

Emergency Cooperation Mechanism under Institutional Collective Action — A Review on Inter Organizational Collaboration

Wei Kang and Shuo Mao

Abstract—In recent years, due to the high-frequency growth and increasing cross-border nature of all kinds of emergency events, which has made the emergency management ability of a single organization in the face of all kinds of emergencies is not so prominent. How to strengthen the cooperation of different organizations in emergency management has become a major problem to be solved by the governments at all levels. Many scholars in various fields have also carried out a variety of theoretical research and management practice. This paper introduces the role of cooperation mechanism under the institutional collective action framework in the emergency management in the face of different types of emergencies. The emergencies are divided into natural disasters, social security events, disaster accidents and public health emergencies. This study found that cooperation mechanism with different degree of autonomy and complexity can effectively help organizations strengthen their willingness to cooperate, promote formal and informal exchanges, promote the rational flow and effective allocation of resources and promote effective collective action. And the binding and bridging mechanism is more popular with the organization participants in all levels of government when dealing with all kinds of emergencies, while other types of cooperation mechanisms focus on different types of emergencies according to their own characteristics. Through the in-depth study of cooperation mechanism under the institutional collective action framework, it also provides a new idea for the domestic emergency management.

Index Terms—Emergency management, emergency, institutional collective action, inter organizational collaboration.

I. INTRODUCTION

With the frequent occurrence of emergencies, it has a greater and greater impact on the whole society, and has brought huge casualties and property losses to the society. The emergency management of emergencies has also become an important task for the government to improve social management ability, promote economic development and maintain social stability. However, efficient emergency management is not only an institutional arrangement, but also the degree to which each organization participates in the emergency management process [1]. Relying solely on the traditional government subject capacity and a single institutional arrangement cannot timely and effectively improve the management situation at a certain stage to deal with complex and diverse emergencies. In other words, areas with resilience should be areas with collaborative emergency

management capabilities, including various organizations [2]. While many aspects of the collaborative process have been discussed in the management literature, the connection between collaboration and the dynamics of institutional fields has remained largely unconsidered. Yet, collaboration is an important arena for interorganizational interaction and, therefore, a potentially important context for the process of structuration upon which institutional fields depend. In this article, we argue that institutionalization and collaboration are interdependent; institutional fields provide the rules and resources upon which collaboration is constructed, while collaboration provides a context for the ongoing processes of structuration that sustain the institutional fields of the participants. Thus, we provide a simple definition of collaboration: a cooperative relationship among organizations that relies on neither market nor hierarchical mechanisms of control. This definition is inclusive, yet provides a set of three critical characteristics that distinguish collaboration from other forms of organizational activity. First, collaboration occurs between organizations; it is an interorganizational phenomenon. Second, our definition limits collaborative relationships to those that are not mediated by market mechanisms. Third, while collaboration is distinct from the exchange relations that characterize markets, it is also distinct from the hierarchical relations that are often contrasted with markets.

The emergency management of various emergencies should develop towards strengthening Inter Organizational cooperation, mainly for the following two reasons. First, environmental complexity. Due to the diversity and uncertainty of emergencies, even if organizations have a clear understanding of the emergency management network, the ability of a single organization to absorb natural and non natural disasters is disturbed by a variety of uncertain factors, which may cause the emergency management ability of a single organization to be submerged in various stages such as prevention, response and aftermath. Therefore, emergency management should develop towards multiple governance subjects. Organizational participants with different backgrounds need to interact and cooperate to improve the efficiency of emergency management. Inter Organizational cooperation has become an indispensable part of emergency management [3], [4]. Second, the limitations of organization and resources. A single organization rarely has sufficient and necessary resources to deal with all kinds of emergencies [5]. Therefore, establishing and maintaining inter organizational collaboration has become the key to overcome the limitations within the organization and strengthen the ability of organizational governance [6], [7]. Inter Organizational

Manuscript received June 30, 2022; revised August 23, 2022.

Shuo Ma and Wei Kang are with the Harbin Engineering University (e-mail: kangwei9199@qq.com, ms_heu@163.com).

linkages across administrative and political boundaries have laid the foundation for the efficient allocation of various resources among organizations. The formulation of effective emergency preparedness plans and implementation plans depend on multiple organizations [8]. In disaster prone areas, emergency preparedness based on Inter Organizational collaboration can enable organizations to effectively respond to various disasters, efficiently mobilize key resources and minimize losses [9]. Based on the above two reasons, local governments and organizations all over the world are more inclined to adopt cooperative governance in the face of emergency management, which can deal with the collective action dilemma caused by the administrative fragmentation of a single government. And because all kinds of emergencies have their own different characteristics, how to adopt appropriate cooperation mechanisms to promote Inter Organizational cooperation has attracted scholars' close attention.

