Legal Regulatory Dilemma and Theoretical Breakthrough of Social Collaborative Governance - Based on the Perspective of Multi-Agent Interaction

Feng Li
Department of Public Security Management, Hubei Police College, Wuhan 430034, Hubei, China
Corresponding author: Feng Li (e-mail: 18007161500@163.com)

ABSTRACT This paper addresses the collaborative-governance deficit caused by unclear stakeholder responsibilities and disordered interactions in complex public governance scenarios. From the perspective of multi-agent interaction, it constructs a three-dimensional "stakeholder-behavior-responsibility" analytical framework. Evolutionary game models are used to simulate strategic interaction processes, social network analysis is used to describe structural relationship characteristics, and scenario simulation experiments are used to observe behavioral performance. Through the integrated analysis of strategy, structure, and behavior, the study decodes the formation mechanism and regulatory path of collaborative governance dilemmas. The results show that clear and coordinated incentive-punishment rules can increase stable cooperation probability to 92.7%, a multi-center information transmission model can improve regulatory penetration efficiency by approximately 44.5%, and a detailed procedural rule framework can shorten task completion time by about 34.0%. The study verifies that a composite research method based on interaction perspective can effectively diagnose governance gaps and optimize institutional design for substantive rule-of-law collaboration.

INDEX TERMS social governance, collaborative governance, legal regulation, multi-agent interaction, evolutionary game

I. INTRODUCTION

AS the complexity of cross-domain public affairs— such as digital platform governance and environmental protection cooperation—increases, the traditional government-centered, command-and-control regulatory model no longer meets the collaborative governance needs of the modern industry, where frequent communication and complex stakeholder interests intersect across fiber innovation and green manufacturing standards. This evolution necessitates a shift toward a more flexible, interactive framework capable of addressing the intricate technical and ecological requirements inherent in contemporary production [1,2]. The core problem is that the current legal system can't effectively define and regulate the multiple stakeholders' power and responsibility relationship which presents in dynamic form, resulting in regulatory lag, inefficient collaboration, and even institutional dysfunction. Thus, how to theoretically break through the static and one-dimensional regulatory thinking and build a legal regulatory model which can adapt to dynamic interaction and guide substantive cooperation to promote governance modernization has become a key problem to overcome. Existing research has fully recognized the importance of legal guarantees in collaborative governance and has mainly explored this from two levels: macro-level institutional construction and static power and responsibility allocation. However, most of these studies treat "collaboration" as a whole or a result, focusing on the normative argumentation of governance models and institutional principles, and generally lacking in-depth analysis of the micro-level interactive behaviors of multiple stakeholders in the "collaboration process" and how they shape each other with legal rules. This makes it difficult for relevant theories to explain why formally complete legal provisions often encounter implementation deviations or interaction failures in practice. To overcome these limitations, recent studies have attempted to analyze governance interactions using tools such as game theory and social network analysis. However, these methods are often fragmented, either overemphasizing theoretical deduction while neglecting empirical testing, or limited to a single analytical dimension, failing to systematically integrate "strategy-structure-behavior" to provide a panoramic view of the actual effectiveness of legal regulation. Therefore, this paper proposes and systematically applies a "multi-

agent interaction perspective" as an integrative analytical framework, aiming to bridge the gap between macro-level institutions and micro-level behaviors, and to provide a new methodological path for understanding how law takes effect in actual interactions [3,4]. This study attempts to systematically identify the legal regulatory dilemmas of social collaborative governance from this perspective and explore its theoretical breakthrough path. We first establish a three-dimensional "agent-behavior-responsibility" framework, then apply evolutionary game models, social network analysis and scenario simulation experiments to empirically test the effectiveness of different legal rule designs from three dimensions: strategic interaction dynamics, network structure characteristics, and behavioral outcomes [5,6]. Through this gradual analysis, in addition to revealing that "high incentive-high punishment" collaborative rule can raise the probability of stable cooperation, this study also finds that the multi-center interactive structures and detailed procedural rules have decisive influence on regulatory efficiency. This research provides solid theoretical support and empirical evidence for constructing a rule-of-law collaborative solution that matches the complex interactive reality of the industry, where aligning fiber technological innovation with stringent environmental regulations requires integrated multi-stakeholder governance. This framework facilitates a more robust legal and operational synergy capable of navigating the intricate technical standards and collaborative demands of modern manufacturing.

