Review

A Review and Prospect of Community Resilience and Governance Research Based on CiteSpace

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Abstract: As the smallest unit of social governance, communities face various social risks. How to construct a universal research framework for community resilience and accurately identify the influencing factors of community resilience is the main focus of future research. On this basis, a systematic study was conducted on the direction and content of community resilience, and Cite Space was used to explore research hotspots related to community resilience. A review was conducted from three aspects: the definition and dimension division of community resilience, resilience assessment, and governance pathways. Finally, this article summarizes the three constructive aspects of work mainly done under this theme, and through visual analysis and literature review, summarizes four directions that can be further discussed in depth in the future, providing new research perspectives for multidimensional community resilience construction and governance mechanisms under diverse risks.

Keywords: CiteSpace, Community, Resilient governance, Summarize, Visual analysis

1. Introduction

"Resilience" was originally mainly applied in physics and engineering, referring to a physical property of an object, describing the material's resistance and ability to recover from fracture when deformed, and the higher the recovery speed, the better the toughness (Zhao, 2022). With the increasing complexity of the social environment, resilience has gradually been introduced into the ecological field: ecological resilience considers that some systems have multiple stable states, and therefore measures resilience by the magnitude of their ability to resist disturbances before changing their own structure (Hall, 2023). On the basis of ecological resilience, scholars such as Walker proposed the concept of "evolutionary resilience", which refers to the ability of "social ecosystems" to change, adapt, and transform in the face of external pressures and their own limiting conditions, reflecting the sustainable development ability of complex systems to cope with dynamic changes (Wang, 2022). Subsequently, resilience gradually entered the social sphere, such as at the 2002 United Nations Global Summit on Sustainable Development, where resilience was first introduced into the fields of urban construction and disaster prevention and reduction, and gradually entered the research perspective of multiple fields (Yang, 2019).

As the smallest unit of social governance, the community should not only use daily organizational and management methods to cope with disturbances, but also explore its identification mechanisms for different social risks and self-organized resilience, in order to achieve more refined and modern social management. Based on this, scholars at home and abroad have conducted extensive research on community resilience, with current research mainly focusing on connotation and dimension division, resilience assessment, and governance pathways.

2. Data Sources And Analysis

2.1. Data Source

This study mainly focuses on Chinese literature, with a search period from January 1, 1995 to March 1, 2022. The main data comes from three important journal databases in CNKI, namely "CSSCI", "Peking University Core", and "CSCD", and 561 Chinese literature data were retrieved.

2.2. Keyword Analysis

Keywords are the core of an article. From a bibliometric perspective, high-frequency keywords can be used to identify hot topics in a research field, and the trend of word frequency can determine the forefront of community resilience research (Wu, 2022). The use of keyword co-occurrence analysis can reflect the current research hotspots and past hot research topics on community resilience, as shown in Figure 1.
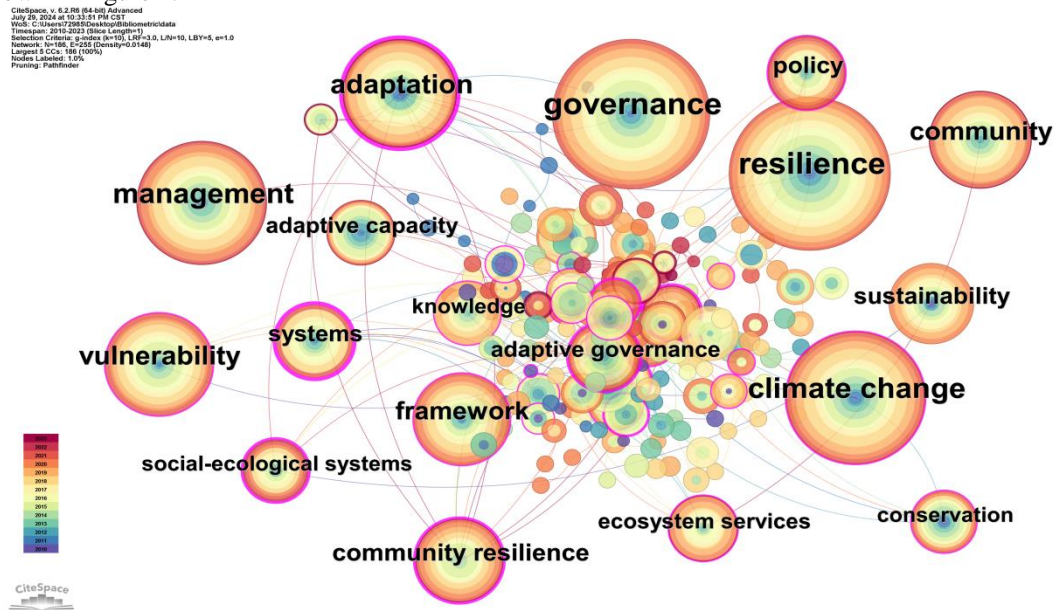