For the problem of strengthening Inter Organizational cooperation, scholars in various fields have put forward a variety of theoretical models. Ostrom Put forward the institutional analysis and development framework. Joint agreement or cooperative action can be taken on the premise of individual rationality to alleviate the collective action dilemma, but it has limitations when applied to the collective action dilemma at the organizational level. In 2005, Professor feiock first put forward the theoretical framework of institutional collective action, which is based on the institutional analysis and development framework, takes rational actors as the central preference, focuses on the interaction between organizations, and further studies how to face the dilemma of collective action among multiple organizations [10]. This enables organizations to analyze collective action at the organizational level and take collective action higher than the individual level [11]. Moreover, for Inter Organizational collaboration, the ICA framework believes that due to the different nature of Inter Organizational activities, different frequency of collaboration and different experience with existing or potential collaborators, organizations often make strategic decisions depending on the level of collaboration risk in order to obtain the comparative advantage of collaboration with other organizations^[10,12]. Then if we can design a reasonable scheme that can reduce the risk of cooperation, the government or other organizations as rational people can cooperate with other organizations [10], [13]. In other words, appropriate Inter Organizational cooperation mechanism can make collective action carried out efficiently. Based on this ICA framework, a cooperation mechanism with different autonomy and different cooperation scope is proposed to meet the cooperation needs of various organizations, so that it can achieve better results than acting alone.

Emergency management is not only a normalization process, but also an emergency disposal process, but also a trial and error process. It can only be the continuous adjustment and efforts among organizations, and summarize the scientific scheme from experience and summarize the theory. In all kinds of emergencies, coordinating the contact between various organizations is the top priority for efficient emergency management. There is an urgent need for various appropriate cooperation mechanisms between organizations

to build a stage for emergency management, and give full play to the role of inter organization cooperation in efficient allocation of resources, reducing the burden of individual organizations and improving the post disaster recovery capacity of various regions [14]. The cooperation mechanism under the ICA framework provides different ways for inter organization cooperation and communication, expands the communication channels and improves the communication efficiency. For example, in public health emergencies, good communication results help to improve the awareness of organizations about some infectious diseases and reduce the spread of cross-border infectious diseases to a certain extent. At present, institutional collective action has become the international mainstream framework for collaborative governance in various fields. Different organizations can flexibly choose the cooperation mechanism to serve them according to their autonomy and cooperation scope in the emergency management network structure. However, in the existing research, there is still a lack of comprehensive research on the role of the cooperation mechanism under ICA in various emergency management. This paper is committed to making up for this gap, collecting and sorting out a large number of documents, and taking different types of emergencies as different research topics. On the basis of reflecting on the research of past scholars, In order to analyze and show the problem intuitively and comprehensively, and provide a scientific academic basis for the follow-up scholars' in-depth research. Its literature mainly comes from important academic journals, research monographs and conference reports in the field of management, such as public management, emergency management and crisis management.

II. INTER ORGANIZATIONAL COLLABORATION IN NATURAL DISASTER EVENTS

A. Inter-organization Cooperation Based on Binding Mechanism

As far as natural disasters are concerned, the structure of emergency management network is constantly changing. Previous studies on earthquakes, hurricanes and storms have shown that the network structure may change after natural disasters. During a disaster, the government may not be able to manage all aspects of the current situation. The change of network relationship after the disaster means that the organization will readjust its collaborative relationship with other partners to effectively respond to the disaster. This shows that it is an important emergency management step to make actual adjustment according to the needs of the current situation in the event of a disaster. This is also because different emergency management network structures can meet the different needs of inter organization cooperation and provide diversified choices for inter organization cooperation. Organizations in various emergency management network structures will establish new relationships, terminate previous relationships and maintain existing relationships by perceiving, experiencing and learning the importance of collaborative relationships in disasters. This is mainly based on the success of previous collaboration, the importance of current partners and the expectation of subsequent

collaboration that will eventually enhance organizational flexibility. And the change of network structure in natural disasters tends to choose between binding and bridging cooperation mechanism.

Some scholars believe that during disaster response, organizations may not be able to effectively share risks with other organizations. On the contrary, the collaborative risks caused by emergencies may encourage organizations to cooperate directly with organizations with key resources and information [10], [15]. Kyujin Jung Based on the network evolution method of social network analysis, the data at different time points before and after the typhoon are studied. The results show that after the disaster, the organization is more likely to directly contact those densely gathered people or organizations, so as to form a close network [14]. Comfort It is also believed that organizations tend to avoid bridging mechanisms during disasters and are willing to establish direct contact with people with the necessary information and resources [15].

After a disaster, organizations prefer to choose binding mechanism, which may be based on the following reasons. First, reduce collaboration risk. Dynamic disaster environment can not provide a stable network structure environment. Reducing cooperation risk is very important to promote inter organization cooperation [16]. In case of uncertainty, the bridging mechanism is more likely to produce the high risk of betrayal mentioned in the ICA framework, that is, the arrival of disaster will lead to a large-scale transformation of the organization's cooperation mode and the problem of defection [10]. Kyujin Jung had proved by studying flood disasters. He believed that the uncertainty caused by disasters and the serious shortage of resources will increase the cooperation risk under the current organizational cooperation mode [17]. This will lead to the failure of the bridge between organizations previously owned by the organization to function effectively under the pressure of disaster [18]-[20]. Michael D. Using the exponential random graph model to study Hurricane Katrina, it is found that the uncertainty in emergency and the speed of organizational decision-making may make the organization more naturally rely on existing partners or similar organizations to establish organizational ties, and it is more likely to form a cooperative relationship between two organizations with common partners, and the binding mechanism is more likely to achieve the effects required by emergency management [21].