II. CASE ANALYSIS OF MULTI-SUBJECT INTERACTIVE SCENARIOS

In terms of subject dimension, there are significant differences in the legal status and role functions of the parties. Government departments have the dual identity of rule makers and executive supervisors; platform enterprises, as key hubs, are both commercial operators and undertake some de facto management functions; drivers and passengers, as direct users, have their rights claims and behavior patterns directly affecting the collaborative effectiveness; industry associations play the role of soft coordination and standard transmission. This role differentiation itself constitutes the primary reality that legal regulation needs to face. In terms of behavioral interaction dimension, a multi-level dynamic game relationship has been formed among multiple subjects. For example, the platform dynamically adjusts the order dispatch logic and reward and punishment mechanism through algorithm rules, while drivers respond with order-taking strategies, service ratings, and even collective strikes; local government departments issue regional management rules, and the platform needs to adjust its operating strategy to comply with the regulations, and may also form "regulatory cooperation" or "strategic avoidance" with the local government through data capabilities; passenger complaints may simultaneously trigger the platform's internal handling procedures and administrative regulatory intervention. These interactive behaviors often cross the traditional public and private legal domains, forming a continuous "behavioral flow," while the current laws often regulate this with fragmented and static clauses, resulting in regulatory lag or misalignment [7]. In terms of liability allocation, the cases clearly expose structural gaps in the law when addressing emerging collaborative models. For example, in the division of liability for safety accidents, the joint liability between platforms, drivers, and third parties is vaguely defined; in data governance and privacy protection, the boundaries between government regulatory power, platform governance power, and user rights are unclear; and in the coordination of collective interests (such as fare adjustments and revenue distribution), there is a lack of legally mandated negotiation procedures and guarantees of effectiveness. These gaps in liability are not simply legislative voids, but rather stem from the failure of rules to effectively embed themselves in the dynamic process of continuous interaction among multiple stakeholders, making liability provisions difficult to implement in practice or triggering new conflicts.

III. SOCIAL NETWORK GRAPH DRAWING OF INTERACTIVE RELATIONSHIPS

To operationalize the three game-theoretic roles, we map "regulators" to government nodes (e.g., Municipal Transportation Bureau), "core collaborators" to platform nodes, and "subordinate participants" to driver associations and individual practitioners. As defined entities in the case studies, the Municipal Transportation Bureau, platform companies, driver associations, and consumer rights organizations in case studies are referred to as "nodes". The "edges" connecting these nodes are weighted and assigned values according to the type of interaction between them: that is, "issuing administrative orders" and "submitting compliance reports" are defined as edges with authoritative flow; "data sharing" and "joint implementation" are defined as cooperative edges; "complaints" and "administrative penalties" are defined as conflicting or binding edges. The weights of the edges are quantified based on the level of interaction recorded in the policy texts, cooperation agreements, or case studies [8,9]. Based on the qualitative materials obtained from the case study deconstruction and some available quantitative data (such as the number of cross-departmental joint documents, the frequency of platform-government data interface calls, and the degree of entity participation in dispute mediation records), the study constructs a multimodal data matrix. For example, a "subject-event" membership network matrix is constructed to analyze the participation pattern of collaborative events, and a "subject-subject" directional relationship matrix is constructed to characterize the actual flow direction of resources, information, or influence. Finally, applying social network analysis software such as Gephi or UCINET, above matrix was imported and a visual network graph was drawn. In comparison with above static matrix, not only graph can intuitively display the core nodes and peripheral groups as well as the "structural holes" connecting different subgroups, but also it can accurately measure structural

