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# THE FORMATION MECHANISM OF EMERGENCY RESPONSE CAPACITY IN MAJOR EMERGENCIES AT THE GRASS-ROOTS LEVEL

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**Abstract:** The emergency response capacity of major emergencies at the grass-roots level includes both potential emergency response capacity elements and emergency response capacity realization mechanisms. The emergency response capability realization mechanism is not only the mechanism for potential emergency response capability elements to be transformed into real emergency response capability, but also the environmental conditions and institutional guarantee for the formation of emergency response capability. In the formation process of emergency response capacity for major emergencies at the grassroots level, potential emergency response capacity elements, emergency response capacity realization mechanism and real emergency response capacity elements interact and influence each other to form a complete emergency response capacity. Therefore, this study will start from the analysis of the role of emergency response capacity realization mechanism on the transformation of potential emergency response capacity into real emergency response capacity, and explain the mechanism of emergency response capacity formation in major emergencies at the grassroots level.
**Keywords:** Grass-roots level; Emergencies; Emergency response capacity; Formation mechanism

## 1 INTRODUCTION

Strengthening the construction of China's emergency management system and upgrading the capacity of emergency management is the proper meaning of promoting the modernization of the national governance system and governance capacity[1]. Emergency management not only undertakes the mission of preventing and resolving major social risks, but also has the responsibility of safeguarding people's lives and property and maintaining social harmony and stability. Emergency management capacity is the national governance capacity in a major crisis state, and is an important factor for the government to realize the mitigation of the impact of disasters[2]. Especially with the high complexity and uncertainty of modern society and the increasing frequency of the flow of all kinds of elements, emergency management of emergencies has become a prominent issue facing social management today. Various types of sudden public events not only seriously threaten the survival of human beings and normal social order, but also seriously jeopardize economic, political and cultural development. Under the influence of the long-term urban-rural dualistic system, China's emergency management of public emergencies has a situation of “emphasizing the city and neglecting the countryside”, and there are significant differences in the directions of crisis early warning, crisis response, crisis communication, crisis recovery and crisis learning[3]. The grassroots is the front line of sudden public events, and also the key area of concern and weak link of emergency management. With the goal of strengthening and improving the emergency response capacity of the grassroots to deal with major sudden public events, comprehensively deconstructing the basic connotation of the emergency response capacity of the grassroots to deal with major sudden public events, analyzing the mechanism of its emergency response capacity formation, and exploring effective paths to enhance the emergency response capacity, it has a very important theoretical value and practical significance for the soundness of the national emergency response management system, the enhancement of the capacity of the rural areas to cope with the sudden major public events, and the advancement of the modernization of national governance system and governance capacity.

## 2 LITERATURE REVIEW

In September 2007, the U.S. federal government completed the National Preparedness Guidelines (NPG) under the Post-Katrina Emergency Management Reform Act, laying the policy foundation for restructuring the U.S. emergency management system and clearly defining the core capabilities that the U.S. government should have to respond to specific types of major emergencies that pose the greatest risk to U.S. national security. It clearly defines the U.S. government's core capabilities for specific types of critical emergencies that pose the greatest risk to U.S. national security. The United States Government has adopted “emergency response capability” as the core terminology for constructing an emergency management system. Emergency response capability is defined as providing the means to achieve a mission or function from one or more mission-critical performances in a given situation to a performance goal

area during a major emergency[4]. Liu et al. used the 2009 Chinese influenza A (H1N1) virus as an example to conduct a multi-subject simulation analysis on the NetLogo platform to analyze the evolution mechanism of the epidemic. The results show that there may be four evolutionary scenarios for the epidemic and different emergency response capabilities are formed respectively[5]. Bethany Saxon et al. examined the mechanisms by which the role of the media shapes emergency response capacity for public events, using the U.S. media coverage of the 2014 Ebola outbreak in West Africa as an example. Most factual media reports have been found to increase self-efficacy, reduce risk perception, and facilitate the development of a collective social emergency response capacity for public health events[6]. Tom Christensen et al. borrow structural and institutional analytical tools to study the impact of government emergency coordination structures and mechanisms on the mechanisms of emergency capacity formation[7]. Dosi's perspective emphasizes the role of capacity as a bridge between purpose and outcome, and in fact views capacity as a key capability for the transformation between resources (inputs) and goals (outputs)[8]. However, the internal mechanism of this capacity, i.e., what it is and how it operates, remains a “black box”, full of unknowns and mysteries. Many scholars have applied this “black box” theory to the analysis of emergency management capabilities. These studies pay more attention to the strategies and means of crisis resolution, emphasize the importance of advance planning, and seek to prevent crises from occurring, control their development, and minimize losses through well-planned contingency plans.