Fig 1. co-occurrence of community resilience keywords.

Research on the resilience of Chinese communities is more targeted and biased towards historical backgrounds. From high-frequency keywords, it can be seen that keywords often involve macro level directions, highlighting the institutional advantages of the socialist system in overall planning and implementation. Currently, community resilience mainly addresses social risks such as climate change and floods. However, it also has the drawbacks of backwardness and unsustainability, and the vulnerability of various socio-economic systems is an important entry point for resilience research. Compared to restorative and sustainable approaches, social organizations currently lean towards adaptive governance. In the future, we can consider refining the research granularity of community resilience, improving the service ecosystem framework, precisely enhancing the absorption capacity of risks and natural disasters, strengthening micro level community construction, and thereby enhancing the subjective initiative and flexibility of communities.

The keyword emergence graph can reveal the relationships and evolutionary trends between keywords in literature and knowledge domains. According to Figure 2, it can be observed that in the early stages of community resilience and governance research, community ecosystem diversity governance and adaptive co management were the main focus. The research objects mainly focused on some ecosystems under global climate or economic environment changes, such as coral reefs, small-scale fisheries, and social ecosystems in flood prone areas. The governance content has shifted from inertia governance to scientific governance, and from adaptive governance to restorative and preventive governance; Small scale ecosystem governance tends towards urban resilient system autonomy.

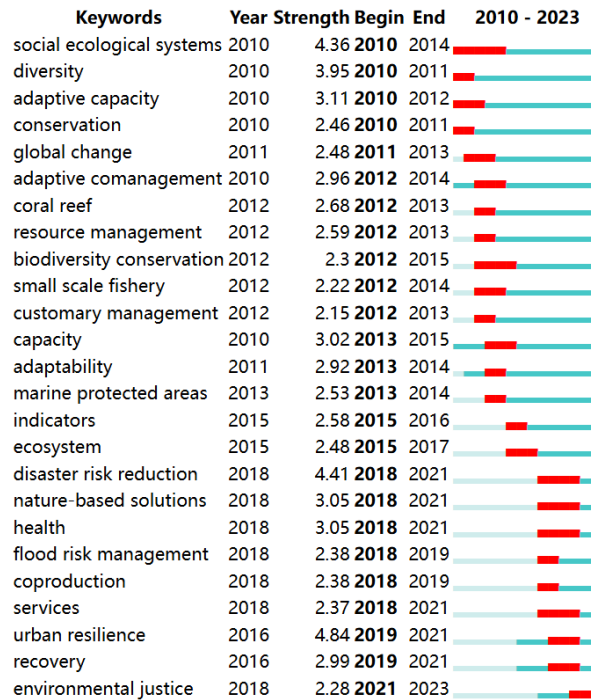## Top 25 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2010 - 2023
social ecological systems	2010	4.36	2010	2014	
diversity	2010	3.95	2010	2011	
adaptive capacity	2010	3.11	2010	2012	
conservation	2010	2.46	2010	2011	
global change	2011	2.48	2011	2013	
adaptive comanagement	2010	2.96	2012	2014	
coral reef	2012	2.68	2012	2013	
resource management	2012	2.59	2012	2013	
biodiversity conservation	2012	2.3	2012	2015	
small scale fishery	2012	2.22	2012	2014	
customary management	2012	2.15	2012	2013	
capacity	2010	3.02	2013	2015	
adaptability	2011	2.92	2013	2014	
marine protected areas	2013	2.53	2013	2014	
indicators	2015	2.58	2015	2016	
ecosystem	2015	2.48	2015	2017	
disaster risk reduction	2018	4.41	2018	2021	
nature-based solutions	2018	3.05	2018	2021	
health	2018	3.05	2018	2021	
flood risk management	2018	2.38	2018	2019	
coproduction	2018	2.38	2018	2019	
services	2018	2.37	2018	2021	
urban resilience	2016	4.84	2019	2021	
recovery	2016	2.99	2019	2021	
environmental justice	2018	2.28	2021	2023	

