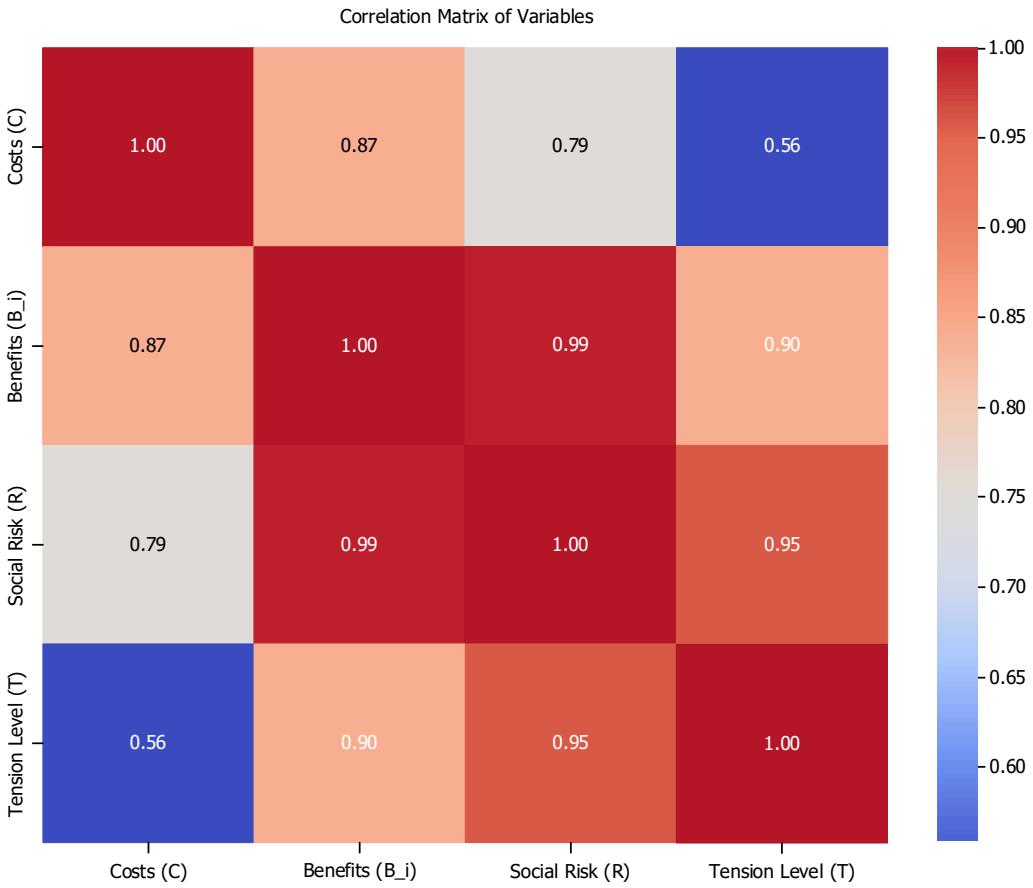


**Figure 4. Visualization of correlation analysis results assessing the relationship between key model variables: costs, benefits, social risks, and social tension levels.**

The positive relationship between costs and benefits confirms the importance of financial investments in social conflict management programs. However, the moderate correlation between costs and tension levels indicates that funding alone, without a strategic approach to planning measures, does not ensure a significant reduction in social tension. Conversely, the high correlation between benefits and tension levels confirms the effectiveness of comprehensive measures focused on achieving social cohesion.

The analysis results show that social risks are the central variable determining social stability. Their strong relationship with benefits and tension levels indicates that risk management is a key tool for achieving stability. At the same time, the strong positive correlation between benefits and social risks highlights the importance of focusing on long-term programs that maximize benefits through risk reduction.

The data suggests that a social conflict management system should be based on integrating economic and social factors into a unified strategy. This is confirmed by the high correlation coefficients between the model variables, indicating their interdependent influence. Thus, the study results emphasize the importance of a multi-criteria approach to management, where the optimization of financial resources, risk reduction, and ensuring social cohesion are fundamental to achieving stability.

