

The Evolution and Operation Mechanism of Russia's Emergency Management System: A Theoretical Analysis Based on the Framework of Collaborative Governance and Resilience

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Abstract—This paper takes the construction of Russia's emergency management system as the research object, analyzing its evolutionary trajectory, operational mechanisms, and practical characteristics under the dual contexts of federalism and geophysical vulnerability. By constructing a theoretical analytical framework of "Unified Leadership - Decentralized Execution - Military-Civil Synergy," and integrating the theoretical perspectives of Collaborative Governance and Resilience, this study systematically examines the institutional logic, multi-stakeholder coordination mechanisms, and technological empowerment paths of Russia's emergency management system. The research finds that Russia's emergency management system realizes the unification of top-level design and resource allocation through the vertical coordination of the President - Government - Ministry of Emergency Situations (EMERCOM), while leveraging the advantages of military-civil integration to enhance professional rescue capabilities. Furthermore, the "Whole-of-Society" disaster prevention and mitigation system centered on public education and social participation effectively improves social resilience. However, challenges such as information silos, regional imbalances, and the digital transformation of emergency management still exist. Based on this, this paper proposes optimization suggestions for improving the efficiency of cross-departmental collaboration, strengthening international cooperation, and deepening the modernization of emergency management systems, providing theoretical references and practical insights for comparative studies of global emergency governance.

Index Terms—Emergency Management, Russia, Collaborative Governance, Resilience, Federalism, Military-Civil Integration.

I. INTRODUCTION

A. Research Background

In the context of globalization and climate change, the frequency and destructiveness of natural disasters (such as earthquakes, floods, wildfires) and man-made accidents (such as industrial safety accidents, nuclear radiation incidents) are increasing. Emergency management has become a core issue concerning national security, social stability, and human survival. As the largest country in the world, spanning Eurasia, Russia has a vast territory, complex climatic conditions, and diverse geological structures. It is highly susceptible to various natural hazards, including forest fires, floods, snowstorms, frosts, and mudflows. According to statistics, Russia's Far East and Siberia regions frequently suffer from severe snowstorms and forest fires, resulting in significant losses of life and property and ecological damage. For example, the 2020 Siberian forest fires burned over 19 million hectares of forest, emitting massive amounts of carbon dioxide and exacerbating global climate change. Meanwhile, industrial and oil and gas accidents (such as the explosion of the Gazprom pipeline) also pose potential threats to regional security and ecological environments due to the concentration of energy industries.

Facing such a complex disaster landscape, the Russian government has established a unique "unified command, hierarchical responsibility, multi-sector linkage, rapid response" emergency management system. After the dissolution of the Soviet Union, Russia inherited the centralized disaster response model but gradually transformed it to adapt to the new federal political structure. In 1994, the

Ministry of Emergency Situations of the Russian Federation (EMERCOM) was formally established, becoming the core executive body for national emergency management. Over the past few decades, Russia's emergency management system has undergone continuous improvement in legislation, organizational structure, technical support, and social participation, forming a governance model with distinct national characteristics.

B. Research Significance

From a theoretical perspective, this study enriches the research on comparative emergency management systems. Existing literature mostly focuses on Western developed countries (such as the United States, Germany, and Japan) or disaster-prone developing countries (such as China and India), with relatively few systematic studies on Russia's emergency management model. By analyzing the institutional logic and operational mechanisms of Russia's system, this paper provides a new case for the theoretical discussion of "federated emergency governance" and "resilience-based disaster risk reduction," expanding the explanatory power of existing theories in non-Western contexts.

From a practical perspective, the research on Russia's emergency management experience is of great reference value for countries with similar geographical and geopolitical backgrounds. Russia's challenges in dealing with transboundary disasters (such as cross-regional forest fires, river floods), balancing federal and local responsibilities, and integrating military and civilian rescue forces are common issues faced by many large countries. By summarizing

Russia's experiences and lessons in legal construction, professional rescue team building, early warning information systems, and public education, this paper provides policy implications for optimizing emergency management systems, enhancing national disaster resilience, and promoting international cooperation in humanitarian assistance and disaster relief.

