Challenges and Dilemmas in Cultivating Institutional Resilience in Urban Governance

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Abstract: The cultivation of institutional resilience in urban governance is the key to dealing with uncertain risks. However, in reality, it is confronted with multiple predicaments such as the shackles of path dependence, the constraints of cognitive bias, and the bottlenecks of resource constraints. To break through these constraints, it is necessary to establish a dynamic iterative mechanism of "learning - feedback - correction", improve the collaborative governance structure of multiple entities including the government, the market and society, and innovate resilient financing and risk-sharing models. Through the empowerment of digital technology, the reconstruction of interest mechanisms and the application of market-oriented tools, the transformation of institutional resilience from static defense to dynamic adaptation is promoted, ultimately forming a resilient governance ecosystem led by the government, activated by the market and co-governed by society, providing institutional guarantees for the sustainable development of cities.

1. Introduction

The rapid superimposition of global climate change and urbanization has made the risk forms faced by cities increasingly complex. The traditional rigid governance model has frequently failed due to its lack of adaptability. Institutional resilience, as the core capability of the urban governance system, not only concerns the immediate effectiveness of disaster response but also determines the sustainability of the city's long-term development. However, most of the existing institutional designs are trapped in the lock-in effect of path dependence. The cognitive bias of governance subjects leads to the misallocation of resources, and the shortage of funds and the absence of risk-sharing mechanisms further exacerbate the lag in resilience construction[1]. Against this backdrop, to explore the optimization path of institutional resilience, it is necessary to break through the single-dimensional reform thinking and construct a systematic solution from three dimensions: mechanism iteration, subject collaboration, and resource innovation.

2. Multi-dimensional Characteristics of Institutional Resilience in Urban Governance

2.1 Dynamic adaptability

The dynamic adaptability of institutional resilience in urban governance, as one of its core

features, is neither a mechanical adherence to existing rules nor a passive response to external shocks. Instead, it achieves self-adjustment and evolutionary upgrading of the rule system through the continuous interaction between the institutional subject and the risk environment. This adaptability is first reflected in the flexible threshold design of the institutional trigger mechanism - unlike the binary judgment model of "either-or" in traditional rigid systems, resilient systems often adopt a hierarchical response mechanism, such as the four-level emergency response system constructed in Tokyo's "Basic Law on Disaster Countermeasures", which sets the resource allocation authority and administrative intervention scope corresponding to different disaster levels. It not only avoids the misallocation of resources due to "minor disasters and major treatments", but also prevents the failure of governance due to "major disasters and inadequate treatment"[2]. Furthermore, dynamic adaptability is also embedded in the institutional learning mechanism. Institutional subjects transform their risk response experiences into institutionalized knowledge through knowledge production methods such as case review and scenario simulation, thereby promoting the iteration of rules. The "circuit breaker - adjustment - restart" mechanism established by Singapore in the fight against the COVID-19 pandemic is based on the continuous assessment and optimization of its previous epidemic prevention policies. By dynamically adjusting parameters such as the number of quarantine days for entry and the limit on the number of people in social gatherings, it seeks a dynamic balance between ensuring public health security and maintaining economic vitality. What is more worthy of attention is that this adaptability is not a one-way institutional adjustment, but rather accompanied by the reconstruction of the cognitive framework of governance subjects. When cities are confronted with complex risks and challenges, the traditional linear thinking mode is gradually replaced by systems thinking, and governance subjects start to shift from the causal chain of "risk - response" to the evolutionary logic of "disturbance - adaptation - transformation". This cognitive leap, in turn, has strengthened the internal driving force for fostering institutional resilience. Therefore, the dynamic adaptability of institutional resilience in urban governance is essentially a spiral upward process of "adaptation - learning - re-adaptation" formed through the continuous interaction among institutional rules, governance subjects and the risk environment. The strength of this process directly determines the elastic space of the urban governance system in responding to uncertain risks.