## DISCUSSION

The discussion focuses on implementing financial and economic approaches to resolving social conflicts in municipal governance, considering modern challenges such as economic instability, social tension, and the consequences of military aggression. Synyuk (2024) emphasizes that conflict prevention and strategic planning at the local level are key elements in reducing social tension, particularly in an era of constant change. He highlights that modern municipal governance requires integrating financial and economic tools such as mathematical modelling and big data analysis. Garashchuk and Kutsenko (2022) point out that ensuring social security must consider the sociocultural aspects of sustainable development. Their study demonstrates that social initiatives to reduce inequality and support vulnerable groups are essential for long-

term social progress. This is supported by the research of Morita et al. (2019), which illustrates the effectiveness of local strategies for integrating vulnerable groups, using examples from Japan and Indonesia. Specifically, they stress the importance of combining national and regional governance approaches. Alsayegh et al. (2023) and Yankovoi et al. (2024) emphasize the role of digital technologies in monitoring social conflicts and implementing sustainable governance solutions. Their focus on digitalization as a tool for rapid response and resource optimization underscores the relevance of such approaches for the Ukrainian context. Ilchenko's (2023) study highlights the importance of social entrepreneurship as an effective tool for reducing conflict by creating new jobs and fostering social capital.

Meanwhile, O Garafonova et al. (2023) demonstrate how economic tools, particularly strategic financing, can be applied to post-war reconstruction and ensure the sustainable development of agricultural regions. The discussion confirms that integrating social, economic, financial, and technological innovations in a multidisciplinary approach is essential for effectively managing social conflicts. The conditions of the modern world demand not only the implementation of these approaches but also their adaptation to local specificities, which is particularly relevant for Ukraine in the context of post-war recovery.

## CONCLUSIONS

The study results confirm the significance of financial and economic approaches in assessing the effectiveness of social conflict resolution within the municipal governance system, a key condition for ensuring social stability and the sustainable development of territorial communities. The proposed mathematical model enables the optimization of resource allocation, forecasting the consequences of managerial decisions, and minimizing social risks, which is particularly crucial in the context of post-war recovery. The use of linear programming methods, agent-based modelling, and stochastic analysis enhances decision-making efficiency by considering multidimensional socio-economic factors and ensuring a comprehensive approach to social conflict management.

Correlation analysis has demonstrated a high level of interdependence between social risk levels and overall social stability, confirming the necessity of implementing strategies to mitigate conflict-inducing factors and establishing mechanisms to support social cohesion. The examination of international experience highlights the most effective practices, including social partnerships, state support mechanisms, and integration programs for vulnerable groups, which can be adapted to the Ukrainian context.

Further research should focus on expanding the interdisciplinary approach by integrating sociological, legal, and psychological aspects into financial and economic models for assessing social conflicts. A critical direction remains the application of artificial intelligence technologies and big data analytics for predicting conflict dynamics, opening new opportunities for improving the municipal governance system. Adapting the developed models to real management processes and testing them at the regional and national levels will contribute to enhancing the effectiveness of social conflict resolution mechanisms and ensuring the sustainable development of territorial communities.