Fig 2. Keyword Emergence graph.

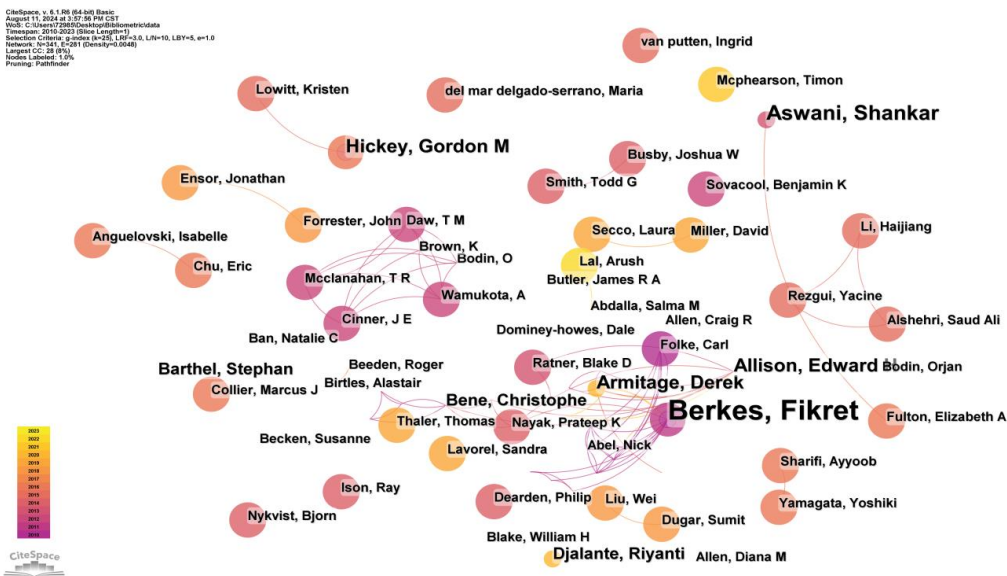*2.3. Author Collaboration Network Analysis*

Fig 3. Author Collaboration Network graph.

The analysis of the author's collaborative network diagram helps to gain a deeper understanding of interpersonal relationships and research collaboration dynamics within the academic community, providing useful information for academic research and decision-making. According to Figure 2 and Figure 3, Berkes and Fikret have the closest collaboration relationship, followed by Aswani and Shankar, Allison and Edward H, Vanke and Frank, Armitage and Derek, respectively. Based on the visualization analysis of the publication status of various research institutions, it was found that several institutions with a large number of publications have cooperated with other institutions. However, overall, the cooperation between institutions is relatively monotonous, and the distribution of research results is uneven. Among them, journals with a high number of articles included in Current Opinion in Environmental Sustainability, with more than 10 publications, include International Journal of Disaster Risk

Reduction and Science of The Total Environment. Through frequent author collaborations and publishing houses with a large number of articles included, it can be seen that the research content that receives more attention under the theme of community resilience and governance is transitioning from logical evolution and qualitative governance to dynamic micro research with temporal and spatial effects such as spatiotemporal evolution and mechanism analysis. These data reflect the development of community resilience and governance research, which has received attention from various journals, scholars, and institutions.