2.2 System integration

The systematic integration of institutional resilience in urban governance, as the core support for resisting complex risks, is neither the simple superposition of a single institutional module nor the mechanical splicing of departmental powers. Instead, it achieves the organic coupling and dynamic synergy of governance elements at the structural, functional and value levels through the construction of a multi-dimensional and cross-level institutional network. This integration is first reflected in the nested connection of horizontal institutional modules. Taking urban flood control and governance as an example, resilient systems not only require water level monitoring rules from the water conservancy department and evacuation plans from the emergency department, but also need collaborative design for underground pipeline renovation by the transportation department and supporting measures for water area ecological restoration by the environmental protection department. Each system module forms a closed loop through the logical chain of "goal - means". For instance, the "basin - region - community" three-level linkage mechanism implemented by Shanghai in the Huangpu River flood control project precisely integrates subsystems such as meteorological warning, project dispatching, and community mobilization to build a full-cycle governance chain of "monitoring - response - recovery"[3]. In the vertical dimension, the system integration is manifested in the flexible adjustment of the relationship between the central and local

governments. When a city is confronted with super-local risks, the resilient system needs to break through the limitations of territorial management and establish a cross-administrative level resource coordination mechanism. For instance, when the Guangdong-Hong Kong-Macao Greater Bay Area was responding to typhoon disasters, it established a three-level emergency material reserve coordination platform of "national - provincial - municipal" Realize the cross-regional allocation and dynamic replenishment of strategic materials. A deeper integration occurs at the level of institutional values. Resilient systems need to balance multiple goals such as safety, efficiency, and fairness to avoid system imbalance caused by excessive emphasis on a single value. When Hangzhou was promoting the construction of its city brain, it formulated the "Data Sharing Ethics Guide", which not only ensured the realization of efficiency goals such as traffic flow optimization but also set fair constraints such as algorithmic discrimination review. It highlights the guiding role of value rationality in the integration of systems. Therefore, the systematic integration of institutional resilience in urban governance is essentially a process in which governance subjects achieve structural coupling, functional complementarity and value symbiosis through institutional design. The degree of integration directly determines the carrying threshold and repair capacity of the urban governance system in response to complex risks.

2.3 Value Inclusiveness

The value inclusiveness of institutional resilience in urban governance, as a deep-seated support for resisting risk shocks and achieving sustainable transformation, is neither a simple compromise on multiple values nor a one-way reinforcement of mainstream values. Instead, it is achieved through the establishment of a flexible value ranking mechanism and negotiation platform. We must strive to achieve dynamic balance and symbiotic evolution among core value dimensions such as safety, efficiency, fairness, and ecology[4]. This inclusiveness is first reflected in the open absorption of the value demands of stakeholders in the system design. When cities promote the construction of smart transportation systems, resilient systems not only need to consider technical goals such as optimizing traffic efficiency, but also need to go through public hearings, algorithmic ethics reviews and other means. Society must prioritize embedding social equity values-like inclusive mobility and economic accessibility in transportation-into policy frameworks. For instance, when London introduced the congestion charging system, it simultaneously launched the "Low Emission Zone Subsidy Scheme", which not only achieved environmental governance goals but also avoided economic squeeze on vulnerable groups. Furthermore, value inclusiveness requires that systems have the ability to adapt to value conflicts. When tensions arise among different value demands, resilient systems dynamically adjust rules by setting priorities rather than adhering to a single value standard. For instance, during Singapore's epidemic prevention and control, it initially prioritized life safety and implemented strict lockdowns. Later, as vaccination rates rose, societies began integrating economic recovery into value considerations, establishing a phased balance between security and development via a "coexistence roadmap." More fundamental inclusiveness is reflected in the respect and inheritance of intergenerational values by the system. Resilient systems need to go beyond short-term political performance orientation and incorporate long-term values such as ecological protection and cultural inheritance into the decision-making logic. For instance, when Copenhagen formulated its climate adaptation strategy, it broke down the "carbon neutrality by 2050" goal into operational phased indicators. Society can safeguard the long-term presence of intergenerational equity values in governance by adopting participatory models like the "Climate Citizens Conference." Therefore, the value inclusiveness of institutional resilience in urban governance is essentially a process in which governance subjects achieve the consolidation of value consensus, the resolution of value conflicts, and the stimulation of value creation through

institutional innovation. Its degree of inclusiveness directly determines the adaptability and leadership of the urban governance system in responding to the challenges of diverse values.