position and power of each entity in interactive network by computing basic indicators such as network density, node centrality (degree centrality, betweenness centrality, proximity centrality), and core-periphery structure. For example, the entities that actually play the role of "hidden hubs" (which may not be the legally dominant institutions) can be identified by analyzing centrality; and by analyzing network components and subgroups, we can find out whether the regulatory power or information resources is controlled by a few groups, or there are just a lot of "information silos" scattered. These diagnostic findings carry direct implications for legal design. The identification of "hidden hubs"— nodes exercising de facto regulatory power despite lacking formal legal authority—signals a need for the law to impose corresponding procedural obligations and accountability mechanisms on these actors. Conversely, the presence of "structural holes" between regulatory authorities and grassroots participants indicates gaps in information flow that legal frameworks should bridge through mandated transparency and consultation procedures. Thus, social network analysis does not merely describe interaction patterns but reveals where legal intervention must reallocate rights, responsibilities, and information access to transform fragmented networks into coherent governance systems.

IV. STRATEGY INTERACTION SIMULATION BASED ON GAME THEORY MODEL

Building on the empirically derived network, we aggregate its concrete nodes into three ideal types— regulators, core collaborators, and subordinate participants—to form the evolutionary game model. First, the basic framework and types of game are determined. This study abstracts the essence of the interaction in collaborative governance into an evolutionary game with three typical representatives: regulators (taking the government as an example, having two strategies: "strict regulation," or "lenient regulation"), core collaborators (taking platform enterprises as an example or large social organizations having two strategies: "active compliance," or "strategic avoidance") and subordinate participants (taking individual practitioners as an example or small organizations, having two strategies: "cooperation," or "free-riding"). This demonstrates the typical hierarchical relationship of power and inferiority and subordination in the governance network [10]. Second, payoff matrix is set and the parameters of legal rule are introduced. The payoff matrix of the model is not fixed. The concrete contents of the core elements of the legal rules–the intensity of economic incentives (subsidy, tax reduction and exemption), the intensity of punishment (fine, disqualification), and the clarity of responsibility division are transformed into adjustable parameter variables. For example, the implementation cost of "strict regulation" strategy, the fine for "strategic avoidance" behavior, and the reputation gain and policy reward acquired by "active compliance" behavior are quantified into specific value of parameter based on a three-step calibration using industry financial data, legal penalty clauses, and case-based utility conversion, so as to simulate the moderating effect of the rule "leverage". It is important to acknowledge that the linear parameterization of incentive intensity (e.g., 0.3 to 0.8) in our model represents a necessary simplification for computational tractability, rather than an assertion of legal reality. In practice, regulatory instruments such as tax exemptions and subsidies are subject to diminishing marginal returns — beyond a certain threshold, additional fiscal stimulus yields progressively smaller behavioral changes due to institutional saturation or compliance fatigue. Furthermore, constitutional constraints and budgetary ceilings impose upper bounds on feasible incentive levels, which our parametric ranges (0.3, 0.8) are calibrated to reflect proportionally rather than absolutely. Thus, the “high” intensity setting (0.8) should be interpreted as the maximum legally and fiscally permissible level within a given jurisdiction, not as an unconstrained optimum. Finally, multi-scenario simulation and evolutionary path analysis were conducted. Based on the computational simulation tool, the multi-round group strategy interaction was simulated by setting different initial strategy ratio and rule parameter combination. The system’s strategy distribution converged to different stable equilibrium states (such as "all-member cooperation"), or "all-member betrayal," or mixed strategy equilibrium) after a period of time under the evolutionary rule of replicator dynamics. The evolutionary path, convergence speed and equilibrium result of the system under different regulatory scenario (such as "high incentive-weak punishment"), or "weak incentive-high punishment," or "incentive-punishment synergy") were compared and analyzed, so as to explore what kind of rule combination can guide and lock the system in a highly cooperative state.