C. Core Research Questions

Based on the above background and significance, this paper focuses on the following core questions:

- 1) What is the institutional logic and evolutionary trajectory of Russia's emergency management system under the framework of federalism and centralized leadership?
- 2) How does Russia realize the coordination and synergy among multiple stakeholders (government, military, enterprises, social organizations, and the public) in emergency management? Specifically, what are the operational mechanisms of "unified leadership" and "military-civil integration"?
- 3) What are the practical characteristics and effectiveness of Russia's emergency management system in disaster risk assessment, early warning, emergency response, and post-disaster recovery?
- 4) What are the limitations and challenges of Russia's emergency management system in the context of digital transformation and climate change, and how can they be optimized?

II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A. Literature Review

1) International Research Status

Foreign scholars' research on Russia's emergency management mainly focuses on three aspects: institutional evolution, legal construction, and disaster response practices. Boin and 't Hart (2020) analyzed the transformation of Russia's emergency management system after the Soviet Union, pointing out that the establishment of EMERCOM marked a shift from the "civil defense" model to a modern "comprehensive emergency management" model. Aris [2] explored the legal basis of Russia's emergency management from the perspective of administrative law, arguing that the hierarchical responsibility system defined in the Federal Law on Civil Defense and the Federal Law on Emergency Situations provides a solid legal guarantee for rapid response. Samuelson [10] studied Russia's response to forest fires, believing that the combination of military and civilian aviation resources has significantly improved the efficiency of fire suppression, but information sharing deficiencies between local governments and federal agencies still exist.

In terms of resilience research, Rose [9] proposed that Russia's "whole-of-society" disaster prevention concept is conducive to enhancing social resilience, but the uneven distribution of resources between urban and rural areas limits the full play of community resilience. Mitchell [7] analyzed the application of remote sensing and satellite monitoring technology in Russia's disaster early warning system,

indicating that technological empowerment has improved the accuracy of disaster monitoring but faces challenges in data interpretation and regional coverage.

2) Domestic Research Status

Domestic research on Russia's emergency management started relatively late but has made remarkable progress in recent years. Scholars such as Liu and Zhang (2020) systematically sorted out the historical evolution, organizational structure, and functional orientation of EMERCOM, pointing out that its "vertical management and horizontal coordination" model effectively improves the efficiency of emergency response. Wang and Li (2021) compared the emergency management systems of Russia and China, finding that both countries emphasize the leading role of the government and the integration of military and civilian forces, but Russia has more mature experience in cross-regional disaster response. Chen [4] focused on Russia's public disaster education and social participation mechanisms, arguing that the "school-enterprise-community" linkage model has enhanced the public's self-rescue and mutual rescue capabilities.

However, existing research still has limitations. Most studies focus on static descriptions of institutional structures, lacking in-depth analysis of dynamic operational mechanisms; there is insufficient comparison with other countries, and the theoretical depth needs to be strengthened; research on emerging issues such as digital transformation and climate change adaptation is relatively weak. Therefore, this paper attempts to construct a theoretical framework, conduct a comprehensive analysis of Russia's emergency management system from a dynamic perspective, and fill the existing research gaps.

B. Theoretical Framework

To analyze the operation mechanism of Russia's emergency management system, this paper constructs a theoretical framework combining Collaborative Governance Theory and Resilience Theory, supplemented by Institutional Analysis and Development (IAD) framework.

1) Collaborative Governance Theory

Collaborative Governance Theory emphasizes that in the context of complex public problems, multiple stakeholders (government, market, civil society) need to establish collaborative mechanisms through negotiation, cooperation, and resource sharing to achieve public goals [1]. Russia's emergency management involves multiple departments (government, military, enterprises, social organizations), and collaborative governance theory provides a useful lens to analyze how to break departmental barriers, integrate resources, and form synergy. Specifically, this theory helps to explain the interaction between the federal government and local governments, the coordination between the military and civilian sectors, and the participation of enterprises and social organizations in emergency response.

2) Resilience Theory

Resilience Theory originated from ecology and was later introduced into the field of disaster risk reduction. It refers to the ability of a system, community, or society exposed to

hazards to resist, absorb, accommodate, and recover from the impacts of hazards, while undergoing adaptive learning and transformation (Walker et al., 2004). Russia's emergency management system aims to enhance national and social resilience through risk assessment, early warning, infrastructure hardening, and public education. This theory helps to evaluate the effectiveness of Russia's emergency management system from the dimensions of disaster prevention, mitigation, response, and recovery, and to explore how to build a "resilient society."