In recent years, academics have developed a keen interest in the specific process and internal mechanism of the formation of emergency management capacity. Researchers have begun to explore in depth the issue of “how emergency response capacity is formed”, trying to reveal the regularity and internal logic of its formation process. Some scholars suggest that emergency response capability is not static, but a dynamic evolutionary process. As emergency events continue to evolve and develop, emergency management capabilities are constantly being adjusted, changed and upgraded. For example, in his study of governmental public crisis management, Kong et al. pointed out that crisis management is an organized, strategic and persistent management process[9]. Depending on the potential or current crisis, the government will take appropriate control measures at different stages of the crisis, aiming at preventing, dealing with and eliminating the crisis. The keys to this process are: timely information on and anticipation of crises, effective preventive measures, efficient management of and feedback on crises, recovery and reconstruction after the crisis is over, and maintaining continuous learning and innovation. When discussing the evaluation of the efficiency and capability of emergency response, Lee et al. emphasized that the focus of emergency management should not be limited to information and public opinion management, but should be extended to the formulation of plans, teamwork and equipment configuration, and to achieve a comprehensive coverage from the front-end to the back-end of the emergency response, to achieve the transition from the extraordinary to the normal[10].

The purpose of this paper is to explore how to improve the grassroots' ability to cope with public emergencies in the new era as a whole, apply structural equation modeling to the sample response situation, focus on the outstanding problems of the grassroots in coping with public emergencies, and prospectively explore the strategic concepts of improving the grassroots' ability to cope with public emergencies.

## 3 RESEARCH HYPOTHESES

The formation of emergency response capacity at the grass-roots level, as a comprehensive dynamic evolutionary process, contains macro-realistic capacities such as emergency warning capacity, emergency preparedness capacity, emergency response capacity, emergency response capacity, emergency recovery capacity, and emergency response capacity for learning, as well as micro-potential capacities such as emergency response infrastructure, human resources deployment, integrated emergency response information platforms, emergency response institutions and organizations, and the social environment[11-12]. First of all, the constraint mechanism is the basic mechanism relied on in the formation process of emergency response capacity in emergencies[13]. It is a way to ensure that the subject's behavior does not exceed the proper boundaries, an important means to regulate and standardize the behavior of the subject, and an important safeguard for the organizational behavior and social order of emergency management. Therefore, through legal supervision, administrative supervision, public supervision and other levels to carry out constraints, the prevention and resolution of major risks to do a good job. Second, the incentive mechanism by stimulating the enthusiasm of the subject, the subject power from the potential state actively adjusted to the state of reality, effective incentives can become the power of emergency management activities to ensure[14]. Incentive mechanism and accountability mechanism interact with each other, the accountability mechanism in public crisis management is a kind of incentive mechanism for officials, and the current emergency response capacity formation in public crisis events also lacks the synergy of incentive mechanism and accountability mechanism. Disaster tolerance mechanism refers to the compatibility and tolerance to disaster, which is the process subject relationship to minimize the loss of the crisis by establishing backup systems and auxiliary facilities to counteract catastrophic data destruction so that it can be able to operate and recover soon after the disaster occurs[15]. The learning mechanism serves as the fundamental basis on which the formation of emergency response capacity is based. After an emergency has been dealt with, in-depth investigation, summarization and study of the incident will help to comprehensively analyze the inner laws of the emergency and achieve a broad understanding of the situation[16]. In the face of all kinds of possible, unpredictable and unavoidable public crises and social risks, the construction of a diversified learning system is essential to enhance the capacity of grassroots emergency management. These five mechanisms are indispensable and mutually reinforcing, and together they promote the continuous improvement and optimization of emergency response capacity.

In order to validate the constructed theoretical model, based on the above analysis, the following five research

hypotheses are proposed(see Figure 1):
H1: Potential capability has a positive influence on real capability through incentive mechanism;
H2: Potential capability has a positive influence on real capability through constraint mechanism;
H3: Potential capability has a positive influence on real capability through accountability mechanism;
H4: Potential capability has a positive influence on real capability through learning mechanism;
H5: Potential capability has a positive influence on real capability through tolerance mechanism.