V. "SUBJECT-BEHAVIOR-RESPONSIBILITY" THREE-DIMENSIONAL RULE GAP DIAGNOSIS

In terms of the subject dimension, the core of the diagnosis lies in the "static" and "formal" deviations in the legal identification and definition of actual roles in the governance network. Existing rules usually assign general identities based on traditional organizational types (such as administrative organs, corporate entities, and social groups), but fail to effectively respond to the new functional roles derived from continuous interaction. For example, large digital platforms play the role of "quasi-regulators" in practice, exercising de facto data governance, access review, and behavioral punishment rights. However, current laws have not set up matching lists of powers, procedural constraints, and accountability mechanisms for this kind of power formed based on technological and market advantages, resulting in the exercise of their power being in a state of "operation outside the law" or "invoking vague clauses." At the same time, for the information hub and trust bridge functions undertaken by key "intermediary organizations" or "opinion leaders" in the network, the law also lacks special qualification certification and behavioral guidelines, making their role dependent on chance rather than institutional guarantee [11]. In terms of

behavioral interaction dimension, the gaps in the rules are embodied in the lack of procedureal regulation of process interaction. Laws often emphasize on the substantive content of rights and obligations of all parties and the final outcome of interaction (such as fine and compensation), but lack a solid and flexible procedural design of dynamic processes that are indispensable to achieve collaborative goals (such as how to share information symmetrically, how to resolve differences in negotiation and how to balance interests in stages, etc.). For instance, in environmental collaborative governance, negotiations among governments, businesses, and communities often falter due to the absence of legally prescribed procedures—mirroring challenges in algorithmic governance [4,6], where platform-driven interactions similarly suffer from accountability gaps due to underspecified procedural rules. In terms of responsibility allocation, the problems diagnosed above, present a break in the chain of responsibility and a gap in sharing mechanism. That is, when damage or governance failure is caused by joint actions of stakeholders, current laws often find it hard to draw a clear line and fairly trace responsibility: Firstly, the determination of responsibility is over-reliant on causal relationship in a line, and hard to apply to collaborative scenario of networked multi-causes-to-effects, thus giving rise to ambiguous responsibility attribution or "dilution of responsibility" under joint liability; Secondly, there is a lack of flexible and dynamic responsibility sharing and updating mechanism corresponding to the collaborative process. Thirdly, for "soft" cooperative responsibilities such as reporting of information and issue of risk warning, the legal consequences of non-action are vague or the penalty is too mild and fails to form effective constraint.

VI. MULTIDIMENSIONAL MEASUREMENT OF COLLABORATIVE REGULATORY EFFECTIVENESS

A. EXPERIMENTAL SETUP

This study conducted the following three progressive and complementary experiments to establish a multi-dimensional measurement system for the effectiveness of collaborative regulation: First, drawing on the relational structures identified in the social network analysis (Section 3), we conducted evolutionary game simulation experiments (Section 4) to analyze the long-term effectiveness of different types of legal rules (incentives and penalties) on the evolution path and stability of multi-agent cooperative strategies under different parameters set, and evaluate the effectiveness of rules from an interactive dynamic perspective. Second, this study conducted social network penetration experiments to establish collaborative network models based on real case data and simulate the diffusion process of regulatory information in existing interaction structures, and evaluate the coverage uniformity and transmission effect of regulation from a structural perspective by measuring the penetration ability of regulation. Third, this study conducted scenario simulation control experiments to observe the behavior and performance of multiple agents in completing the same collaborative tasks under two differentiated legal frameworks (explicit procedural rules vs. principle-based provisions), and directly compare the immediate effects of refinement of legal rules on cooperation efficiency, conflict resolution, and agent perception. The above three experiments have verified the complex relationship between legal regulatory design and collaborative governance effectiveness from three dimensions, namely, rule parameters, network structure, and behavioral outcomes. This study was approved by the Ethics Committee of Hubei Police College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

B. MULTI-AGENT COOPERATIVE EVOLUTIONARY GAME EXPERIMENT UNDER REGULATORY CONDITIONS

This experiment builds an evolutionary game experiment model to simulate the process of three types of actors, namely, the government, enterprise, and social organization, interacting strategically in collaborative governance under certain legal rule parameters (incentives and penalties). The model sets an initial cooperation ratio and iteratively learns and corrects in several periods according to certain payoff matrix, hoping to explore the evolutionary effect of different regulatory intensities in the long term. The comparison results are presented in Table 1.