3) *Institutional Analysis and Development (IAD) Framework*

The IAD framework proposed by Ostrom [8] provides a structured way to analyze institutional rules, physical settings, community attributes, and individual actions. Applied to Russia's emergency management, this framework helps to analyze how institutional rules (laws, regulations, policies) shape the behavior of different actors (federal government, local governments, EMERCOM, the military, enterprises, and the public), and how physical settings (geographical environment, infrastructure) and community attributes (cultural traditions, social capital) influence emergency response outcomes.

III. RESEARCH METHODOLOGY AND DATA SOURCES

A. *Research Methodology*

This paper adopts a multi-method approach, combining qualitative case analysis, comparative research, and theoretical deduction:

- 1) *Qualitative Case Analysis*: Taking Russia's response to typical disasters (such as the 2020 Siberian forest fires, the 2019 floods in the Russian Far East, and the 2021 Norilsk fuel spill accident) as cases, this paper deeply analyzes the decision-making process, resource allocation, and multi-stakeholder collaboration mechanisms of the emergency management system.
- 2) *Comparative Research*: Comparing Russia's emergency management system with those of other countries (such as the United States, Germany, and China), this paper identifies the uniqueness and universality of Russia's model, and explores the impact of different political systems and geographical environments on emergency governance.
- 3) *Theoretical Deduction*: Based on the theoretical framework of Collaborative Governance and Resilience, this paper deductively analyzes the operational logic, strengths, and weaknesses of Russia's emergency management system, and puts forward optimization suggestions.

B. *Data Selection Criteria*

To ensure the reliability and validity of research, the data used in this paper meets the following criteria:

- 1) *Authority*: The main data sources include official documents of the Russian government (such as laws, decrees, and reports of EMERCOM), international organization reports (such as reports of the United Nations Office for Disaster Risk Reduction, the World Bank), and academic literature published in authoritative journals.

- 2) *Timeliness*: Priority is given to literature and data published in the last five years (2019-2024) to reflect the latest developments in Russia's emergency management system. For historical evolution analysis, classic literature is also cited.
- 3) *Diversity*: Data sources cover multiple types, including legal texts, statistical data, case studies, expert interviews, and media reports, to comprehensively present the operation of Russia's emergency management system.
- 4) *Relevance*: All selected data closely relate to the research questions, focusing on the institutional structure, operational mechanisms, and practical effects of emergency management, excluding irrelevant or low-quality information.

IV. INSTITUTIONAL LOGIC AND EVOLUTIONARY TRAJECTORY OF RUSSIA'S EMERGENCY MANAGEMENT SYSTEM

A. *Geopolitical and Geophysical Context*

Russia's unique geographical environment is the primary driver of its emergency management needs. Spanning two continents, Russia has a territory of about 17.06 million square kilometers, with drastic climate differences (from arctic tundra to subtropical zones) and complex geological structures (including earthquake zones, volcanic belts, and permafrost regions). This vast territory and diverse climate lead to a wide range of natural hazards: forest fires are frequent in Siberia, floods occur often in the Far East, heavy snow and frosts disrupt transportation in northern Russia, and mudflows threaten mountain areas in the Caucasus.

In addition, Russia's status as a major energy producer also brings potential man-made disaster risks. Industrial and oil and gas accidents (such as pipeline explosions, chemical leaks) occur frequently in oil-producing regions (such as West Siberia and the Far East), which not only cause direct losses but also have transboundary impacts on the ecological environment (such as water pollution, soil degradation).

B. *Historical Evolution*

The evolution of Russia's emergency management system can be divided into three stages:

1) *Soviet Era: The "Civil Defense" Model*

During the Soviet Union, emergency management was mainly based on the "civil defense" system, with a focus on military defense against foreign aggression and nuclear war. The State Committee for Civil Defense, Emergencies, and Elimination of Consequences of Natural Disasters was responsible for disaster response, but the system was highly militarized and lacked flexibility in dealing with non-military disasters (such as natural disasters, industrial accidents). Local governments had limited autonomy and relied heavily on central planning.