2.4. Time Zone Chart Analysis

The time zone chart visually displays the research hotspots of community resilience in different periods. From the perspective of research content, the emergence of community resilience literature began in 2010, indicating that domestic research started relatively late and initially focused on climate governance. In recent years, there has been a convergence trend compared to foreign research. At present, the research on adaptive joint management with local governments is relatively complex, involving areas such as agriculture, forestry, animal husbandry, fisheries, food, medical health, and mental health. It tends to achieve horizontal social governance by improving the comprehensive resource management of residential areas' integrity and diversity. By jointly building an adaptive social management framework with local governments and restoring green ecological urban environments, vertical social risk resistance can be strengthened. The research on community resilience after 2016 is in line with the actual national conditions, and keywords such as "disaster prevention and reduction" and "rural communities" are in line with China's development status. In recent years, research on community resilience has developed rapidly, and the research content has shown a systematic and refined characteristic. The rapid increase in the number of literature in the short term indicates that research on community resilience is still in its infancy. Meanwhile, this is closely related to the global spread of the COVID-19 pandemic in 2019. Unlike natural disasters such as earthquakes and floods, the pandemic has had an unprecedented impact on urban and rural community systems. It is not only a comprehensive test of community crisis response and economic recovery capabilities, but also a quality assessment of resilient community construction in various regions. During the period after the restructuring of the epidemic, research has tended to focus more on the participation of social residents in learning and building community resilience, achieving collective action for global change through policy innovation,As shown in Figure 4.
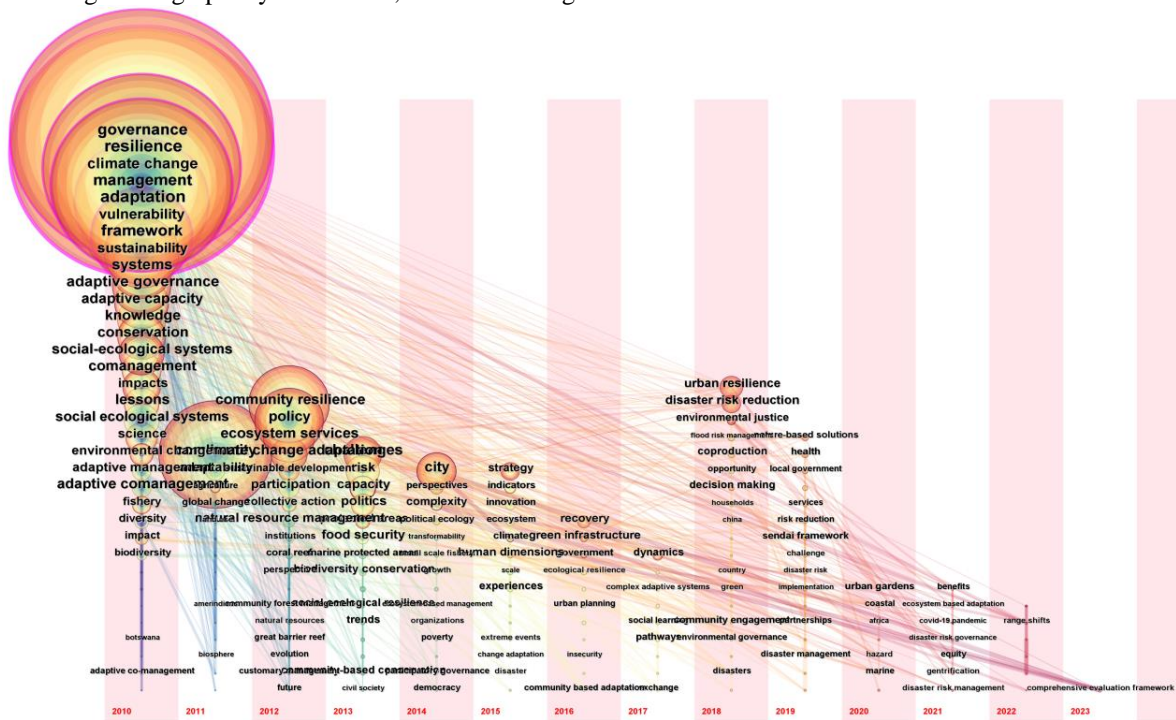