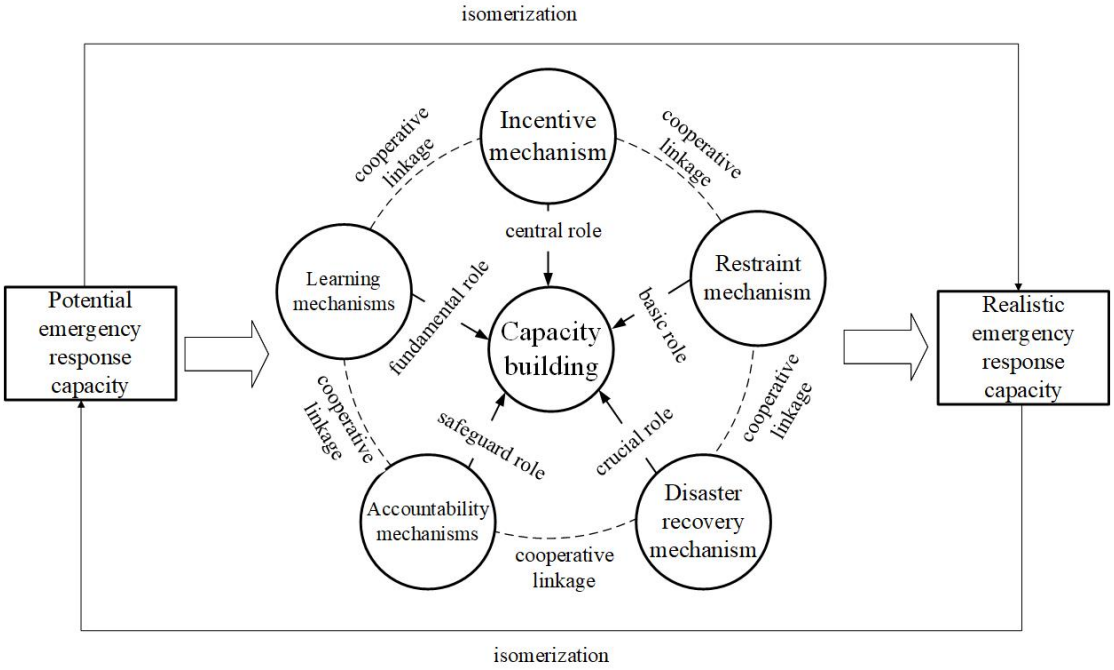


**Figure 1** Theoretical Model of Grassroots Emergency Response Capacity Formation Mechanism

## 4 RESEARCH METHODS AND MODEL CONSTRUCTION

### 4.1 Research Methods

Structural Equation Modeling (SEM) is a statistical modeling method that includes both explicit and latent variables. Generally, SEM consists of two parts, structural model and measurement model, the structural model is used to describe the relationship between the analyzed latent variables, and the latent variables are the variables that cannot be directly measured, and need to be measured using the measurement model[17]. Measurement model is used to measure the structure between latent variables and explicit variables, to infer latent variables by measuring explicit variables, to analyze the structural relationship between explicit variables and latent variables, and then to verify the model assumptions and causal relationships between variables. The main advantages of structural equation modeling are the ability to deal with multiple variables at the same time; to allow for measurement error to be included in both the independent and dependent variables; and to estimate the goodness-of-fit of the overall model. The method is often used in social science research to analyze latent variables that cannot be directly measured, and thus through the use of structural equation modeling, direct multivariate multi-causal analysis can be conducted to determine how the elements of latent emergency response capacity are transformed into manifested capacity in the process of the formation of emergency response capacity of grass-roots level for major public emergencies and how the elements of emergency response capacity interact with each other and have influence on each other.

### 4.2 Model Construction

The research variables involved in the study of structural equation modeling are of two major categories: manifest variables and latent variables, and the latent variables in the conceptual model of the formation mechanism of emergency response capacity for major public emergencies at the grass-roots level need to be specifically analyzed through manifest variables. Define and classify the variables in the above conceptual model, and get five real capabilities of emergency warning capability, emergency preparedness capability, emergency disposal capability, emergency recovery capability, emergency learning capability, and five potential capabilities of emergency infrastructure, emergency human resources deployment, emergency integrated information platform, emergency response agency organization, and the social environment, and the process of transforming the elements of the potential emergency response capability into the real emergency response capability is subjected to the restraints Mechanism, incentive mechanism, disaster recovery mechanism, accountability mechanism, learning mechanism, the interaction of each other, the resulting formation of 24 apparent variables, the specific meaning of the description of the Table 1.