B. Inter-organory Cooperation Based on Bridge Mechanism

The effect of bridging mechanism on tissue elasticity is mainly reflected in two aspects. First, in the horizontal emergency management network structure. Simon Andrew tested the impact of binding and bridging on enhancing organizational elasticity by studying flood disasters. The research results show that bridging mechanism plays an important role in enhancing organizational elasticity [22]. Because of the coordination role of some central organization participants, it can ensure that more resources are provided to other organizations in the network, better solve the problem of resource allocation and ensure the flexibility of network structure. This also shows that the central organization under

the bridging mechanism can improve emergency preparedness, joint response and recovery plan by ensuring access to key resources and information, so as to enhance the flexibility of the organization in catastrophic events [3]. Second, in the hierarchical emergency management network structure. Kyujin Jung found by using the method of multiple region analysis that when the organization cooperates with different organizations during emergency response, the coordination role of high-level government agencies is very important to finally improve the organization's adaptability [23]. This means that the bridging mechanism in the hierarchical emergency management network has a positive impact on the level of organizational elasticity, and the organization in an important position plays a very important role in transmitting new information and resources to each organization participant.

III. SOCIAL SECURITY AND INTER ORGANIZATIONAL COOPERATION IN DISASTER ACCIDENTS

A. Inter-organory Cooperation Based on Bilateral Agreement

Social security incidents and disaster accidents are closely related to people's life, and the social harm they cause will seriously threaten social stability. Therefore, this paper combines the two types of events into the same topic. Although the political order of government agencies is the key to efficient emergency management, some regions are more vulnerable to disasters such as terrorism because of their own environmental characteristics. For example, the response to the 911 major disaster shows the limitations of government agencies in emergency management, and the government agencies responsible for responding to disasters can no longer complete their work alone. At this time, through collective action with other participants, emergency management will become more efficient. Bridges built between organizations create the necessary public judgment to combat terrorism and other emergencies, and can increase the diversity of different organizations in sharing information and exchanging ideas. This paper focuses on two cooperation mechanisms that have a great impact on strengthening Inter Organizational cooperation in such emergencies: bilateral agreement and multilateral agreement.

Bilateral agreements play an important role in promoting cross regional cooperation among organizations, especially the emergency management network formed by adjacent organizations participating in bilateral agreements is the key factor to solve certain problems [24]. The main reasons may be as follows: first, geographical proximity will have a strong and positive impact on bilateral agreements. By studying the absolute difference matrix of bilateral agreements involved in pollution caused by wastewater discharge [23], scholars believe that polluting enterprises are more likely to be established where the two regions border, and the geographical proximity will enable organizations to identify problems with common environmental conditions, and similar policy concerns can stimulate local governments to cooperate. It can also make the organization more involved in the agreement. This also explains that organizations located in the continuous area of the Pearl River Basin will generally

pay attention to water pollution, because maintaining water quality is a common concern of organizations. Sharing common policy issues can easily reduce coordination costs, reduce collaboration risks and improve benefits. Second, political similarity will promote frequent interregional interaction through formal or informal agreements. The interregional cooperation for timely response to disasters can be attributed to political similarity, and homogeneity is the key factor affecting the network structure among organizations [25], It represents the tendency to establish cooperative relations with others, and political homogeneity also affects the scope of common preferences of organizations. Organizational participants with political homogeneity are more likely to reach consensus on the adoption and implementation of specific policies, increasing the possibility of Inter Organizational cooperation in the emergency management network [12], [23]. Moreover, many organization participants play political roles when they are involved in social and public security emergencies. Therefore, political factors are very important for the organization's cooperation in the emergency management network, especially in the event of a disaster, it may change the emergency management operation or strategy between organizations to deal with new changes [26].

B. Inter-organory Cooperation Based on Multilateral Agreement

Some scholars use the data of public security agreements between municipal and county governments and use the method of logistic regression to study. It shows that adaptive multilateral agreements with high flexibility are a better choice for organizational participants in more cases [27]. The reasons may be as follows: first, the problem of organizational homogeneity. In the emergency preparedness and response stage of emergencies, multilateral agreement participants with similar functional departments can directly use the corresponding resources for emergency management without readjusting the collective action network structure of organization participants. Therefore, the homogeneity among multilateral agreement organization participants can reduce the negotiation cost of organization interregional agreements. In this case, it promotes the emergence of adaptive multilateral agreements with higher flexibility, and it is more likely to establish adaptive agreements among organizations. Second, the number of participants in bilateral agreements. Because collective actions do not tend to occur in smaller groups, and when the uncertainty related to transactions is relatively high, with the increase of the number of participants in multilateral agreements and other variables remain unchanged, the transaction cost increases with the increase of the number of participants. When the uncertainty related to organizational transaction risk is relatively high, In order to consider future changes, participants want to avoid the "joint decision trap". Third, geographical location. Some geographical proximity and the relative permanence of administrative boundaries affect the relationship between organizations. These relationships are generally reflected in the arrangement of adaptive agreements. Therefore, the emergence of adaptive multilateral agreements also depends on the geographical location of each organization.