Experimental data shows that a simple weak incentive and weak penalty approach (Scenario A) is unlikely to foster stable cooperation (probability is only 24.5%). While high-intensity unilateral regulation can increase the probability of cooperation (65.8% in Scenario B and 42.1% in Scenario C), it has limitations in convergence speed and total system benefit. Only the synergistic combination of "high incentive and high penalty" (Scenario D) achieves optimal efficiency, significantly increasing the probability of stable cooperation to 92.7%. The system converges to cooperative equilibrium in only an average of 32.1 rounds and generates the highest average total benefit (356.2 units). This demonstrates that the effectiveness of legal regulation depends on the synergistic effect of "carrot and stick," and a single approach cannot solve the cooperation dilemma. However, this finding is not a universal prescription. Its optimality assumes sufficient fiscal budgets and constant enforcement costs—conditions often undermined in practice by institutional rigidities such as legislative approval processes or judicial review, which introduce non-linear cost structures. Future research should incorporate dynamic budget constraints and enforcement cost functions to test the robustness of this finding under fiscal stress.

C. EXPERIMENT ON THE EFFICIENCY OF REGULATORY INFORMATION TRANSMISSION BASED ON SOCIAL NETWORKS

A directed weighted social network is built in this experiment for simulating the multi-agent system in the usual

TABLE 1. Evaluation of Multi-Agent Cooperative Evolutionary Game under Regulatory Context

Regulatory Scenario ID	Incentive Intensity (I)	Penalty Strength (P)	Cooperative Stability Probability (%)	Average Convergence Time (Rounds)	Average Total Revenue (Units)
Scenario A	Low (0.3)	Low (0.3)	24.5	78.2	125.7
Scenario B	High (0.8)	Low (0.3)	65.8	45.6	287.4
Scenario C	Low (0.3)	High (0.8)	42.1	60.3	201.9
Scenario D	High (0.8)	High (0.8)	92.7	32.1	356.2

social collaborative governance. The network nodes denote four kinds of agents, including government agencies, core enterprises, social organizations, and the public. The weights of edges indicate the connection strength or the probability of information transmission between agents. The experiment simulates two kinds of regulatory information transmission modes: single-center mode (the information comes from one single node, i.e., the government node) and multi-center mode (the information comes from three center nodes, i.e., the government node and three hub social organization nodes at the same time). In 100 Monte Carlo simulations, the evolution of network coverage with time step is recorded, and the average time step required to reach 80% coverage is calculated as well as the average path length between core nodes. The comparison results are shown in Figure 1.

Simulation results show that the multi-center information transmission model exhibits a significant efficiency advantage over the traditional single-center model. In achieving the key indicator of 80% network coverage, the multi-center model requires an average of only 14.2 time steps, approximately 44.5% faster than the single-center model (25.6 time steps). Simultaneously, the average path length between core nodes in the multi-center model decreases from 2.81 to 1.93, a reduction of 31.3%, indicating that the transmission of regulatory information among key collaborative entities is more direct and efficient. It should be noted that the attached figure shows a single simulation instance under specific parameter settings; its trend is consistent with the average results of multiple simulations, and the differences in specific values reflect the individual characteristics of the random network structure. Overall, the data demonstrates that cultivating multiple information hub nodes in a collaborative governance network can effectively improve the penetration efficiency of legal regulation.