**Table 1** Indicators and Meanings of the Measurement Model of Grassroots Emergency Response Capacity Formation Mechanism

| Latent Variable | Manifest Variable Serial Number | Manifest Variable | Manifest Variable Specific Description |
|---|---|---|---|
| Realistic Capability | X1 | Emergency Warning Capability | Management measures taken during the period in which certain signs that may lead to emergencies have been detected but have not yet broken out are the prerequisites and preparations for choosing and implementing an emergency plan, and are the basis for incident intervention and control. |
| | X2 | Emergency Preparedness Capability | In order to effectively prevent and respond to a variety of emergencies and other aspects of knowledge, resources and materials to prepare. |
| | X3 | Emergency Disposal Capability | The rapid establishment of emergency command institutions, timely emergency response, and rapid action to effectively prevent the spread of harm |
| | X4 | Emergency Recovery Capability | Multi-dimensional aftermath of the main body of the government and a variety of non-governmental organizations, effectively avoiding the chain of crises and the spread of the impact of the incident |
| | X5 | Emergency Learning Capability | The government in the aftermath of the incident has the goal of constantly adjusting, changing, and innovating the concepts and behaviors to solve the possible future problems, summarize the experience of responding to the situation, and eliminate the hidden dangers in order to prevent the same incident from happening again. |
| Latent Capacity | X6 | Emergency Infrastructure | The lack of emergency response infrastructure will have a negative impact on the current emergency response model, with various emergency response resources not functioning properly, which directly contributes to the inefficiency of the entire emergency response activity. |
| | X7 | Emergency Human Resources Deployment | Whether the existing emergency personnel conditions can meet the expected demand for incident response and calm the spread of incident crisis. |
| | X8 | Emergency Integrated Information Platform | The platform makes it possible to get comprehensive information support and guarantee in the emergency management of emergencies in all aspects of early warning, response and communication. |
| | X9 | Emergency Agency Organization | It can promote the effective operation of all kinds of emergency resources, and promote the overall synergy between regular work and emergency work. |
| Incentive Mechanism | X10 | Social Environment | A stable online public opinion environment after an emergency can reshape emergency response capabilities. |
| | X11 | Reputational Incentives | Increase the speed of emergency management for the sake of its own and the government's reputation. |
| | X12 | Spiritual Incentives | To seek cooperation on public emergencies in order to gain political advancement. |
| | X13 | Compensation Incentives | To increase their efforts in order to obtain higher salary benefits, thus motivating government departments to achieve emergency response goals faster. |
| Restraint Mechanisms | X14 | Legal Oversight | Whether there is a lack of appropriate legal oversight in the event of an emergency. |
| | X15 | Administrative Oversight | In public emergencies, the outbreak of the incident is quickly traced back to the root cause and administrative accountability, which improves the effectiveness of emergency management. |
| | X16 | Public Oversight | Effective monitoring and guidance of public opinion will increase the pressure on the government in incident management and enhance the level of emergency management effectiveness. |
| Disaster Recovery Mechanisms | X17 | Disaster Recovery Plan | Maintain a long-term effective disaster recovery plan, the effectiveness of emergency management of current emergencies. |
| | X19 | Technical Support | Being able to have a comprehensive grasp of the operational characteristics of emergency management, providing first-hand information basis of crisis occurrence for the commanding organization to carry out emergency management activities, and enhancing the emergency rescue capability. |
| | X20 | Backup Systems | Whether emergency call-ups to standby resource facilities can minimize disasters, effectively optimize resources across the |

| | | | |
|---|---|---|---|
| | | | network to reduce overall losses from disasters, and provide data support for emergency management activities. |
| Accountability mechanisms | X21 | Administrative sanctions | Whether effective administrative accountability is an important means of improving emergency management capacity and responding to societal pressures to quickly trace the root causes of outbreaks. |
| | X22 | Criminal sanctions | Whether the results of criminal accountability will draw attention to emergency management as the beginning of a new emergency management cycle. |
| Learning mechanisms | X23 | Mock drills | Whether the organization of systematic and practical activities for emergency response actions by relevant personnel can identify planning deficiencies and insufficient resource allocation, and also reduce casualties and property damage in actual emergencies. |
| | X24 | Safety Education | Whether systematic educational activities can be used to enhance the capacity for early warning, preparedness, disposal and recovery from emergencies. |