Fig 4. Community Resilience Time Zone Map.

3. Review of Research Hotspots

Based on the visual analysis of community resilience mentioned above, this paper reviews existing research from three aspects: defining the connotation and dimension of community resilience, assessing resilience, and governance paths, and summarizes the shortcomings.

3.1. Definition of Connotation And Division Of Dimensions

The connotation of community resilience is directly related to its research field and specific application scenarios. Through extensive literature review, it can be summarized as the ability of communities to adapt to shocks by adjusting their functional operation mechanisms, coordinating and arranging resources in advance, or innovatively utilizing resources, and promoting community transformation and functional improvement after a crisis. From the perspective of community disaster resistance, the process of resilience includes resistance, resilience, adaptability, etc. This reflects the process of community resilience, such as resistance, which refers to the ability of the community to absorb external disturbances, resist external disturbances, and make adjustments to mitigate the impact of disturbances; The second is resilience, which means that a resilient community can return to pre disaster levels more quickly than a less resilient community; The third is adaptability or creativity, which refers to the ability of a community to adapt or develop new operating models due to adversity, and enter a stage of healthy development; And based on the level of community function, a dynamic resilience curve model of the community can be established, which can effectively measure community resilience by determining the influencing factors and their temporal characteristics of community function level (Luan,2020). Based on this division, the connotation of community resilience as shown in Table 1 mainly involves the following abilities:

Table 1. Overview of Relevant Abilities Involved in the Study of Community Resilience

Competency	Source
Integration, coordination, adaptability, and intelligence	(Klerks, 2022)
Stability, resilience, adaptability, and learning ability	(Yuan, 2022)
Organizational capability, redundancy capability, recovery capability, and adaptability	(Hwang, 2023)
Resilience, adaptability, learning and feedback ability, resilience, autonomy	(Liu, 2023)
Adaptability, redundancy, learning ability, cohesion, synergy, intelligence	(Ye, 2023)
Self organization, cohesion, reflection, and learning ability	(Ben, 2022)

Redundancy mainly refers to the ability to maintain normal operation and provide basic public services even after experiencing shocks; Intelligence mainly refers to the effectiveness of using information technologies such as big data, blockchain, and cloud computing in government governance and disaster prevention and reduction. From the above summary, it can be seen that no matter how the connotation of resilience evolves and deepens, it always relies on the support of the most basic abilities such as resilience, adaptability, and learning ability, and constantly expands to include intelligence, organizational coordination, and other abilities in the diversified changes of society.

From the perspective of the connotation composition of resilient communities, they can be divided into structures such as physical resilience, social resilience, and institutional resilience. Physical resilience refers to the degree to which various types of infrastructure in the community play a role in risk and disaster response, mainly manifested in disaster mitigation and emergency response; Social resilience focuses on governance entities and community capital, emphasizing the diversity of community risk governance entities and the emergence of community capital; Institutional resilience refers to the degree to which institutional design plays a role in risk management, mainly including organizational structure, performance incentives, and specific institutional norms for work (Wang, 2020). The connotation of resilient communities is also reflected in three aspects: hardware guarantee, service resource matching, and governance capability system. Or it can be divided into material resilience and management resilience: namely, the ability to efficiently circulate materials and restore communication information between bottom line reserves and different spatial units, as well as the high-intensity coordination ability of management cores; And it is emphasized that in the future, more attention should be paid to the cultivation of soft power such as management resilience (Zhu, 2023).