IV. INTER ORGANIZATIONAL COLLABORATION IN PUBLIC HEALTH EVENTS

A. Inter-organory Cooperation Based on Cross Border Risk Communication

In recent years, global public health emergencies, such as SARS, Ebola virus and New Coronavirus, which spread rapidly and have a wide range of infectious diseases, have seriously endangered the stability and development of the society. In the emergency management of such emergencies, a single organization mainly has the following problems: unclear nature of infectious diseases, slow disclosure of relevant information, different organizational information standards and priorities, and limitations of organizational information system. In order to better deal with such emergencies, it is necessary to improve the risk communication efficiency between organizations to carry out collective action efficiently. Risk communication refers to the "exchange of information on health and environment between relevant parties". This information includes not only the factors of health and environmental risks themselves, but also the organization's policy decisions on relevant risk management. Risk communication is both hierarchical and horizontal. Therefore, organizations need to strengthen hierarchical communication between different levels and horizontal communication between the same level. Efficient risk communication has a positive impact on Inter Organizational cooperation, which is conducive to quickly convey the policy decisions of the organization, obtain high-quality key information, and save valuable resources and time. This can reduce the inaccurate understanding of hazard risks to a certain extent, so as to take actions efficiently during emergency management and improve the effectiveness of organizational cooperation.

The high mobility and explosion of infectious diseases will make the virus spread rapidly in regions with different administrative boundaries [24], [28], Therefore, this kind of emergency is a cross-border emergency management problem. Due to the cross-border transmission nature of infectious diseases, although organizations in the same region can establish multiple contacts to obtain information from each other, the emergence of infectious diseases will affect the effectiveness of inter organization cooperation in information sharing and resource allocation [29]. In order to prevent the further development of infectious diseases, the organization should obtain comprehensive information about the transmission path of infectious diseases through efficient and rapid cross-border risk communication, effectively deal with the fuzziness of the transmission scope of infectious diseases and the limitations of the organization's information system, so that the organization can effectively carry out emergency response under the given time and resources [30], [31]. However, due to the complexity of emergencies and the uncertainty of the scope of disaster impact, organizations should choose appropriate cooperation mechanisms in cross-border risk communication to deal with infectious diseases [32], Its choice of cooperation mechanism is also affected by many factors.

First, it is affected by asset specificity. Due to the characteristics of high liquidity and high explosion of such emergencies, the asset specificity of such emergencies will be

higher with the increase of the organization's resource demand and dependence on partners. Asset specificity refers to the extent to which the asset can be used for different purposes and utilized by different users [33]. In this case, organizations may generally prefer to choose a binding mechanism that can reduce the supervision cost for cross-border risk communication. Because the binding mechanism can enable organizations to diversify, share risks, obtain high-quality information, and reduce costs through a tight network structure [29]. Second, affected by the speed of emergency response. In order to carry out emergency action in time and quickly, the binding cooperation mechanism is welcomed by many organizations. Because organizations are more inclined to establish information communication relationships directly with organizations with common third-party cooperative relationships when conducting cross-border risk communication, and the binding mechanism can establish efficient communication between organizations that directly send information and organizations that receive information. It improves the response speed of emergency management. Third, it is affected by the efficiency of organizational cooperation. Generally, the lower the constraint level, the higher the cooperation efficiency in emergency management. KyungWoo Kim By using the ordinary least square method to test the impact of different communication strategies and communication channels on the cooperation efficiency between organizations, the research shows that the bridging cooperation mechanism is conducive to improve the cooperation efficiency of organizations in cross-border risk communication [34]. This mechanism can enable organizations to obtain more key risk information from other organizations, which plays an important role in accurately identifying the transmission route of infectious diseases, coping with the high uncertainty caused by its "super negative externalities" and strengthening the effectiveness of cross-border cooperation [29], [34].