Structural equation modeling reveals causal associations between latent variables that are difficult to observe and explicit variables that can be measured, as well as the interactions between the latent variables. The association between the latent variables can be presented and expressed by means of a specific form of structural equation[18]:

$$\eta = B\eta + \Gamma\xi + \zeta \quad (1)$$

The relationship between the indicator and the latent variable can be characterized using a measurement equation with a specific structure as follows:

$$X = \Lambda_x \xi + \delta \quad (2)$$

$$Y = \Lambda_y \eta + \varepsilon \quad (3)$$

Based on the above analysis, latent variables are determined by combining the indicator system of emergency management capacity formation in Table 1. Among them, emergency management realistic ability ($LV_1$) corresponds to have 5 significant variables represented by $A_i$ (i=1, 2, 3, 4, 5), $W_{ai}$ is the variable weight; emergency management potential ability ($LV_2$) corresponds to have 5 significant variables $B_i$ (i=1, 2, 3, 4, 5), $W_{bi}$ represents its variable weight; accountability mechanism ($LV_3$) corresponds to have 2 significant variables represented by $C_i$ (i=1, 2) denoted by $W_{ci}$ as variable weights; the incentive mechanism ($LV_4$) corresponds to have 3 explicit variables denoted by $D_i$ (i=1, 2, 3), and $W_{di}$ as variable weights; the constraint mechanism ($LV_5$) corresponds to have 3 explicit variables denoted by $E_i$ (i=1, 2, 3), and $W_{ei}$ as variable weights; and the disaster-tolerance mechanism ($LV_6$) corresponds to have 3 explicit variables denoted by $F_i$ (i=1, 2, 3), and $W_{fi}$ is the variable weight; learning mechanism ($LV_7$) corresponds to have 2 significant variables represented by $G_i$ (i=1, 2), and $W_{gi}$ is the variable weight; in this paper, we take the influence on the real capacity of emergency management as exogenous latent variables, and the potential capacity of emergency management, accountability mechanism, incentive mechanism, constraints mechanism, disaster-tolerance mechanism, and learning mechanism 6 as endogenous latent variables.

The variable x is defined as a q×1 vector consisting of q exogenous observables. Correspondingly, ξ represents a q×1 vector consisting of a combination of n exogenous latent variables. Whereas Λx is used to characterize the intrinsic link between exogenously observed indicators and exogenous latent variables, this relationship is often captured in conventional analyses with the help of path coefficients, which are essentially the q×n factor loading matrix of x on ξ. In addition, δ denotes the q×1 vector of q measurement errors aggregated from the q ones. Turning to the endogenous variable component, y denotes the p×1 vector consisting of p endogenous observables. η, on the other hand, represents the m×1 vector consisting of a combination of m endogenous latent variables. Λy is used to characterize the relationship between the endogenous observables and the endogenous latent variables, and is generally also characterized by the path coefficients, which are the pm factor loading matrices for y on η. Meanwhile, ε is a p×1 vector of p measurement errors. Regarding the relationship between latent variables, B is used to reflect the association of endogenous latent variables η with each other, which is usually characterized by path coefficients $\beta_{ij}$, which is a m×m factor matrix. And the influence exerted by the exogenous latent variable ξ on the endogenous latent variable η is also commonly measured by the path coefficient $\gamma_{ij}$. In addition, ξ is also presented here as a residual term of the structural equation in the form of an m×1 vector, which embodies that part of the information of η that cannot be accounted for in the equation. The role of variables in the formation process of emergency response capacity includes direct and indirect roles, the degree of direct role is directly expressed by the path coefficient between the variables, and the degree of indirect role can be expressed by the product of path coefficients of the intermediate variables, and the total role of the variables in the formation process of emergency response capacity is the sum of the direct and indirect roles, which provides a better method for quantitatively portraying the mechanism of the formation of emergency response capacity.

## 5 EMPIRICAL RESULTS AND DISCUSSION

### 5.1 Data Sources

After the pre-questionnaire was modified and supplemented by going to many places for research and organizing the opinions of relevant experts in emergency management and relevant emergency management staff at each local

government level to form the formal questionnaire, the data were collected by combining the on-site distribution of the questionnaire and the online email distribution of the questionnaire. The target respondents were relevant emergency management staff at each local government level and research scholars in the field of emergency management. Finally, we find the constraint mechanism, incentive mechanism, disaster-tolerance mechanism, accountability mechanism, and learning mechanism between the real capacity and potential capacity of emergency management, and thus form 24 secondary measurement indexes. 536 questionnaires are recovered, which meet the requirement of 200 samples at least for the SEM model, among which 397 are recovered by on-site distribution, and 139 are recovered by online questionnaires, and the questionnaires with duplicated and blank options are excluded. The valid questionnaires were 519, with an effective rate of 96.8%. The article used SPSS 20 software for descriptive statistics and reliability-validity analysis, and AMOS 22 software for hypothesis testing of the model.