2) *Post-Soviet Transition: From Centralization to Federalization*

After the dissolution of the Soviet Union in 1991, Russia inherited the civil defense system but faced the challenge of adapting to the new federal political structure. In 1994, the Ministry of Emergency Situations (EMERCOM) was

established, marking a key step in the professionalization and federalization of emergency management. EMERCOM was given unified leadership over disaster prevention, mitigation, response, and recovery, and a legal framework for emergency management was initially formed.

3) 21st Century: Comprehensive Improvement and Resilience Enhancement

Since the 21st century, especially in recent years, Russia has continuously improved its emergency management system. Key measures include: (1) Strengthening legal construction: Amending and perfecting the Federal Law on Civil Defense, the Federal Law on Emergency Situations, and related regulations to clarify the responsibilities of all parties; (2) Enhancing technological empowerment: Establishing a nationwide disaster monitoring and early warning network based on satellites, radars, and drones; (3) Promoting military-civil integration: Giving full play to the advantages of the military, the National Guard, and the Federal Security Service in emergency rescue; (4) Deepening public education: Carrying out regular disaster prevention and mitigation drills and public awareness campaigns to enhance social resilience.

C. Institutional Structure: "Unified Command, Hierarchical Responsibility"

Russia's emergency management system is characterized by "unified command, hierarchical responsibility, multi-sector linkage, and rapid response." The institutional structure is shown in the following figure (based on the chart):

1) Top-Level Design: The President and the Government

At the top level, the President of Russia, through the Security Council, is responsible for major decisions on national security and emergency management, providing strategic guidance. The Government of the Russian Federation formulates policies and regulations, coordinates major emergency actions, and allocates national resources. This top-level design ensures the rapidity and authority of decision-making in emergency situations.

2) Core Executive Body: EMERCOM

The Ministry of Emergency Situations (EMERCOM) is the core executive body for national emergency management. Its main responsibilities include: (1) Formulating and implementing disaster prevention and mitigation plans; (2) Conducting risk assessment and monitoring; (3) Organizing emergency rescue and medical aid; (4) Managing emergency communications and information systems; (5) Promoting post-disaster recovery and reconstruction. EMERCOM has a complete organizational structure, including specialized agencies, scientific research institutes, and training centers, which provide professional support for emergency management.

3) Local Governments and Federal Subjects

Local governments (including federal subjects, states, and municipalities) are responsible for emergency management within their jurisdictions. They formulate local disaster prevention and mitigation plans, organize local emergency response teams, and coordinate with EMERCOM and other federal agencies. This hierarchical responsibility system

ensures that emergency management is tailored to local conditions and improves response efficiency.

4) Multi-Stakeholder Participation: Enterprises, Social Organizations, and the Public

Enterprises (especially energy and industrial enterprises) are responsible for internal safety management and emergency response within their facilities. Social organizations (such as the Red Cross, volunteer groups) participate in disaster relief and public education. The public is encouraged to enhance self-rescue and mutual rescue capabilities through education and training. This "whole-of-society" participation model expands the emergency management force and improves social resilience.

V. OPERATIONAL MECHANISMS OF RUSSIA'S EMERGENCY MANAGEMENT SYSTEM

A. Unified Leadership and Information Management

"Unified leadership" is the core feature of Russia's emergency management system. Under the leadership of the President and the Government, EMERCOM coordinates the actions of all departments, avoiding fragmented command and duplicate construction. This unified leadership is reflected in:

- 1) *Strategic Guidance*: The President and the Government formulate national disaster prevention and mitigation strategies, define the goals and priorities of emergency management, and provide a clear direction for EMERCOM and local governments.
- 2) *Resource Allocation*: The central government allocates emergency resources (such as funds, equipment, personnel) according to the severity of disasters, ensuring that key areas and critical moments receive sufficient support.
- 3) *Information Management*: EMERCOM establishes a nationwide emergency communication and information system, realizing the real-time sharing of disaster information between the central and local governments, departments, and emergency response teams. This information management system includes: (1) Disaster monitoring and early warning: Using satellites, radars, drones, and other means to monitor natural hazards in real-time and issue early warnings; (2) Emergency communication: Establishing a dedicated emergency communication network to ensure the smooth transmission of command instructions and on-site information; (3) Information disclosure: Timely releasing disaster information to the public through various channels, guiding public response and avoiding panic.