B. Inter-organory Cooperation Based on Online Risk Communication

Affected by the high uncertainty and complexity of infectious diseases, sometimes organizations prefer online risk communication methods such as telephone and e-mail to improve the speed of emergency management [31]. Some scholars have studied online risk communication through semi-structured interviews. The research believes that when organizations deal with such emergencies, organizations use telephone, e-mail and official letters to convey risk information to ministries and commissions and local governments is an important content to promote Inter Organizational cooperation. Especially during the outbreak of New Coronavirus, because the epidemic is highly contagious, in some serious epidemic areas, it is necessary to reduce the mobility of the organization staff to reduce the speed of the epidemic. In order not to delay the emergency response speed, the Inter Organizational Communication will depend to a large extent on online risk communication. Online risk communication plays the following roles in promoting inter organizational collaboration. First, online risk communication can expand risk communication channels and enable organizations to obtain the latest risk

information faster. In such emergencies, in order to prevent the further spread and secondary impact of the epidemic situation, the emergency management should be rapid and agile. When organizations use online media, such as websites and social media, they can further expand the channels of risk communication between organizations, which improves the efficiency of organizations to obtain the latest information, and plays an important role in timely responding to the spread of infectious diseases and rapidly improving the public's awareness of infectious diseases [29]. Second, online risk communication can make organizations more inclined to Inter Organizational cooperation under horizontal communication when expanding risk communication channels. Strengthening horizontal communication is very important to deal with public health emergencies. Although the frequency of horizontal information sharing among some government agencies is lower than that of hierarchical information sharing, horizontal communication is very important to deal with the cross-border nature of infectious diseases. Because although local government agencies will rely on the central government to obtain relevant information about the route of infection and the nature of infectious diseases, horizontal communication is more conducive to the organization to establish a mutually beneficial relationship, timely collect all kinds of information to deal with the epidemic situation, and efficiently coordinate and allocate key resources. Moreover, the inter organizational collaboration under horizontal communication can effectively cope with the limitations of the organization's capabilities. Some scholars have found that the areas with serious disaster and weak R & D capability will turn to other organizations with strong motivation to curb the epidemic and solve their public health problems through the study of the difference matrix of the incidence rate of infectious diseases. This shows that Inter Organizational cooperation under horizontal communication can effectively strengthen the emergency management ability of a single organization, and alleviate the pressure on the emergency management process caused by the limitations of the organization's own ability to a certain extent. In addition, the "reciprocity" and "transmissibility" of Inter Organizational Information communication can also enhance the flexibility of risk communication.

V. CONCLUSION AND FUTURE RESEARCH AGENDA

Through the above analysis, it can be seen that various types of cooperation mechanisms can enhance the coordination, adaptability and efficiency of the organization's collective action when dealing with the emergency management of various emergencies. Here, in order to compare and analyze the similarities and differences of various emergencies in the selection of cooperation mechanisms, this paper arranges the functions of various cooperation mechanisms in various emergencies into table 1. As shown in Table 1, the horizontal represents the types of emergencies, the vertical represents various cooperation mechanisms, and the intersection of horizontal and vertical represents the main role of this cooperation mechanism in such emergencies.

In natural disaster emergencies, as shown in Table 1,

organizations prefer to choose the cooperation mechanism related to binding and bridging network structure. The reasons are summarized as follows: the change of network relationship between organizations in natural disasters. Due to the obvious changes in the network relationship between organizations after some natural disasters, and the characteristics of uncertainty and unpredictability of such emergencies, the cooperation mechanism selected by organizations may be more diversified and flexible when dealing with such emergencies. Among them, organizations tend to change between the binding cooperation mechanism regarded as "strong connection" and the bridging cooperation mechanism regarded as "weak connection". Among them, the binding mechanism can reduce the risk of organizational cooperation and strengthen Inter Organizational Trust, while the bridging cooperation mechanism can enhance organizational flexibility, ensure the organization's access to key information and resources, and reduce the organization's dependence on the current partnership. In addition, bilateral agreements can enable organizations to maintain mutually beneficial relations, ensure potential benefits and reduce cooperation risks in such emergencies.

In social security and disaster accidents, as shown in Table 1, organizations prefer to choose cooperation mechanisms related to multilateral and bilateral agreements and political homogeneity among organizations. The reasons are summarized as follows: first, there are many political related factors involved in social security and disaster accidents. Political factors are crucial for Inter Organizational collaboration, as many organizations involved in emergency management also have political roles. And in the event of a disaster, political factors may change the organization's emergency management strategies and steps to deal with new changes. At this time, organizations usually prefer to determine compatible and reliable partnerships to face emergencies, and political homogeneity can make organizations focus on the characteristics of each organization to a certain extent, which can promote organizations with similar characteristics to form a fixed cooperative relationship to quickly determine other organizations with the same policy preferences and problem handling preferences. In addition, political homogeneity can strengthen Inter Organizational Commitment, reduce organizational cooperation risk and reduce organizational transaction cost. Therefore, the impact of political homogeneity on Inter Organizational cooperation in such emergencies can not be ignored. Second, asset specificity. In social security and disaster emergencies, emergency management problems with different asset specificity will usually be involved, and different asset specificity will affect the organization's choice of cooperation mode. For example, for the problem of water pollution, asset specificity and performance measurability are high, and organizations tend to form stable, formal and close cooperative organizational relationships; For air pollution problems, asset specificity and performance measurability are low, and organizations tend to form flexible and loose network organizational relationships. For organizations participating in cooperation, they can choose to establish contractual relationships to protect specific assets from opportunism and speculation, so as to minimize transaction costs. For example, bilateral

agreements can effectively deal with cross-border collective action issues, and multilateral agreements can be effectively applied to organize collective activities with a large number of people to avoid the trap of joint decision-making. However, the formation of agreements of different nature will be affected by many factors. For example, the formation of bilateral agreements will be affected by geographical similarity, especially when the environmental uncertainty is high.