### 5.2 Reliability Testing

Reliability testing is the process of measuring whether the latent variables can be effectively explained by the variance of their manifest variables. In this study, the Cronbach's alpha coefficient method, which is widely recognized in the academic field, was adopted to test the internal consistency of the items in the questionnaire. In general, a Cronbach's alpha coefficient of more than 0.80 indicates that the questionnaire has good reliability, while a level between 0.70 and 0.80 can be considered acceptable. In the current analysis, Cronbach's alpha coefficient was calculated for several dimensions. Specifically, the Cronbach's α value of actual ability is 0.873, that of potential ability is 0.864, that of constraint mechanism is 0.843, and that of incentive mechanism is 0.827. The Cronbach's α value of the disaster recovery mechanism is 0.881, that of the accountability mechanism is 0.894, and that of the learning mechanism is 0.848. All these values exceeded the baseline of 0.70, thus demonstrating that the measurement scales used in this study have excellent reliability and the internal structural consistency among the variables is quite good. This finding provides a solid data base for subsequent studies.(See Table 2)

**Table 2** Reliability Testing

| Variables | Number Of Items | Cronbach's α |
|---|---|---|
| Real Capacity | 5 | 0.873 |
| Potential Capacity | 5 | 0.864 |
| Binding Mechanisms | 3 | 0.843 |
| Incentives | 3 | 0.827 |
| Tolerance Mechanisms | 2 | 0.881 |
| Accountability Mechanisms | 2 | 0.894 |
| Learning Mechanisms | 2 | 0.848 |
| Total Table | 23 | 0.943 |

### 5.3 Validity Testing

Validity tests, in essence, aim to assess the validity of the questionnaire design and the accuracy of its measurement. This assessment focuses on examining whether the items under study accurately reflect the intended variables or dimensions. In other words, it requires that the questionnaire's items be designed not only to be reasonable, but also to ensure that the tester can accurately measure the variable through these items, and that these items are also designed to truly reflect the characteristics of the target variable. There is a basic logic in the relationship between reliability and validity: when validity is high, reliability tends to be correspondingly high, but conversely, a high level of reliability does not necessarily imply an equally high level of validity. Validity usually consists of three types: content, structure and validity scales. Of these, content validity focuses on assessing the reasonableness of a questionnaire's items to measure a particular concept, which is usually demonstrated through textual descriptions and references to authoritative sources, and may include processes such as pretest revision to ensure its validity. Structural validity, on the other hand, is concerned with the logical correlation between measurement items and measurement dimensions, and commonly used measures include exploratory factor analysis and validation factor analysis, especially exploratory factor analysis, which is widely used in current research to verify its structural validity by analyzing the variables in conjunction with the scale. On the other hand, validity scale validity is based on known authoritative standardized data, which is assessed by comparing the correlation between the current data and these standardized data, and when the correlation is high, it indicates good validity scale validity. When conducting validity analysis, it is also important to pay attention to a key statistical indicator, the KMO value. This value is used to measure the bias correlation between variables, and in general, the KMO value should be 0.6 or above; if it is lower than this value, it may be necessary to reconsider the design of the questions or re-distribute the questionnaire.(See Table 3)

**Table 3** KMO and Bartlett's Test

| | | |
|---|---|---|
| KMO | | 0.843 |
| Bartlett's Test of Sphericity | Approximate Chi-squared Value | 7715.633 |
| | df | 264 |
| | Sig. | 0.000 |

### 5.4 Analysis of Initial Model Fitting and Correction of Structural Equations

#### *5.4.1 Initial model fitting for structural equations*

After the initial structural equation model is constructed, in order to ensure the validity and accuracy of the model, the model needs to be further fitted and evaluated. In this process, the estimation of model parameters and the test of model fitness are indispensable steps. AMOS software provides diversified model fitting methods, among which, this paper chooses the maximum likelihood estimation (MLE) to estimate the model parameters. By this method, the various fitting indices of the initial model were obtained. Next, based on the model construction and data validity tests, a comprehensive assessment of model fit was conducted. This assessment was based on three types of fit indices: absolute fit indices, relative fit indices, and parsimony fit indices. Specifically, the fit indices of $\chi^2$/df, CFI, TLI, RMSEA, and SRMR were applied in the structural equation modeling (SEM) analysis for validation factor analysis using Mplus7 software. Among them, $\chi^2$/df is used as the chi-square value of the model fit, and the closer its value is to 1, the better the model fit is; the closer the CFI and TLI values are to 1, the better the model fit is represented; the closer the RMSEA index is to 0, the better the model fit is; while the SRMR value is less than 0.05, the model is usually considered to be well fitted. Detailed analysis of the data by Mplus7 software resulted in the following fit indices: the $\chi^2$/df value was 1.36, indicating a good model fit; the CFI and TLI were both greater than 0.9, further verifying the good fit of the model; and the RMSEA index was 0.033 and the SRMR index was 0.034, which were below the standard thresholds, indicating a good model fit. These results are all consistent with the SEM requirements for the overall fit of the data, Table 4 thus confirming the goodness of fit of the hypothesized model for this study.