From the perspective of social capital, the resilience of communities depends on economic capital, social capital, natural capital, and human capital. When Zhu Lin conducted research on community resilience in Handan City, she selected the four dimensions of social capital that play a major role, such as facilities, space, nature, and society, and then determined the relevant indicators under each dimension to describe the performance process of resilience under the epidemic. In response to the COVID-19, Shi broke down resilience into four specific aspects by integrating two framework systems, and established a community resilience assessment framework including spatial resilience, capital resilience, social resilience, and governance resilience (Shi, 2022). In the process of promoting resilience construction abroad, neighborhood relations and community identity are also included in the goals of community resilience construction, in order to enhance the social capital of the community (Liu, 2021).

Through sorting out, it is found that research based on the dimension of ability often does not determine the specific research object, while community resilience research based on capital often takes a specific community in a city as an example. No matter how the connotation of community resilience evolves, the division of content is related to the hard conditions of the community and the ability to apply these hard conditions, both of which are indispensable. In recent years, although the connotation and dimension

division of community resilience have been continuously deepened, there is still a lack of attention to humanistic values, such as indirectly affecting community capital and resilience through the reconstruction of values and community cultural systems.

3.2. Establishment of Community Resilience Framework

Based on the division of the connotation and dimensions of resilience, the evaluation framework for community resilience includes the following types:

From the perspective of evaluation system, Yang Baoqing introduced the DPSRC model to evaluate community resilience, which includes driving force pressure state response control. This model emphasizes the role of people in the system environment, can handle multiple interactions and causal relationships, and can analyze the degree of social economic environmental integration within a certain spatial range (Yang, 2020). Luo Hui designed an evaluation study based on entropy weight method for rural climate resilience in the Qinling region, including five dimensions: ecological resilience, economic resilience, social resilience, engineering resilience, and institutional resilience (Luo, 2022). Huang Xianming sorted out seven methods for evaluating community resilience in the face of natural disasters, but the shortcomings are that the selection of indicators and the setting of weights are not universal (Huang, 2020).

From the perspective of evaluation methods, such as Ning Shiqiang's approach from the perspective of system security theory, applying the 3MS-5Meic system theory and resilience theory to construct a 3D-3MIEIC theoretical model, and constructing a community disaster resilience evaluation based on the characteristics of resilience absorption, adaptation, recovery, and learning, based on elements such as' human foundation environment management information culture (Ning, 2020). Li Yang selected subway stations with high complexity in urban public spaces as the research object, and used MATLAB to dynamically simulate the recovery effect before and after disasters for resilience assessment (Li, 2021). In terms of quantitative analysis of community resilience, Zhong Ming et al. combined various methods such as information diffusion model, multi-level hierarchical explanatory structure model, and decision laboratory analysis to conduct multidimensional and multi-level complex network system resilience assessment (Zhong, 20**Error! Reference source not found.**). At present, the assessment of community resilience is still mainly based on a combination of qualitative and quantitative analysis. In the future, research objects can be continuously subdivided, and the logical connection between research object subsystems and the overall system of community resilience can be clarified to improve the accuracy of resilience assessment.

From the perspective of evaluation optimization: Faced with problems such as insufficient evaluation data and improper indicator construction leading to low universality of evaluation models, scholars have conducted optimization research on community resilience evaluation models. Based on previous data and expert evaluations, Jing Menghan used the DEMATEL-ISM ensemble method to construct a network hierarchical model between evaluation indicators, quantitatively analyzing the impact, influence, and cause of each indicator to ensure the correlation between evaluation indicators, thereby ensuring strong correlation between evaluation results and research objects (Jing, 2021). There is not much research on optimizing existing community resilience assessment models, and in the future, a combination of qualitative and quantitative methods should be used for optimization.