TABLE I: ROLE OF COOPERATION MECHANISM IN VARIOUS EMERGENCIES

Emergency Cooperation mechanism	Natural disaster events	Social security and disaster accidents	Public health events
Risk communication	1. Diversify the forms of inter organizational collaboration 2. Enhance organizational flexibility	1. Achieve diversity in the exchange of information and ideas 2. Create the necessary public judgment 3. Improve the efficiency of emergency management	1. Address the limitations of the organization itself 2. Enhance the flexibility of Inter Organizational risk communication
Binding mechanism	1. Reduce organizational collaboration risk 2. Strengthening Inter Organizational Trust	1. Promote the sharing of technical resources among organizations according to policy preferences 2. Promoting informal communication among organizations 3. Improve the reputation of the organization	1. Reduce the cost of organizational supervision 2. Improve the emergency response speed of the organization
Bridging mechanism	1. Enhance organizational flexibility 2. Ensure the organization's access to key resources and information 3. Reduce the organization's dependence on current partnerships	1. Diversify the forms of inter organizational collaboration 2. Reduce organizational transaction costs	1. Expand the organization's risk communication channels 2. Improve the efficiency of Inter Organizational risk communication
joint exercises	1. Strengthening Inter Organizational Trust and commitment 2. Increase the possibility of inter organizational collaboration 3. Reduce organizational transaction costs 4. Improving regional adaptive capacity 5. Achieving sustainable emergency management		
Multilateral agreements		1. Adaptive multilateral agreements are applicable to collective actions with a large number of personnel 2. Adaptive multilateral agreements can avoid the trap of joint decision-making	

Bilateral agreement	1. Maintain a mutually beneficial relationship with the organization 2. Ensure the potential benefits of the organization 3. Reduce organizational collaboration risk	1. Effectively address collective action of a cross-border nature	
Political homogeneity		1. Strengthening Inter Organizational Commitments 2. Reduce organizational collaboration risk	

In public health emergencies, as shown in Table I, organizations prefer to choose cooperation mechanisms under different risk communication strategies to deal with emergency management. The reasons are summarized as follows: first, public health emergencies have strong "negative externalities". The high degree of uncertainty brought by "negative externalities" will make inter organization collaboration more inclined to focus on horizontal and vertical risk communication, especially horizontal communication. Horizontal communication generally includes cooperation agreements, coordination meetings, intergovernmental joint meetings and other formal and informal forms of communication. Different forms of horizontal communication can deal with the limitations of organizations, enhance the flexibility of risk communication among organizations and reduce the risk of defection. For example, due to the high explosive and high harm of infectious diseases, there is a high probability of defection risk, that is, in emergency management, some organization participants do not follow collective actions, resulting in other organization participants unable to effectively respond to current emergencies. Some cooperation agreements under horizontal communication will reduce the risk of defection in collective action by regulating and limiting some behaviors of the organization, and will also enhance the commitment and trust between organizations. Second, public health emergencies pay more attention to cross-border cooperation among organizations. Due to the nature of cross-border transmission of infectious diseases, we should pay more attention to cross regional cooperation among organizations in response to such emergencies. The cross regional multi cooperation mechanism will optimize the allocation of key resources in time to avoid varying degrees of failure of the epidemic prevention system with a single local government as the theme in the process of early warning, identification and prevention and control. For example, the binding and bridging mechanisms across regions will play a unique role: the bridging mechanism helps to expand organizational risk communication channels and improve the efficiency of Inter Organizational risk communication, and the binding mechanism helps to reduce organizational supervision costs and improve organizational emergency response speed.

In addition, as shown in Table 1, there are some cooperation mechanisms that are more welcomed by

organizational participants in governments at all levels in response to various emergencies. First, joint exercises. Some joint exercises related to various emergencies can enhance the continuous feeling of members of various organizations about emergencies, increase the communication and interaction between participants, improve the organization's understanding of the importance of cooperation, and enhance the organization's willingness to accept common goals for cooperation. Then, with the enhancement of willingness to cooperate, sustainable firm commitment will appear among organizations. This helps to promote the organization to coordinate resources, reduce transaction costs and collaboration risks, improve regional adaptability and carry out emergency management more efficiently. Finally, the effect of firm Inter Organizational Commitment driven by comprehensive exercises will be demonstrated through the establishment of a sustainable emergency management network. Second, binding mechanism. This mechanism can enable the organization to obtain the information obtained by the organization participants under the close network relationship, and improve its enthusiasm for participation due to its close relationship, especially when the organization responds to conventional emergencies, such as fire, hail and other emergencies, due to the low demand for external information. When implementing a common strategy, it may be more necessary to establish contacts with similar partners. Third, bridging mechanism. Under the bridging mechanism, the organization plays the role of "bridge" to connect other organizations. The organization under the mechanism has wider choices, so that the organization has greater control over the activity scope and resource information of other organizations in the network, and can obtain more resources and information to explain new risk explanations or reveal effective action strategies. For example, on the eve of extreme weather events, some government agencies will use the bridging mechanism to timely communicate the risks to various organizations.