**Table 4** Model Fit Index Test

| Index | Numeric Range | Recommended Standard | Actual Index | Desirable or Not |
|---|---|---|---|---|
| $\chi^2$/df | >0 | <5 | 1.36 | Yes |
| CFI | 0-1 | >0.9 | 0.986 | Yes |
| TLI | 0-1 | >0.9 | 0 982 | Yes |
| RMSEA | 0-1 | <0.05 | 0.033 | Yes |
| SRMR | 0-1 | <0.05 | 0.034 | Yes |

#### *5.4.2 Model conclusion and interpretation of results*

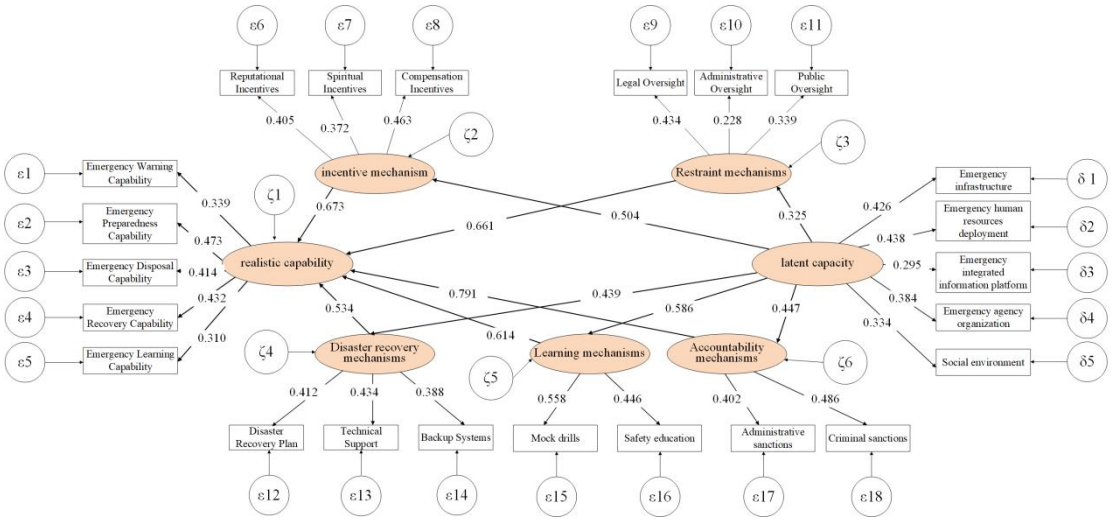


**Figure 2** Analysis Results of the Structural Equation Model

**Table 5** Multilevel Mediation Analysis

| | (1) Standardized Direct Effect | (2) Standardized Indirect Effect | (3) = (1) + (2) Standardized Total Effect |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Potential Emergency Response Capacity → Incentives → Real Emergency Response Capacity | 0.504<br>0.673 | 0<br>0 | 0.504<br>0.673 |
| Potential Emergency Response Capacity → Constraints → Realistic Emergency Response Capacity | 0.325<br>0.661 | 0<br>0 | 0.325<br>0.661 |
| Potential Emergency Response Capacity → Accountability Mechanisms → Realistic Emergency Response Capacity | 0.447<br>0.439 | 0<br>0 | 0.447<br>0.439 |
| Potential Emergency Response Capacity → Learning Mechanisms → Realistic Emergency Response Capacity | 0.586<br>0.614 | 0<br>0 | 0.586<br>0.614 |
| Potential Emergency Response Capacity → Disaster Tolerance Mechanism → Realistic Emergency Response Capacity | 0.439<br>0.534 | 0<br>0 | 0.439<br>0.534 |