Through the review of literature on community resilience assessment, it is found that there is still room for improvement in the following aspects of community resilience assessment research: (1) Community resilience assessment methods and tools should take into account changes in both temporal and spatial scales, and use social network analysis and other methods to consider the impact of social dynamic factors, in order to improve the accuracy of subsequent community resilience assessment research. (2) The assessment of community resilience has gone through a development process from qualitative research to mainly quantitative research, and the combination of the two methods is more accurate. The selection of subsequent research methods needs to be determined based on the specific details of the research object, such as community management structure. (3) There is still a lack of consideration for social capital in the resilience assessment system, and the correlation between various indicators is still insufficient. The consideration of social network indicators is also insufficient. In the future, a resilience assessment index system with higher correlation can be constructed by combining in-depth grassroots research with real-life problems, or by using the principle of mediation to establish quantitative transmission relationships between indicators.

3.3. Governance Path

The ultimate goal of community resilience research is resilience governance, and the fundamental difference between governance and management lies in its emphasis on self-organizing resilience building through community entities, rather than top-down management by government organizations. Based on this, Chinese scholars are continuously deepening their analysis of resilience governance paths: how Lanping emphasizes that communities should adopt resilience governance from the perspectives of diverse collaboration, cultural shaping, and technological empowerment through the structural stratification of resilience governance systems (He, 2023). From the perspective of community resilience governance, Dai Jiamin believes that at present, it is

more important to strengthen the multi-faceted governance of community infrastructure, organizational management, technical management, institutional management, and community emergency management psychology (Dai, 2022). Lu Wengang focuses on one of the weak links in urban resilience governance, the old residential areas. Due to the differentiated characteristics of grassroots community resilience governance, it will affect the effectiveness of community resilience governance. This requires that the positive interaction between resilience governance and specific community scenarios must follow certain adaptation logic and rules, and enhance the physical resilience and community resilience of old residential areas from the perspective of property enterprises as the governance subject (Lu, 2022). Haas found that paying attention to residents' perception of social network support and strengthening their confidence in community capacity can help residents establish more effective and diverse disaster adaptation measures (Haas, 2021). Zhang Qin and others believe that in the process of community resilient governance, more attention should be paid to the cultivation of modern governance capabilities, and the promotion of capacity integration and upgrading to adapt to the development of Chinese path to modernization (Zhang, 2023). Good evolutionary resilience can be applied to complex and dynamic social ecosystems, achieving transformation equilibrium in the cycle of utilization, preservation, release, and reorganization at four different stages, and establishing a more adaptable resilience system. Based on the principle of maintaining the sustainability of resilience and evolution, Ren Yuanyuan and others analyzed and explained the transformation path of resilience governance from structural construction to process construction from four stages of "utilization, preservation, release, and reorganization". By establishing a sound institutional framework, strengthening the cooperation of multiple subjects, and focusing on technological innovation and cultural construction, the resilience level of the community safety system can be continuously improved to provide strong guarantees for coping with various risks and challenges (Ren, 2024). Similarly, in the face of modern community resilient governance, Wu Ruixuan focused his research on super large cities. As an important engine of Chinese path to modernization, super large cities are facing more severe and diversified risks and security challenges, such as the solidification of traditional governance paths, lack of multi agent resonance and interaction capabilities, unsmooth operation of emergency transformation mechanism, and the need for deep coupling of information and technology. To address these issues, promoting the modernization of the community resilience governance system requires transformation from multiple dimensions, and advancing the modernization of the community resilience governance system in mega cities requires transformation and innovation from multiple dimensions such as thinking concepts, governance subjects, collaborative mechanisms, and technological applications (Wu, 2024).