## ADDITIONAL INFORMATION

### AUTHOR CONTRIBUTIONS

*All Authors have contributed equally.*

### FUNDING

*The Authors received no funding for this research.*

### CONFLICT OF INTEREST

*The Authors declare that there is no conflict of interest.*


DOI: 10.55643/fcaptp.2.61.2025.4718

## REFERENCES


1. Synyuk, O. (2024). Management of Social Conflicts: Approaches to Resolution and Prevention. Economy and Society, (65). https://doi.org/10.32782/2524-0072/2024-65-148
2. Garashchuk, O., & Kutsenko, V. (2022). Innovative Aspects of Sustainable Development and Social Security Formation in the Sociocultural Context. Visnyk Ekonomiky, 1, 8–21. https://doi.org/10.35774/visnyk2022.01.008
3. Alola, A. A., Alola, U. V., Akdag, S., & Yildirim, H. (2022). The Role of Economic Freedom and Clean Energy in Environmental Sustainability: Implication for the G-20 Economies. *Environmental Science and Pollution Research, 29*(24), 36608–36615. https://doi.org/10.1007/s11356-022-18666-5
4. Alsayegh, M., Ditta, A., Mahmood, Z., & Kouser, R. (2023). The Role of Sustainability Reporting and Governance in Achieving Sustainable Development Goals: An International Investigation. *Sustainability, 15*(4), 3531. https://doi.org/10.3390/su15043531
5. Bidone, F., & Kovacic, Z. (2018). From Nationalism to Global Climate Change: Analysis of the Historical Evolution of Environmental Governance in the Brazilian Amazon. *International Forestry Review, 20*(4), 420–435. https://doi.org/10.1505/146554818825240656
6. Chang, C. P., Wen, J., & Zheng, M. (2022). Environmental Governance and Innovation: An Overview. Environmental Science and Pollution Research, 1–2. https://doi.org/10.1007/s11356-021-18143-5
7. Guan, C., & Qamruzzaman, M. (2022). A Symmetric and Asymmetric Nexus Between Environmental Sustainability and Tourism Development in BRIC Nations: What Is the Role of Good Governance and Globalization? Frontiers in Environmental Science. https://doi.org/10.3389/fenvs.2022.973420
8. Morita, K., Okitasari, M., & Masuda, H. (2019). Analysis of National and Local Governance Systems to Achieve the Sustainable Development Goals: Case Studies of Japan and Indonesia. *Sustainability Science, 15*(1), 179–202. https://doi.org/10.1007/s11625-019-00739-z
9. Gicheru, E. (2016). The Role of the Co-operative Enterprise Model in Implementing the Sustainable Development Goals (SDGs) in Least Developed Countries (LDCs). Department of Co-operative and Agri-business Management (DCAM). https://repository.cuk.ac.ke/xmlui/handle/123456789/168
10. Halberstadt, J., Niemand, T., Kraus, S., Rexhepi, G., Jones, P., & Kailer, N. (2021). Social Entrepreneurship Orientation: Drivers of Success for Start-ups and Established Industrial Firms. Industrial Marketing Management, 94, 137–149. http://dx.doi.org/10.1016/j.indmarman.2020.06.012
11. Ilchenko, V. (2023). Social Entrepreneurship as a Tool to Achieve the Goals of Sustainable Development. *Market Economy: Modern Management Theory and Practice, 21*(3(52)), 114–126. https://doi.org/10.18524/2413-9998.2022.3(52).275788
12. Lutz, F. G. (2019). Social Enterprises: The Perspective of Distinct Actors in These Ecosystems [Master's thesis, Universidade Federal do Rio Grande do Sul]. https://www.lume.ufrgs.br/bitstream/handle/10183/197932/001099319.pdf?sequence=1
13. Rahman, A., & Sultana, N. (2020). Social Business: A New Chapter of Hybrid Business Toward Sustainable Development. The Palgrave Handbook of Corporate Social Responsibility, Springer, 1–30. https://link.springer.com/content/pdf/10.1007/978-3-030-22438-7_47-1.pdf
14. Yankovoi, R., Stadniichuk, R., Zhosan, H., Garafonova, O., & Biriukov, I. (2024). Innovative Transformation of a Financial Institution in the Context of Digitalisation and Its Impact on Social Conflict Management. *Financial and Credit Activity: Problems of Theory and Practice, 2*(55), 75–88. https://doi.org/10.55643/fcaptp.2.55.2024.4386
15. Kuznyetsova, A., Garafonova, O., Yankovoi, R., Zhosan, H., & Lomachynska, I. (2023). Development of an International Marketing Strategy for Domestic Enterprises During a State of War. *Marketing and Management of Innovations, 14*(4), 200–211. https://doi.org/10.21272/mmi.2023.4-15
16. Kuznyetsova, A., Kulish, D., Prykhodko, B., & Kuznyetsov, O. (2024). Innovative approaches to improving the process of risk management in the context of developing a strategy for the foreign economic activity of enterprises. *Marketing and Management of Innovations, 15*(1), 210–228. https://doi.org/10.21272/mmi.2024.1-16
17. Samoilikova, A., Herasymenko, V., Kuznyetsova, A., Tumpach, M., Ballova, M., & Savga, L. (2023). Effect of Education on Ease of Doing Business in Conditions of Innovation Development: Factor Analysis and Multiple Regression. *Marketing and Management of Innovations, 2*, 208–217. https://doi.org/10.21272/mmi.2023.2-19