Figure 2 and Table 5 report the results of the analysis of multiple mediating effects, and the data show that: the mediating effect of the incentive mechanism between the potential emergency response capability and the real emergency response capability is positive, at 0.673. Effective performance incentive mechanism is established to guarantee the stability of the talent team. The mediating effect of the constraint mechanism between potential emergency response capacity and real emergency response capacity is positive, at 0.661. In the absence of a constraint mechanism, the strategic behavior of local governments can easily fall into a situation in which both sides choose a non-cooperative strategy, and there will be a failure of coordination resulting in the inefficiency of the mobilization of emergency resources, which affects the handling of and response to emergency crises; in order to promote the implementation of a cooperative strategy by the local government, the introduction of a constraint mechanism of external conditions. The mediating effect of accountability mechanisms between potential emergency response capacity and actual emergency response capacity is positive, at 0.791. Focusing on learning in accountability focuses on accountability with the aim of learning, so as to avoid accountability without learning. The symbolic meaning of "campaign-style accountability" is often aimed at alleviating the crisis of trust faced by the government, and often stops at the 'resignation' or "dismissal" of government officials, which is not yet possible. It has not yet been possible to reflect deeply on the root causes of the emergencies and crises, resulting in a situation of constant accountability but no progress in reform. Therefore, there is a need to focus on learning in accountability, focusing on accountability for the purpose of learning, not only in the response to major emergencies, but also in why major emergencies occur, that is, a balance between "personal accountability" and "accountability for risk", to avoid the following. The balance between "personal accountability" and "risk accountability" should be struck so as to avoid the transfer of responsibility for risk exposure as a response measure, and to replace the responsibility for prevention and early warning with the responsibility for the response process during the event. Specifically, one is to focus on the ex ante prevention and early warning process of risk accountability, risk accountability is to promote crisis learning, that is, to carry out risk accountability should not only pay attention to the personal responsibility of officials and cadres, punishment and disposal, but also pay more attention to the policy, system, structure and value of the substantive changes, the second is to focus on the incident in the response process of the incident accountability, although the officials and cadres of the individual is the representative of the government, but the individual behavior is a result of the combination of the rules of the system and the specific situation. Although officials and cadres are representatives of the government, their personal behavior is the result of the combination of institutional rules and specific situations, and the accountability of the incident needs to focus on the operational status of the emergency management system of "one case, three systems" in the response to major emergencies, the operation mode of the whole society in the state of emergency, as well as the operation mode of the coexistence of normal state and state of emergency, the synergy mode of the state and the society, the mode of cooperation between government departments, and the relationship between the government and the market, and so on. The mode of cooperation between government departments, the relationship between government and market, etc. The mediating effect of the learning mechanism between potential contingency and actual contingency is positive, at 0.614. Learning agents can be categorized into higher-level policy decision-making agents and grass-roots policy-executing agents. In the normal situation, on the one hand, the "top-down" model can reduce conflicts and improve efficiency, but the decision-making body is prone to fall into an odcxfver-pursuit of low-noise but low-information-quality, and is unable to capture the complexity and dynamics of the policy environment. On the other hand, information asymmetry between levels of government leads to lower levels of government taking advantage of information to reduce the control of higher levels of government. In emergency situations, mobilizing mechanisms such as "front-line command" and "central steering groups" shorten the policy implementation chain, and the flow of information to a certain extent escapes from redundant bureaucratic procedures, allowing for rapid upward and downward communication and policy feedback. Therefore, the dichotomy between the policy decision-making body and the implementation body has some realistic rationality, and the mediating effect of the disaster-tolerance mechanism between the potential emergency response capacity and the real emergency response capacity is a positive effect of 0.534. In summary, the potential capacity of the grassroots level has a significant effect on the real emergency response capacity through the mechanism's role.

## 6 CONCLUSION

The core entity of emergency management effectively transforms potential resources into operational emergency response capabilities by activating its inherent potential emergency response resources (covering multi-dimensional resources such as organizational structure, human resources, infrastructure, material reserves, information integration and the social environment) and relying on a series of capability transformation mechanisms (including motivation mechanisms, constraint systems, disaster-tolerance plans, accountability systems, and learning and feedback loops). Specifically, the real emergency response capability system covers a full range of capabilities, from the advance layout of risk early warning, to the keen insight of accurate crisis identification, to the rapid response and efficient implementation of emergency decision-making, as well as the subsequent emergency response, extensive social mobilization, proper rehabilitation and continuous emergency response learning. In order to deeply understand and optimize this process, this study innovatively constructs a closed-loop model of grassroots emergency response capability generation, which is “incentive initiation - constraints and norms - disaster protection - accountability and reinforcement - learning and iteration”, which aims to profoundly analyze the internal logic and external manifestation of the emergency response capability construction and enhancement from the perspective of dynamic evolution.

## COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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