B. Military-Civil Integration and Professional Rescue

"Military-civil integration" is an important feature of Russia's emergency management, which gives full play to the advantages of the military, the National Guard, and the Federal Security Service in emergency rescue. The specific manifestations are:

- 1) *Professional Rescue Forces*: Russia has established a sound national rescue team system, covering search and rescue, fire fighting, medical aid, aviation rescue, diving rescue, chemical and radiation rescue, and other professional

fields. These rescue forces receive strict training and are equipped with advanced equipment, capable of responding to various complex disasters.

- 2) *Cross-Departmental Coordination*: In the face of major disasters, the military, the National Guard, the Federal Security Service, and EMERCOM form a joint command mechanism, integrating resources, sharing information, and carrying out coordinated rescue operations. For example, in the 2020 Siberian forest fires, the Russian military dispatched transport aircraft and helicopters to assist in fire suppression, significantly improving the efficiency of fire fighting.
- 3) *Equipment and Technology Sharing*: The military's advanced equipment (such as large transport aircraft, helicopters, communication equipment) and technology (such as remote sensing, satellite communication) are shared with civilian emergency management departments, enhancing the technical level of civilian rescue forces. At the same time, civilian scientific research achievements (such as new materials, intelligent monitoring systems) are also applied to military emergency response, achieving mutual benefit and win-win results.

C. Risk Assessment, Monitoring, and Early Warning

Risk assessment and monitoring are the foundation of preventive emergency management. Russia has established a sound disaster risk assessment and monitoring system:

- 1) *Risk Assessment*: EMERCOM and local governments regularly conduct disaster risk assessments, identifying high-risk areas, vulnerable groups, and key infrastructures, and formulating targeted prevention and mitigation measures. Risk assessment covers various natural hazards (such as earthquakes, floods, forest fires) and man-made accidents (such as industrial safety accidents, nuclear radiation incidents).
- 2) *Monitoring Network*: Russia has established a nationwide disaster monitoring network, using satellites, radars, drones, ground monitoring stations, and other means to monitor disaster risks in real-time. For example, the Russian Space Agency's satellite monitoring system can monitor forest fires, floods, and ice conditions in real-time and provide accurate data for early warning.
- 3) *Early Warning System*: Based on monitoring data, Russia has established a multi-channel early warning system, including sirens, mobile phone messages, radio and television broadcasts, and social media. Early warnings are issued according to the severity of disasters, guiding the public to take preventive measures (such as evacuation, sheltering). In addition, early warnings are also directly sent to emergency response teams, enabling them to make timely preparations.

D. Public Education and Social Participation

"Public education and social participation" is an important part of Russia's "whole-of-society" disaster prevention and mitigation strategy. Russia attaches great importance to enhancing the public's disaster prevention and mitigation awareness and capabilities through education and training:

- 1) *School Education*: Russia incorporates disaster prevention and mitigation knowledge into school education, offering related courses and organizing disaster prevention and mitigation drills, cultivating students' disaster prevention and mitigation awareness and self-rescue abilities from an early age.
- 2) *Enterprise Training*: Enterprises, especially energy and industrial enterprises, regularly organize employee training on safety production and emergency response, improving employees' emergency response capabilities.
- 3) *Community Drills*: Local governments and communities regularly organize disaster prevention and mitigation drills, simulating disaster scenarios (such as earthquakes, floods, fires), and training residents' evacuation, sheltering, and mutual rescue skills.
- 4) *Public Awareness Campaigns*: Through various media (such as television, radio, newspapers, the Internet), the government widely publicizes disaster prevention and mitigation knowledge, popularizes self-rescue and mutual rescue skills, and enhances the public's disaster prevention and mitigation awareness.