*Стаднійчук Р., Гарафонова О., Янковой Р., Жосан Г., Джерелюк Ю., Стеценко Б.*

## ФІНАНСОВО-ЕКОНОМІЧНІ ПІДХОДИ ДО ОЦІНКИ ЕФЕКТИВНОСТІ ВРЕГУЛЮВАННЯ СОЦІАЛЬНИХ КОНФЛІКТІВ У МУНІЦИПАЛЬНОМУ УПРАВЛІННІ В КОНТЕКСТІ СТАЛОГО РОЗВИТКУ

Стаття присвячена аналізові фінансово-економічних підходів до оцінювання ефективності врегулювання соціальних конфліктів у системі муніципального управління, що спрямовані на забезпечення сталого розвитку територіальних громад. Визначено ключові чинники, що впливають на рівень соціальної напруги, серед яких нерівномірний розподіл ресурсів, соціально-економічні диспропорції, міграційні процеси та наслідки воєнних конфліктів. Досліджено

необхідність інтеграції міждисциплінарних підходів до оцінки соціальних конфліктів та управління ними, що охоплюють економічні, соціальні, політичні та правові аспекти. Обґрунтовано доцільність використання економічних інструментів оцінювання ефективності врегулювання соціальних конфліктів у муніципальному управлінні. Зокрема, застосовано аналіз витрат і вигод, регресійне моделювання та багатофакторний аналіз, що дозволяє оптимізувати ухвалення управлінських рішень і підвищити ефективність використання фінансових і матеріальних ресурсів. Проаналізовано можливості застосування математичних методів, таких як агентно-орієнтоване моделювання та стохастичний аналіз, для прогнозування динаміки соціальних конфліктів і розроблення стратегій їх попередження. Особливу увагу приділено українському контекстові, зокрема впливу внутрішньо переміщених осіб на соціальну структуру регіонів, економічному стимулюванню локальних громад і залученню міжнародного досвіду для відновлення соціально-економічної стабільності. Розглянуто стратегічні підходи до адаптації світових практик, включаючи механізми соціального партнерства, розвиток громадських ініціатив та інтеграційні програми, спрямовані на забезпечення соціальної згуртованості й економічного розвитку муніципалітетів. Автори наголошують на необхідності формування комплексної політики управління соціальними конфліктами, що базується на поєднанні інституційних механізмів, економічного стимулювання, фінансового розвитку й технологічних інновацій. Запропоновані результати можуть бути корисні для представників органів державної влади та місцевого самоврядування, науковців, практиків у царині муніципального управління та стратегічного планування, а також міжнародних партнерів, зацікавлених у підтримці процесів відновлення й розвитку України.

**Ключові слова:** управління соціальними конфліктами, фінансово-економічні підходи, математичне моделювання, зміни, витрати, ефективність, соціальна напруга, сталий розвиток, публічне управління, стратегічне управління

**JEL Класифікація:** H75, H77, O18, Q01, D74, C61, R58


DOI: 10.55643/fcaptp.2.61.2025.4718