

Spatial-temporal Evolution and Obstacle Factor Analysis of Government Governance Capacity in the Yangtze River Delta, China

Yaying Xu ^{1*}, Yingying Hua ¹

¹Jiangsu University, Zhenjiang, Jiangsu, P.R. China

*Yaying Xu, School of Management Science, Jiangsu University, P.R. China.

DOI: <https://doi.org/10.56293/IJMSSSR.2024.4812>

IJMSSSR 2024

VOLUME 6

ISSUE 1 JANUARY - FEBRUARY

ISSN: 2582 - 0265

Abstract: Government governance capacity is a critical component of national governance capacity modernization. This paper measures the local government governance capacity in three dimensions: collaborative governance capacity, resource governance capacity and instrumental governance capacity, and analyses the characteristics of spatial-temporal evolution and obstacle factors of government governance capacity in the Yangtze River Delta. The results show that: the government governance capacity is at a low level and has a fluctuating development trend.; the government governance capacity spatially shows the characteristics of "prominent core and local contiguity"; the key constraints of government governance capacity are resource governance capacity and tool governance capacity.

Keywords: government governance capacity; spatial and temporal evolution; obstacle factors; the Yangtze River Delta

1. Introduction

The information age has greatly promoted social and economic development and brought great benefits to human beings, but it has also generated more complex public management problems (Zhang & Wang,2022). With the increasing complexity of social problems, people have higher expectations of government, which has promoted the creation and rapid development of governance theories. Governance theories emphasize the formation of a collaborative governance system for social public affairs by multiple actors such as government, market, and society, and the requirement to improve government governance is the key to the effectiveness and success of collaborative governance development in the public sphere. Therefore, it has become a consensus among governments to transform the mode of governance and improve government governance capacity (Acharya,2018). In the face of the intertwining of various contradictions, China, based on the need to deepen reform across the board, have accelerated the transformation of government functions and innovated governance to improve the scientific and rule-of-law level of government governance (Dai,2020).

The Yangtze River Delta (YRD) region boasts strategic significance in the modernization and further opening-up of China. In 2019, the integrated development of the YRD was elevated to a national strategy. Promoting the modernization of local government governance capacity is a crucial assurance for advancing the YRD's integrated development at a higher standard. However, due to the different resource endowments, the development of governance capacity varies when local governments implement policies, and regional differences are becoming more prominent. When the government governance capacity is low, it will affect the benign development of local economic and society, and impede the high-quality growth of regional integration. Therefore, in order to support the modernization of government governance capacity, it is unquestionably crucial to measure the level of local government governance capacity in the YRD as well as to research the characteristics of its spatial and temporal evolution and its obstacle factors.

Along with the emergence and development of modern governance theories, scholars have achieved fruitful results in their empirical research on the local government governance capacity. There are two main aspects: Firstly, the assessment study of government governance capacity, which mainly includes the construction of an index system and the application of various quantitative methods. In terms of constructing indicator systems, the

World Bank constructed the "Global Governance Index" (WGI) system (Kaufmann & Kraay, 2007); Li and Teng (2021) have classified government governance capacity around the function of local government into the dimensions of government political governance capacity, economic governance capacity and social governance capacity; Williams et al. (2020) constructed a capital approach framework for setting a governance baseline and analyzing the functions of existing governance systems to identify the needs of governance capacity, which includes five dimensions: social, political, human, financial, and environmental. What's more, some scholars have evaluated the effectiveness of government governance using just one metric, such as the level of corruption or financial condition (Graycar, 2014; Cepparulo & Giuriato, 2016). Secondly, the analysis of the spatial and temporal change characteristics of the government governance capacity. Li and Dong (2020) analyzed the scores of Jilin government's governance capacity in five dimensions: political, economic, cultural, social, and ecological from 2014 to 2016. Chu and Fei (2021) assessed the government governance capacity of 29 Chinese provinces from 2009 to 2017, and found that local government governance capacity has significant regional heterogeneity in spatial distribution.

Through sorting out the existing literature, scholars still have some limitations in the research of local government governance capacity. Specifically, most of the literature are qualitative and focus on exploring the components and improving path of government governance capability. In the empirical studies of government governance capacity, on the one hand, scholars have mainly focused on research at the national inter-provincial level or individual county level, lacking the analysis of panel data of prefecture-level cities. On the other hand, the literature has concentrated on the creation and measurement of the index system of government governance capacity, with little research on its spatial and temporal variability, which tends to ignore the influence of geographical linkages on government governance capacity. Based on this, the article constructs an index system based on a reasonable definition of the connotation of local government governance capacity, and constructs a theoretical framework of the three elements of "subject-resource-tool" to measure the government governance capacity in three dimensions: collaborative governance capacity, resource governance capacity and tool governance capacity. We use the Entropy-weighted TOPSIS method to measure the level of government governance capacity in the Yangtze River Delta from 2011 to 2020 and systematically analyses its spatial and temporal evolution, and then uses the Obstacle Degree Model to explore the obstacle factors of government governance capacity, with a view to providing decision-making support for promoting the modernization of government governance capacity and the new development pattern of high-quality integration in the YRD region.