3. The Practical Difficulties in Cultivating Institutional Resilience

3.1 The shackle of path dependence

The path dependence shackles faced in the cultivation of institutional resilience in urban governance are essentially deep-seated obstacles to institutional change within the framework of historical institutionalism. Their formation stems not only from the self-reinforcing mechanism of existing institutional rules but is also constrained by the dual locking of the cognitive inertia of governance subjects[5]. From the perspective of institutional rules, the long-established hierarchical structure has built a precisely operating "institutional iron cage" through standardized processes, specialized division of labor and local management. This structure is highly efficient in dealing with routine governance tasks, but it has exposed rigidity when confronting uncertain risks. For instance, in the process of emergency management system reform in some cities in China, The old model of "fragmented management" is still in use, which leads to the cross-departmental collaboration mechanism becoming a mere formality. Risk information is distorted and deformed due to the interdepartmental interest game during hierarchical transmission, ultimately resulting in a governance paradox where "everyone is responsible but no one takes the blame". From the perspective of cognitive inertia, the mindset and behavioral patterns formed by governance subjects in long-term practice have further strengthened the lock-in effect of path dependence. Research shows that over 65% of urban managers simply equate institutional resilience with infrastructure reinforcement or improvement of emergency plans, neglecting the resilience value of soft elements such as institutional culture cultivation and social capital accumulation. This cognitive bias leads to institutional innovation often remaining at the technical level of patchwork and patching, without touching upon the deep-seated structural transformation of the governance system. What is more serious is that path dependence also forms a self-reinforcing cycle through the "increasing returns" mechanism of institutional change. The vested interest groups, in order to maintain the benefits of the existing system, will actively resist any reform attempts that may undermine their position, causing the cultivation of institutional resilience to fall into a vicious cycle of "locking - rigidity - failure", and ultimately weakening the adaptability of the urban governance system to deal with new risks.

3.2 Constraints of cognitive biases

The cognitive bias constraints encountered in the cultivation of institutional resilience in urban governance are essentially systematic misjudgments by governance subjects in terms of risk cognition, institutional understanding, and value ranking. This bias not only stems from the limitations of information processing under bounded rationality but also reflects the lagging adaptability of traditional governance thinking to modern risk characteristics. From the perspective of risk cognition, governance entities often fall into the "empiricism trap", accustomed to using historical disaster data to deduce future risk scenarios, but ignoring the sudden changes in risk patterns triggered by variables such as climate change and technological revolution - for instance, most cities still set flood control standards based on historical rainfall records. However, the extreme rainstorms caused by the superposition of "super typhoons + urban heat island effect" were underestimated. This lag in cognition directly led to the difficulty of institutional design in covering new risk scenarios. At the level of institutional understanding, governance subjects generally exhibit a "narrow instrumental rationality", simplifying institutional resilience to the optimization of

technical standards or management processes, while neglecting the deep-seated organizational culture changes and social capital accumulation behind it. Research shows that only 32% of urban managers incorporate "cultivating a resilient culture" into their policy toolkit. More people still blindly believe in the linear governance logic of "hardware investment - indicator improvement", and this shallow understanding makes institutional innovation merely superficial. The more fundamental constraint lies in the "short-sighted tendency" of value ranking. When confronted with multiple value conflicts such as security, efficiency, and fairness, governance entities often prioritize policy options that are quantifiable and yield quick results, while placing institutional resilience, a "hidden asset" that requires long-term investment, in a secondary position. This kind of value misjudgment eventually led to the urban governance system exposing structural defects such as "fragile hard structure and lack of soft power" under the impact of risks.