To sum up, different collaboration mechanisms promote the emergence and persistence of inter organizational collaboration in different aspects, and organizational participants under some collaboration mechanisms can formulate informal rules of conduct. Collective actions among organizations are coordinated and implemented through social, economic and political network structure relations, rather than formal authority. Compared with more formal solutions, it has more potential advantages, which not only ensures the flexibility of cooperation rules of organizational participants, but also retains the organization's own decision-making and adjustment ability. Therefore, organizations need to measure the Inter Organizational Network Structure under different cooperation mechanisms according to the actual situation, so as to ensure that the most suitable cooperation mode is selected to effectively deal with all kinds of emergencies.

First, the research on Inter Organizational cooperation under horizontal communication. In future research, we can focus on applying the cooperation mechanism under horizontal communication to emergency management, which will help to establish a sustainable emergency management network and improve the efficiency of emergency management. Second, research on the application of

comprehensive theory in Inter Organizational cooperation. In the future research, we should deeply study the application of various comprehensive theories in emergency management, so as to better find solutions to promote the cooperation among organizations in emergency management. Third, the research on Inter Organizational cooperation in dynamic networks. In the future research, we should deeply study the structural characteristics of dynamic network, which is of great significance for mastering the basic laws of emergency management and solving the problem of collective action.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

This study found that cooperation mechanism with different degree of autonomy and complexity can effectively help organizations strengthen their willingness to cooperate, promote formal and informal exchanges, promote the rational flow and effective allocation of resources and promote effective collective action. And the binding and bridging mechanism is more popular with the organization participants in all levels of government when dealing with all kinds of emergencies, while other types of cooperation mechanisms focus on different types of emergencies according to their own characteristics. Through the in-depth study of cooperation mechanism under the institutional collective action framework, it also provides a new idea for the domestic emergency management.

ACKNOWLEDGMENT

This work is supported by the National Natural Science Foundation of China (71774038), and the National Social Science Foundation of China (17ZDA030), and the Provincial Nature Foundation of China (LH2019G015),