D. SCENARIO SIMULATION AND PERFORMANCE COMPARISON EXPERIMENT OF MULTI-AGENT COLLABORATIVE TASKS

In this experiment, we simulated a community environmental improvement task involving budget allocation and pollution control decisions. A total of 120 graduate students were randomly assigned to either a detailed-rules group (Group A, n=60) or a principle-based group (Group B, n=60). Both groups completed identical collaborative tasks under their respective virtual legal frameworks. We recorded task completion time, resource allocation efficiency, conflict resolution success, and post-experiment perceptions of fairness and trust. All reported differences between groups were statistically significant ($p < 0.01$, two-tailed t-tests), validating the robustness of the observed effects. Comparison results are presented in Table 2.

Experimental data shows that, compared to Group B, which relied solely on general principles, operating within a clearly defined framework of rights, responsibilities, and procedures (Group A) resulted in a comprehensive and significant improvement in multi-stakeholder collaborative efficiency. Specifically, task completion time was reduced by 34.0%, resource allocation efficiency increased by 24.3%, and the conflict resolution success rate increased dramatically by 25 percentage points. Furthermore, participants' subjective perceptions also improved significantly, with their sense of fairness and mutual trust in the collaborative process increasing by 41.5% and 43.6%, respectively. These results demonstrate that the concretization and proceduralization of legal regulations are key to overcoming collaborative inertia and friction. By providing clear behavioral expectations and interaction roadmaps, transaction costs can be substantially reduced, and confidence in cooperation can be enhanced, thereby transforming formal collaboration into highly effective governance.

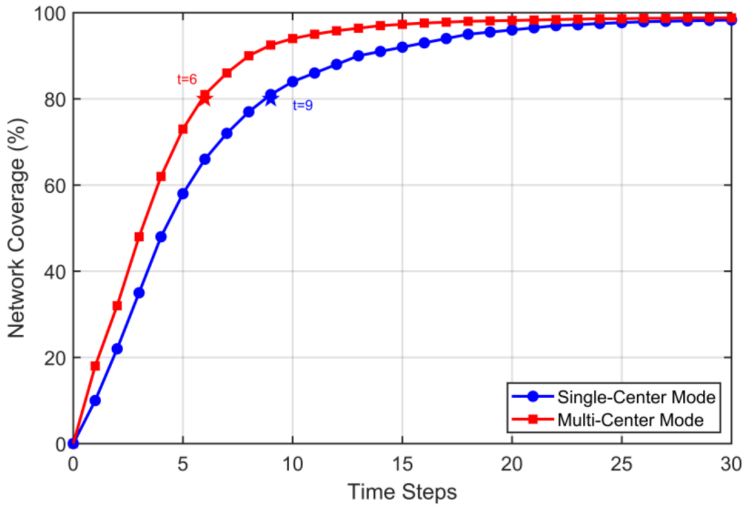

FIGURE 1. Evaluation of Regulatory Information Transmission Efficiency Based on Social Networks

TABLE 2. Scenario Simulation and Performance Comparison of Multi-Stakeholder Collaborative Tasks

Evaluation Metric	Rule-Explicit Group (Group A) Mean	Principle-Based Group (Group B) Mean	Efficiency Improvement
Task Completion Time (minutes)	42.3	64.1	Reduced by 34.0%
Resource Allocation Efficiency (score)	88.5	71.2	Increased by 24.3%
Conflict Resolution Success Rate (%)	90	65	Increased by 25.0 percentage points
Perceived Fairness (7-point scale)	5.8	4.1	Increased by 41.5%
Inter-Subject Trust Level (7-point scale)	5.6	3.9	Increased by 43.6%

*All comparisons between Group A and Group B are statistically significant at $p < 0.01$ (two-tailed t-tests). N = 120 participants (60 per group).