3.3 Resource constraint bottleneck

The resource constraint bottleneck faced in cultivating institutional resilience in urban governance is essentially the result of the combined effect of supply imbalance and inefficient allocation in multiple resource dimensions. This predicament is not only reflected in the absolute shortage of hard elements such as material resources and human resources, but more prominently in the relative scarcity of soft elements such as information resources and policy resources. Moreover, the asymmetric constraints among different resources further magnify the vulnerability of the system. From the perspective of material resources, cities have long shown a tendency of "emphasizing construction over maintenance" in areas such as disaster prevention infrastructure and emergency material reserves. A large number of sponge city facilities that have been built have deteriorated in function due to the lack of continuous financial support. Some cities' emergency material reserve warehouses still adopt the "static inventory" management model. The failure to establish an elastic supply mechanism that dynamically matches population mobility and risk levels has led to the paradox of "having inventory but no goods" or "goods not meeting needs" when disasters occur. At the human resources level, the shortage of professional resilience governance talents has become a universal problem. The proportion of compound talents who are proficient in both urban planning and risk management is less than 5%. Moreover, the existing training system mostly remains at the theoretical indoctrination level and lacks simulation training in real risk scenarios. This often leads to institutional innovation being merely a formality due to the insufficient ability of the implementing subjects. More crucially, there is the constraint of information resources. The data barriers between departments have not been completely broken down. Key information such as meteorology, transportation, and medical care is still scattered in "information islands". Coupled with the time lag between the frequency of data updates and the speed of risk evolution, it makes it difficult for institutional decisions to be dynamically adjusted based on real-time risk profiles. In terms of policy resources, an incentive and compatibility mechanism for cross-departmental collaboration has yet to be established. The solidification of departmental interests makes it difficult to implement institutional arrangements such as joint law enforcement and resource integration, ultimately leading to a governance deadlock where "systems are designed but enforcement lacks motivation".

4. Optimized Paths for Cultivating Institutional Resilience

4.1 Establish an institutional iteration mechanism of "learning - feedback - correction"

The cultivation of institutional resilience in urban governance urgently requires the establishment of a dynamic "learning - feedback - correction" iterative mechanism to break through the static and

closed nature of traditional institutional design and form adaptive governance capabilities that resonate with the evolution of risks. The core of this mechanism lies in building a "dual circulation" system for institutional learning: At the micro level, it is necessary to establish a risk case database and a database of institutional failures. Through big data analysis technology, attribution modeling of institutional loopholes in historical disasters can be conducted. For instance, the problem of delayed emergency response during the "7·20" extreme rainstorm in Zhengzhou can be decomposed into specific institutional deficiencies such as deviations in the setting of early warning thresholds and ambiguous departmental linkage rules, providing precise targets for subsequent corrections. At the macro level, it is necessary to promote the formation of a "reflective practice" culture among governance entities. This can be achieved by regularly holding institutional resilience seminars and cross-city risk governance experience exchange meetings, etc., to facilitate the explicit dissemination of tacit knowledge. For instance, Shenzhen established a mechanism of "daily review - weekly assessment - monthly iteration" during the epidemic prevention and control. It is precisely through frequent reflection and learning that the rapid optimization of institutional rules is achieved. The feedback stage needs to strengthen the participatory supervision of multiple subjects. Digital technology should be utilized to build a collaborative feedback platform for "citizens - enterprises - social organizations", incorporating real-time front-line information such as community disaster perception and enterprise risk response into the institutional evaluation system. At the same time, third-party think tanks should be introduced to conduct institutional resilience stress tests and simulate the institutional carrying capacity under extreme scenarios. During the revision stage, it is necessary to establish a hierarchical response system adjustment rule, dynamically triggering local revisions or overall reconfigurations based on risk levels. For instance, when Shanghai was promoting the "One Network for All Governance" reform, it formulated the "Measures for Dynamic Adjustment of Urban Operation and Management Rules", clearly defining the authority and process for system modifications under different risk scenarios, ensuring that the system iteration is both flexible and authoritative.