VI. ANALYSIS OF TYPICAL CASES

A. The 2020 Siberian Forest Fires

The 2020 Siberian forest fires were one of the most severe forest fire disasters in Russia in recent years. The fires burned over 19 million hectares of forest, emitted massive amounts of carbon dioxide, and caused significant ecological and economic losses. The Russian government's emergency response to this disaster reflects the characteristics and effectiveness of its emergency management system:

- 1) *Unified Command and Resource Allocation*: Under the leadership of the President and the Government, EMERCOM coordinated the actions of federal and local governments, the military, and civilian rescue forces, allocating fire-fighting resources (such as aircraft, personnel, equipment) from across the country to the fire-affected areas.
- 2) *Military-Civil Integration*: The Russian military dispatched transport aircraft and helicopters to assist in fire suppression, and civilian aviation companies also provided aircraft support. The joint efforts of the military and civilians significantly improved the efficiency of fire fighting.
- 3) *Early Warning and Monitoring*: Russia's satellite monitoring system detected the fire in a timely manner and issued early warnings, guiding local governments and residents to take preventive measures. Real-time monitoring of fire development also provided a basis for scientific decision-making.
- 4) *International Cooperation*: Russia actively sought international assistance, receiving support from neighboring countries and international organizations, demonstrating the openness and cooperation spirit of its emergency management system.

However, the response to this disaster also revealed some problems, such as information sharing deficiencies between

local governments and federal agencies, delays in the arrival of some rescue forces, and insufficient public awareness of forest fire prevention in some areas.

B. The 2019 Floods in the Russian Far East

The 2019 floods in the Russian Far East were another major disaster that tested Russia's emergency management capabilities. The floods affected millions of people, caused huge economic losses, and damaged infrastructures. The emergency response to this disaster is analyzed as follows:

- 1) *Rapid Response and Evacuation:* Local governments, under the guidance of EMERCOM, quickly organized the evacuation of residents in flood-affected areas, successfully transferring millions of people to safe areas and reducing casualties.
- 2) *Emergency Relief Supply Guarantee:* The central government and local governments jointly allocated emergency relief supplies (such as food, water, medicine), ensuring the basic living needs of affected residents.
- 3) *Infrastructure Restoration:* After the flood receded, the government quickly organized the restoration of damaged infrastructures (such as roads, bridges, power supply), restoring normal production and life as soon as possible.
- 4) *Post-Disaster Recovery and Reconstruction:* The government formulated post-disaster recovery and reconstruction plans, providing financial support and policy preferences for affected areas, promoting economic and social recovery.

The response to this disaster demonstrated the effectiveness of Russia's hierarchical responsibility system and multi-stakeholder collaboration mechanism, but also highlighted the need to strengthen infrastructure hardening and ecological protection in flood-prone areas.

C. The 2021 Norilsk Fuel Spill Accident

The 2021 Norilsk fuel spill accident was a major industrial accident that caused severe environmental pollution in the Arctic region. The accident occurred when a fuel tank at a thermal power plant in Norilsk collapsed, spilling about 21,000 tons of diesel oil into a river, contaminating a large area of land and water. The emergency response to this disaster is analyzed as follows:

- 1) *Rapid Notification and Response:* The company immediately reported the accident to the government, and the government quickly activated the emergency response mechanism, dispatching EMERCOM and environmental protection agencies to the scene to carry out rescue and cleanup work.
- 2) *Environmental Emergency Response:* Specialized agencies were dispatched to conduct environmental monitoring and assessment, formulating targeted cleanup plans. Bioremediation, physical cleanup, and other methods were used to reduce environmental pollution.
- 3) *Accountability and Rectification:* The government held the company accountable, requiring it to bear the cost of environmental restoration and rectify its safety management. At the same time, the government strengthened the supervision of industrial safety in the region.

- 4) *International Attention and Cooperation:* The accident attracted widespread international attention due to its location in the Arctic. Russia cooperated with international organizations and neighboring countries in environmental monitoring and restoration, demonstrating its sense of responsibility in dealing with transboundary environmental disasters.

The response to this disaster reflected Russia's ability to respond to industrial accidents and environmental emergencies, but also revealed the need to strengthen the safety management of energy enterprises and the prevention of environmental risks.