Although the difficulties in resilience building vary depending on the specific research object, the current difficulties mainly focus on insufficient attention to weak links and vulnerable groups in the community. Previous studies have mostly started with the construction of hard equipment, which easily overlooks the subjective awareness of mobilizing and connecting community residents. There is no complete network of relationships between residents and between residents and management groups to cope with the interference caused by emergencies. Secondly, social networks, as a resource that affects system resilience, have not been fully utilized. They play a significant role in connecting social ecology, social technology, and social entities. The impact mechanism of social networks on community resilience still needs to be further deepened. Finally, the research on the emergency task framework for community related management and service institutions such as neighborhood committees, property management, and higher-level local governments still needs further improvement, in order to build the community's ability in prevention and knowledge learning and improve overall resilience.

4. Conclusions

In recent years, research on urban resilience and community resilience has been increasing with the complexity of the social environment and the diversification of social risks. However, there is a lack of relevant analysis on the mechanism of resilience in specific scenarios and different disasters. The evaluation framework has not reached sufficient universality, and it is also unable to effectively express resilience when analyzing how communities respond to risks in dynamic environments.

This article uses CiteSpace to visualize time zone maps, keyword bursts, and author collaboration relationships, and finds that community resilience and governance have different governance methods and levels under different types of disasters. In the context of natural disasters such as earthquakes and floods, community resilience and governance focus on engineering defense, early warning system construction, emergency rescue, and post disaster recovery, emphasizing the resilience of physical infrastructure; Human made disasters and public health crises such as terrorist attacks and public health security focus more on non physical governance strategies such as information flow, social mobilization, and psychological intervention, emphasizing the social capital and psychological resilience of communities; In complex disaster systems such as compound disasters caused by climate change, the governance level has shifted from a single response to a multi-level prevention preparation response recovery adaptation cycle, emphasizing a systematic and comprehensive governance framework.

Compared to previous research, this article has made new progress in the following three aspects:

(1) Multi angle literature reference: This article deepens and expands the perspective sorting, not only comprehensively examining the resilience of multiple dimensions such as physics, economy, and society, but also introducing the time dimension to analyze the dynamic changes of community resilience in different stages (such as prevention, preparation, response, recovery, and adaptation). In addition, we also attempt to comprehensively examine the multiple influencing factors and interactive mechanisms of community resilience and governance from interdisciplinary perspectives, such as environmental science, sociology, psychology, policy science, etc.

(2) Systematic Explanation of Content Evolution: This article systematically elaborates on the evolution process of community resilience and governance content, using visualization methods such as time zone maps to clearly demonstrate the transformation from single disaster response to comprehensive management of multiple disasters, from single field research to interdisciplinary integration, and from theoretical exploration to practical application. This article also deeply analyzes the key factors driving these evolutions, such as changes in the global disaster situation, technological progress, policy orientation, etc.

(3) Future research trend prediction: This article attempts to grasp the research tendencies of scholars in the field of community resilience and governance through methods such as author collaboration analysis, and identify mainstream research directions and hot topics, revealing the cooperation patterns and knowledge flow paths among scholars. Propose governance mechanisms that may focus more on the prevention capabilities of urban communities rather than their ability to adapt to disasters in the future, and pay attention to the changes in multidimensional dynamic resilience related capabilities in space and time under diverse risk backgrounds.

Based on this, it is necessary to provide specific scenario descriptions for different risks, explore the differences in resilience exhibited by communities in identifying different risks, and explore the interaction process between resilience and risk from a dynamic system perspective. Through extensive literature review and analysis, it was found that: (1) social networks, as a resource that affects system resilience, have not been fully utilized; (2) Less attention has been paid to the emergency response capabilities of vulnerable groups in the community; (3) Lack of establishing a universally applicable community resilience system to accurately resist uncertain events with multiple complex correlations; (4) The integration with social sciences such as behavior and psychology is insufficient to study the role of human emotions in community resilience.And evaluate community resilience at a more detailed level to establish a corresponding relationship with risks, in order to establish a community adaptive mechanism to achieve self transition from low to high levels of resilience, and explore a universal path for resilient community governance.

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