REFERENCES

- [1] M. Gillen, "Urban governance and vulnerability: Exploring the tensions and contradictions in Sydney's response to bushfire threat," *Cities*, 2005, vol. 22, no. 1, pp. 55-64.
- [2] D. R. Godschalk, "Urban hazard mitigation: creating resilient cities," *Natural Hazards Review*, 2003, vol. 4, no. 3, pp.136-143.
- [3] K. Jung, "Sources of organizational resilience during the 2012 Korean typhoons: An institutional collective action framework," University of North Texas, 2015.
- [4] S. A. Andrew, K. Jung, and S. Arlikatti, "Patterns of interorganizational collaboration in the context of emergency preparedness," 2014.
- [5] D. Alexander, "Towards the development of a standard in emergency planning," *Disaster Prevention and Management: An International Journal*, 2005.
- [6] N. Kapucu, "Disaster and emergency management systems in urban areas," *Cities*, 2012, vol. 29, pp. S41-S49.
- [7] J. W. L. Waugh and G. Streib, "Collaboration and leadership for effective emergency management," *Public Administration Review*, 2006, vol. 66, pp. 131-140.
- [8] D. A. McEntire, "Coordinating multi- organisational responses to disaster: Lessons from the March 28, 2000, Fort Worth tornado," *Disaster Prevention and Management: An International Journal*, 2002.
- [9] N. Kapucu, C. V. Hawkins, and F. I. Rivera, "Disaster resiliency: Interdisciplinary perspectives," Routledge, 2013.
- [10] R. C. Feiock, "The institutional collective action framework," *Policy Studies Journal*, 2013, vol. 41, no. 3, pp. 397-425.
- [11] R. C. Feiock, "Metropolitan governance and institutional collective action," *Urban Affairs Review*, 2009, vol. 44, no. 3, pp. 356-377.
- [12] R. C. Feiock and J. T. Scholz, *Self-organizing Federalism: Collaborative Mechanisms to Mitigate Institutional Collective Action Dilemmas*, Cambridge University Press, 2009.
- [13] K. Jung and M. Song, "Linking emergency management networks to disaster resilience: Bonding and bridging strategy in hierarchical or horizontal collaboration networks," *Quality & Quantity*, 2015, vol. 49, no. 4, pp. 1465-1483.
- [14] K. Jung, "Quick response report: Community resiliency and emergency management networks following the 2012 Korean typhoons," *Natural Hazards Center*, 2013.
- [15] L. K. Comfort and T. W. Haase, "Communication, coherence, and collective action: The impact of Hurricane Katrina on communications infrastructure," *Public Works Management and Policy*, 2006, vol. 10, no. 4, pp. 328-343.
- [16] M. Song, K. Jung, N. Ki *et al.*, "Testing structural and relational embeddedness in collaboration risk," *Rationality and Society*, 2020, vol. 32, no. 1, pp. 67-92.
- [17] K. Jung, M. Song, and R. Feiock, "Isolated and broken bridges from interorganizational emergency management networks: An institutional collective action perspective," *Urban Affairs Review*, 2019, vol. 55, no. 3, pp. 950-975.
- [18] S. A. Andrew, "Regional integration through contracting networks: An empirical analysis of institutional collective action framework," *Urban Affairs Review*, 2009, vol. 44, no. 3, pp. 378-402.
- [19] P. Dreier, "Katrina and power in America," *Urban Affairs Review*, 2006, vol. 41, no. 4, pp. 528-549.
- [20] S. A. Macmanus and K. Caruson, "Emergency management: Gauging the extensiveness and quality of public-and private-sector collaboration at the local level," *Urban Affairs Review*, 2011, vol. 47, no. 2, pp. 280-299.
- [21] M. D. Siciliano and C. Wukich, "Network features and processes as determinants of organizational interaction during extreme events," *Complexity, Governance & Networks*, 2015, vol. 2, no. 1, pp. 23-44.
- [22] S. Andrew, S. Arlikatti, L. Siebeneck *et al.*, "Sources of organisational resiliency during the Thailand floods of 2011: A test of the bonding and bridging hypotheses," *Disasters*, 2016, vol. 40, no. 1, pp. 65-84.
- [23] M. Lubell, J. M. Mewhirter, R. Berardo *et al.*, "Transaction costs and the perceived effectiveness of complex institutional systems," *Public Administration Review*, 2017, vol. 77, no. 5, pp. 668-680.
- [24] B. Chen, J. Ma, R. Feiock *et al.*, "Factors influencing participation in bilateral interprovincial agreements: Evidence from China's pan pearl river delta," *Urban Affairs Review*, 2019, vol. 55, no. 3, pp. 923-949.
- [25] M. McPherson, L. Smith-Lovin, and J. M. Cook, "Birds of a feather: Homophily in social networks," *Annual Review of Sociology*, 2001, vol. 27, no. 1, pp. 415-444.
- [26] M. Song, H. J. Park, and K. Jung, "Do political similarities facilitate interlocal collaboration?" *Public Administration Review*, 2018, vol. 78, no. 2, pp. 261-269.
- [27] S. A. Andrew and C. V. Hawkins, "Regional cooperation and multilateral agreements in the provision of public safety," *The American Review of Public Administration*, 2013, vol. 43, no. 4, pp. 460-475.
- [28] R. Keil and H. Ali, "Governing the sick city: urban governance in the age of emerging infectious disease," *Antipode*, 2007, vol. 39, no. 5, pp. 846-873.
- [29] K. Kim, S. A. Andrew, and K. Jung, "Public Health Network Structure and Collaboration Effectiveness during the 2015 MERS outbreak in South Korea: An institutional collective action framework," *International Journal of Environmental Research and Public Health*, 2017, vol. 14, no. 9.
- [30] C. Ansell, A. Boin, and A. Keller, "Managing transboundary crises: Identifying the building blocks of an effective response system," *Journal of Contingencies and Crisis Management*, 2010, vol. 18, no. 4, pp. 195-207.
- [31] K. Kim and K. Jung, "Dynamics of interorganizational public health emergency management networks: Following the 2015 MERS response in South Korea," *Asia Pacific Journal of Public Health*, 2018, vol. 30, no. 3, pp. 207-216.
- [32] K. Jung, M. Song, and R. Feiock, "Building collaborative emergency management: Interorganizational engagements and network resilience," in *Proc. Annual Conference of the American Society for Public Administration*, Washington DC, 2014, pp. 14-18.
- [33] M. H. Riordan and O. E. Williamson, "Asset specificity and economic organization," *International Journal of Industrial Organization*, 1985, vol. 3, no. 4, pp. 365-378.
- [34] K. Kim, H. Y. Yoon, and K. Jung, "Resilience in risk communication networks: Following the 2015 MERS response in South Korea," *Journal of Contingencies and Crisis Management*, 2017, vol. 25, no. 3, pp. 148-159.

Copyright © 2022 by the authors. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited ([CC BY 4.0](#)).



Forum.

Wei Kang is a doctor of management, three-level professor and doctoral supervisor, vice president of Heilongjiang Urban Science Research Association, director of China Soft Science Society, member of Heilongjiang emergency management expert group, interviewer of civil servants and public institutions in Heilongjiang Province; Editorial board member of public administration review, reviewer of Journal of public administration, public administration review and Leadership Science Forum: National Governance



major, and has won the honorary title of excellent student cadres.

Mao Shuo from the School of Economics and Management of Harbin Engineering University. She is a 2019 master of management and will graduate in March 2022. She was graduated from the school of economics and management of Harbin Engineering University, majoring in finance. awards: four second-class scholarships at the university level during the undergraduate period and three second-class scholarships during the master's period, of which the score during the master's period is the top 3% of the