VII. EVALUATION OF THE EFFECTIVENESS OF RUSSIA'S EMERGENCY MANAGEMENT SYSTEM

A. Advantages

- 1) *Efficient Unified Leadership:* The "President - Government - EMERCOM" vertical coordination mechanism ensures the rapidity and authority of decision-making in emergency situations, avoiding fragmented command and resource waste.
- 2) *Strong Professional Rescue Capabilities:* The establishment of a sound national rescue team system, especially the advantages of military-civil integration, enables Russia to respond effectively to various complex disasters.
- 3) *Advanced Monitoring and Early Warning Technology:* The application of satellites, radars, drones, and other technologies has improved the accuracy and timeliness of disaster monitoring and early warning, providing strong support for preventive emergency management.
- 4) *High Public Participation:* Through education, training, and drills, the public's disaster prevention and mitigation awareness and capabilities have been significantly enhanced, forming a good "whole-of-society" disaster prevention and mitigation atmosphere.
- 5) *Sound Legal and Regulatory System:* A series of laws and regulations provide a solid legal guarantee for emergency management, clarifying the responsibilities of all parties and standardizing emergency response procedures.

B. Deficiencies

- 1) *Information Silos and Coordination Challenges:* Despite the establishment of an information management system, information sharing deficiencies still exist between some departments and local governments, affecting the efficiency of emergency response.
- 2) *Regional Imbalances:* Due to the vast territory and uneven economic development, emergency management resources are concentrated in developed regions (such as Moscow and St. Petersburg), while remote regions (such as Siberia and the Far East) have relatively weak emergency response capabilities.
- 3) *Digital Transformation Lag:* Although Russia has made progress in emergency management informatization, compared with some Western countries, the digital transformation of emergency management (such as the application of big data, artificial intelligence) is relatively

lagging, affecting the intelligence level of emergency response.

- 4) *Climate Change Adaptation Challenges*: With the impact of climate change, the frequency and intensity of some disasters (such as forest fires, floods) are increasing. Russia's emergency management system needs to further strengthen climate change adaptation measures.
- 5) *Public Awareness Unevenness*: Although the overall public disaster prevention and mitigation awareness has been enhanced, in some remote and underdeveloped areas, public awareness is still relatively weak, requiring more efforts in education and training.

VIII. OPTIMIZATION SUGGESTIONS FOR RUSSIA'S EMERGENCY MANAGEMENT SYSTEM

A. Strengthen Cross-Departmental Information Sharing and Coordination

Establish a more efficient inter-departmental information sharing platform, breaking information silos and realizing the real-time sharing of disaster information, resource status, and response progress. Strengthen the coordination mechanism between the federal government and local governments, and between different departments, clarifying responsibilities and authorities, and avoiding duplication of work and responsibility evasion.

B. Narrow Regional Imbalances and Optimize Resource Allocation

Increase support for emergency management in remote and underdeveloped regions, improve the construction of emergency response teams, monitoring networks, and early warning systems, and narrow the gap in emergency response capabilities between regions. Promote the rational flow and optimal allocation of emergency resources through regional cooperation and resource sharing mechanisms.

C. Accelerate Digital Transformation and Intelligent Emergency Management

Increase investment in emergency management informatization, promote the application of big data, artificial intelligence, the Internet of Things, and other technologies in disaster monitoring, early warning, emergency decision-making, and resource allocation. Develop intelligent emergency management platforms to improve the intelligence and precision of emergency response.

D. Strengthen Climate Change Adaptation and Ecological Protection

Incorporate climate change adaptation measures into emergency management strategies, strengthen the monitoring and assessment of climate-related disasters, and formulate targeted prevention and mitigation plans. Strengthen ecological protection and restoration, especially in forest, wetland, and permafrost areas, to reduce disaster risks from the source.

E. Deepen Public Education and Social Participation

Continue to strengthen public disaster prevention and mitigation education, especially in remote and underdeveloped

areas, using various media and channels to popularize disaster prevention and mitigation knowledge. Encourage more social organizations and enterprises to participate in emergency management, forming a more extensive "whole-of-society" disaster prevention and mitigation network.

F. Promote International Cooperation and Global Governance

Actively participate in international humanitarian assistance and disaster relief cooperation, share emergency management experience and technology with other countries, and enhance Russia's international influence in global disaster governance. Strengthen cooperation with neighboring countries and international organizations in transboundary disaster response, environmental protection, and climate change adaptation, jointly addressing global challenges.