4.2 Improve the multi-subject collaborative governance structure

The in-depth cultivation of institutional resilience in urban governance urgently needs to break away from the governance paradigm dominated by a single subject and instead build a three-dimensional governance framework featuring deep collaboration among multiple subjects such as the government, market, society, and the public, in order to maximize resource integration and optimize governance efficiency in risk response. The improvement of this framework should be based on the redistribution of "power - responsibility - interest". Through legislative forms, the role positioning and the boundaries of rights and responsibilities of each subject in the entire chain, including risk early warning, emergency response, and recovery and reconstruction, should be clearly defined. For instance, the three-level linkage mechanism of "federal - state - local" stipulated in Germany's "Disaster Prevention Act" not only grants local governments the autonomy in emergency response, It also ensures the smoothness of cross-level resource allocation through means such as fiscal transfer payments. The design of the collaborative mechanism should focus on the enabling role of digital technology. By building smart platforms such as the "Urban Governance Brain", the data barriers and information silos among departments can be broken down, achieving real-time collaboration in risk perception, resource scheduling, and decision-making command. For instance, when Hangzhou was responding to Typhoon "Yanhua", it relied on the urban brain to integrate data from over 20 departments including meteorology, transportation, and water conservancy. A full-process closed-loop management system of "monitoring - early warning - handling - assessment" has been established. In addition, it is necessary to establish a trust

cultivation mechanism involving multiple subjects. This can be achieved through regular communication, joint drills, and shared benefits to enhance the cohesion of collaboration. For instance, Singapore's "Community Emergency Response Team" program, which regularly organizes residents to participate in disaster simulation training, not only improves the public's self-rescue capabilities but also promotes mutual trust and cooperation between the government and the community. Ultimately, the improvement of this collaborative governance framework will drive the transformation of institutional resilience from "government-led" to "social co-governance", forming a resilient governance ecosystem where "everyone has responsibilities, everyone fulfills their duties, and everyone shares".

4.3 Innovate resilient financing and risk-sharing models

The long-term cultivation of institutional resilience in urban governance urgently needs to break through the single reliance on traditional fiscal input. By innovating financing mechanisms and risk-sharing models, a resilient financial guarantee system shared by the government, the market and society should be established to address the problems of resource misallocation and supply lag under the impact of uncertain risks. The core of this innovative path lies in establishing a closed-loop mechanism of "risk pricing - capital guidance - loss sharing" : In the risk pricing stage, big data and artificial intelligence technologies should be applied to conduct dynamic loss assessments of urban floods, earthquakes and other disasters, and form differentiated risk premium models. For instance, Tokyo has built a "disaster risk map database" to convert the earthquake loss probabilities of different regions into insurance rate adjustment coefficients, providing precise pricing basis for market-based financing. At the capital guidance level, the leverage role of policy-based finance should be fully leveraged. By setting up special funds for resilient cities and issuing green municipal bonds, social capital can be attracted to participate in the resilience transformation of infrastructure. For instance, the "Sponge City PPP Project" implemented in Rotterdam, the Netherlands, uses government subsidies to leverage private investment, achieving a synergy between flood control projects and commercial development. The loss-sharing mechanism requires the establishment of a multi-level protection network. On the basis of the mandatory implementation of the catastrophe insurance system, financial tools such as reinsurance and catastrophe bonds should be introduced to disperse extreme risks. At the same time, a complementary system of government emergency reserves and community mutual aid funds should be established, such as the "Resilience Trust Fund" established by New York City after Hurricane Sandy. By integrating federal grants, charitable donations and self-raised funds from residents, a hierarchical sharing model of "core guarantee + flexible supplementation" is formed. This innovative model not only alleviates fiscal pressure but also stimulates the intrinsic motivation of all parties to participate in resilience building through market mechanisms, ultimately achieving a sustainable leap in the cultivation of institutional resilience.

5. Conclusions

The cultivation of institutional resilience is the inevitable path to the modernization of urban governance. Its optimization requires a dynamic iterative mechanism to break through path dependence, a multi-party collaborative architecture to bridge cognitive biases, and an innovative financing model to break through resource constraints. By constructing a closed-loop system of "institutional learning - risk feedback - rule correction", it promotes the formation of adaptive cognition among governance subjects. By leveraging digital technology integration and benefit-sharing mechanisms, the collaborative effectiveness of multiple entities can be stimulated. By applying market-oriented financial tools and risk-sharing strategies, sustainable guarantees for

resilient investment can be achieved. Only in this way can the urban governance system maintain flexibility and vitality in a risk society and ultimately move towards a new realm of resilient development characterized by "resilience - recovery - evolution".

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