VII. CONCLUSION

This study demonstrates that a multi-stakeholder interaction perspective effectively diagnoses and resolves legal regulatory dilemmas in industry governance by aligning divergent interests across fiber manufacturers, research institutions, and environmental regulators. Applying the integrated "strategy-structure-behavior" framework, we find that effective legal regulation must move beyond static rights allocation to govern dynamic interaction processes. Specifically, rule design should pursue coordinated integration of incentives and penalties, cultivate multi-centered information nodes, and reduce interaction costs through fine-grained procedural rules. Critically, social network analysis translates these diagnostic insights into legal design: identifying "hidden hubs" mandates accountability mechanisms, while "structural holes" require information-forcing rules—enabling law to dynamically recalibrate power asymmetries. However, real-world implementation must also account for fiscal constraints and diminishing marginal returns on regulatory interventions, factors that future dynamic models should integrate. Given that this study is based on models and controlled experiments, the universality of its findings for non-steady-state governance scenarios requires further testing. Future research should expand into diverse, cross-cultural collaborative contexts within the global industry, exploring how to embed dynamic rules into technological governance systems to align emerging engineering standards with automated regulatory frameworks, thereby ensuring long-term industrial sustainability and innovation.

AUTHOR CONTRIBUTIONS

Feng Li designed, collected and analyzed the data, and drafted the manuscript. Feng Li conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Feng Li participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

FUNDING

This research received no external funding.

HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of Hubei Police College, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

ACKNOWLEDGEMENTS

Not applicable.

REFERENCES

[1] N. K. Singh and P. Kumar, "Analysing Social Entrepreneurship's Legal and Regulatory Frameworks Using Collaborative Innovation," Journal of Law and Sustainable Development, vol. 11, no. 6, Art. no. e1188, 2023, doi: 10.55908/sdgs.v11i6.1188.

[2] H. Wang and B. Ran, "Network governance and collaborative governance: A thematic analysis on their similarities, differences, and entanglements," Public management review, vol. 25, no. 6, pp. 1187-1211, 2023, doi: 10.1080/14719037.2021.2011389.

[3] T. Birkstedt, M. Minkkinen, A. Tandon, and M. Mäntymäki, "AI governance: themes, knowledge gaps and future agendas," Internet Research, vol. 33, no. 7, pp. 133-167, 2023, doi: 10.1108/intr-01-2022-0042.

[4] D. Gritsenko and M. Wood, "Algorithmic governance: A modes of governance approach," Regulation & Governance, vol. 16, no. 1, pp. 45-62, 2022, doi: 10.1111/rego.12367.

[5] F. Lumineau, W. Wang, and O. Schilke, "Blockchain governance—A new way of organizing collaborations?," Organization Science, vol. 32, no. 2, pp. 500-521, 2021, doi: 10.1287/orsc.2020.1379.

[6] A. Taeihagh, "Governance of artificial intelligence," Policy and society, vol. 40, no. 2, pp. 137-157, 2021, doi: 10.1080/14494035.2021.1928377.

[7] A. V. Wirba, "Corporate social responsibility (CSR): The role of government in promoting CSR," Journal of the Knowledge Economy, vol. 15, no. 2, pp. 7428-7454, 2024, doi: 10.1007/s13132-023-01185-0.

[8] B. Gu, F. Chen, and K. Zhang, "The policy effect of green finance in promoting industrial transformation and upgrading efficiency in China: analysis from the perspective of government regulation and public environmental demands," Environmental Science and Pollution Research, vol. 28, no. 34, pp. 47474-47491, 2021, doi: 10.1007/s11356-021-13944-0.

[9] B. Kiss, F. Sekulova, K. Hörschelmann, C. F.Salk, W. Takahashi, and C. Wamsler, "Citizen participation in the governance of nature-based solutions," Environmental Policy and Governance, vol. 32, no. 3, pp. 247-272, 2022, doi: 10.1002/eet.1987.

[10] J. Torfing, E. Ferlie, T. Jukić, and E. Ongaro, "A theoretical framework for studying the co-creation of innovative solutions and public value," Policy & Politics, vol. 49, no. 2, pp. 189-209, 2021, doi: 10.1332/030557321X16108172803520.

[11] S. Bussu, A. Bua, R. Dean, and G. Smith, "Introduction: Embedding participatory governance," Critical Policy Studies, vol. 16, no. 2, pp. 133-145, 2022, doi: 10.1080/19460171.2022.2053179.