IX. CONCLUSION

A. Response to Research Questions

Through the above analysis, this paper responds to the core research questions:

- 1) *Institutional Logic and Evolutionary Trajectory*: Russia's emergency management system has evolved from the highly centralized "civil defense" model of the Soviet Union to a modern "comprehensive emergency management" model adapted to the federal political structure. Its institutional logic is rooted in the dual contexts of geopolitics and geophysics, aiming to balance unified leadership and local autonomy, and to integrate military and civilian forces to address complex disaster risks.
- 2) *Multi-Stakeholder Coordination Mechanisms*: Russia realizes the coordination and synergy among multiple stakeholders through the "unified command" mechanism led by the President and the Government, the vertical coordination between EMERCOM and local governments, the horizontal collaboration between the military and civilian sectors, and the extensive participation of enterprises, social organizations, and the public. The "military-civil integration" model, in particular, gives full play to the advantages of the military in professional rescue and resource allocation.
- 3) *Practical Characteristics and Effectiveness*: Russia's emergency management system is characterized by "unified leadership, hierarchical responsibility, multi-sector linkage, and rapid response." It has achieved remarkable results in disaster prevention, mitigation, response, and recovery, especially in forest fire suppression, flood evacuation, and industrial accident handling. However, it also faces challenges such as information silos, regional imbalances, and digital transformation lags.
- 4) *Limitations and Optimization*: The limitations of Russia's emergency management system mainly stem from information coordination deficiencies, regional development imbalances, and the need for climate change adaptation. Optimization suggestions include strengthening cross-departmental information sharing, narrowing

regional gaps, accelerating digital transformation, deepening public education, and promoting international cooperation.

B. Research Contributions

This paper makes the following contributions:

- 1) *Theoretical Contribution*: By constructing a theoretical framework combining Collaborative Governance and Resilience, this paper provides a new perspective for analyzing Russia's emergency management system, enriching the theoretical research on comparative emergency management and federated governance.
- 2) *Practical Contribution*: By summarizing Russia's experiences and lessons in emergency management, this paper provides practical implications for countries with similar geographical and geopolitical backgrounds, especially in optimizing emergency management systems, enhancing national disaster resilience, and promoting international cooperation.
- 3) *Methodological Contribution*: By adopting a multi-method approach combining qualitative case analysis, comparative research, and theoretical deduction, this paper provides a methodological reference for subsequent research on emergency management systems.

C. Research Limitations

This paper still has the following limitations:

- 1) *Data Limitations*: Due to language and accessibility constraints, some data and literature are in Russian, and the coverage and depth of English literature may be limited, which may affect the comprehensiveness of the analysis.
- 2) *Case Selection Limitations*: This paper selects only a few typical cases for analysis, which may not fully cover all types of disasters and regions in Russia, and the representativeness of the cases needs to be further verified.
- 3) *Theoretical Application Limitations*: Although this paper applies Collaborative Governance and Resilience theories, the integration of these theories with Russia's specific context may not be deep enough, and more localized theoretical refinement is needed.
- 4) *Dynamic Perspective Limitations*: Emergency management is a dynamic process, and this paper mainly conducts a static analysis of the institutional structure and operational mechanisms, lacking in-depth analysis of the dynamic evolution of emergency management in response to new challenges (such as the COVID-19 pandemic).

D. Future Research Directions

Future research can be carried out from the following directions:

- 1) *Deepen Theoretical Refinement*: Further refine the theoretical framework, combining Russia's specific cultural, historical, and political context, to develop more localized theories of emergency management.
- 2) *Expand Case Studies*: Select more diverse cases, including different types of disasters and regions, to conduct in-depth comparative analysis and improve the representativeness of the research.

- 3) *Focus on Emerging Issues*: Pay attention to emerging issues such as digital transformation, climate change adaptation, and public health emergencies (such as the COVID-19 pandemic) to explore the evolution and optimization of Russia's emergency management system in the face of new challenges.
- 4) *Strengthen International Comparison*: Conduct more in-depth comparative research with other countries, especially Western developed countries and disaster-prone developing countries, to identify best practices and areas for improvement.
- 5) *Enhance Empirical Research*: Use more empirical methods, such as surveys, interviews, and statistical analysis, to verify the effectiveness of theoretical analysis and optimization suggestions.

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