2. The connotation of local government governance capacity and the evaluation index system

2.1. The connotation of local government governance capacity

Government governance capacity is a new development of government capacity in the context of the governance era. Dinh and Nguyen (2021) pointed out that government capacity plays a decisive role in policy outcomes and economic development, and that public administration capacity and fiscal capacity are the two main aspects of local government capacity in a decentralized system. After the rise of governance theories, van Popering-Verkerk et al. (2022) pointed out that there are three main characteristics of governance: (1) governance is related to collective problems; (2) governance is about the interaction between different actors; and (3) actors have different resources related to collective problems and exchange resources. Based on interactive governance theory, Horigue et al. (2016) proposed that governance capacity is the ability to govern the interaction of social, economic, and political processes and dynamics within a given political unit, and thus governance capacity is related to factors such as participation, organizational structure, leadership, and conflict resolution. In the context of governance theory, government governance capacity has been applied to study the capacity and role of government in a "polycentric" governance system (Liu & Ren, 2011). Local governments play a pivotal role in the governance hierarchy, not only taking over the macro policies of the central government, but also facing the specific realities at the grassroots level, thus requiring a strong governance capacity. Based on this, this paper defines local government governance capacity as the sum of the local government's ability to accurately grasp the policy implications and realistic demands, innovate the government's operating system and mechanism according to actual needs, and promote the innovation of the governance model, to efficiently perform government functions, thereby promoting public interests, facilitating balanced social development, and achieving the government's governance goals.

2.2. The evaluation index system of local government governance capacity

The building of local government governance capacity is a systematic project. Considering the dynamic nature of government governance objectives in the new situation due to the differentiation and diversification of governance needs (Lou,2010), the governance capacity of local governments is characterized by the optimization and reshaping of governance structures, the rational deployment of governance resources and the innovative use of governance tools. Firstly, in terms of governance structures, the most obvious feature of governance is the plurality of governance subjects. The rise of governance theory emphasizes that governance is not limited to the government, but also involves the market, society and other subjects, and that subjects can cooperate with each other in the form of cooperation in the governance of public affairs. Scholars advocated that the government, as the leading role in a polycentric governance system, should clarify its own role and have the ability to ensure the implementation of various rules and regulations (Merilee,1996), to create a favorable development environment for all subjects to participate in collaborative governance and bring into play their ability to govern collaboratively. Secondly, in terms of governance resources, the government has unique and limited resources such as human and financial resources to use for governance. Resource-based theory states that governments can transform resources into capacities and achieve desired goals by acquiring, allocating, integrating, and applying means (Amit & Schoemaker,1993). Therefore, in the face of the complex governance situation and limited governance resources, the government must make an integrated arrangement of governance resources in the process of governance, complete the optimization and deployment of resources, and enhance the efficiency of the use of governance resources in order to fully utilize its resource governance capacity. Finally, in terms of governance tools, government governance objectives must be achieved using various tools. According to modern government tools theory, government tools are ways or means of solving public problems through collective action, and are selected and applied according to the attributes of different tools (Salamon,2002). Therefore, in the framework of governance, due to the complexity of the content of governance, governments must continuously innovate and flexibly use governance tools to improve their tool governance capacity in order to achieve efficient governance. In summary, the components of the government's governance capacity can be divided into three dimensions: structure, resource, and tool, which correspond to the evaluation index system's collaborative governance capacity, resource governance capacity and tool governance capacity respectively, so that the government can always maintain an efficient operation mechanism when dealing with complex social problems, in order to promote the effective achievement of the government's governance goals.

Collaborative governance capacity refers to the ability of government to play a leading role in the public governance system and form a cooperative public service provision network with enterprises, social organizations, and other governance subjects. On the one hand, as the main supplier of fundamental public services, the willingness and ability of local governments to supply largely determine the standard of public service delivery. On the other hand, the government creates a favorable environment for the survival and development of enterprises and social organizations through actions such as decentralization and policy leadership, enhances their enthusiasm to participate in public governance, and fills the gaps in government management with the advantages of professionalism and high efficiency (Troy et al.,2005). Therefore, the government's management effectiveness and efficiency, and the degree of participation of enterprises and social organizations in public service provision reflect the collaborative governance capability. Specifically, the collaborative governance capacity dimension includes three element layer indicators: government performance, enterprise participation and social organization participation. Among them, government performance is expressed by the relative size and administrative efficiency of government, social organization participation is expressed by the number of employees in public administration and social organizations, and enterprise participation is expressed by the number of industrial enterprises, Hong Kong, Macao, and Taiwan invested enterprises and foreign invested enterprises above the scale. Strong government governance capability means that the government of that place can provide a good environment to attract enterprise investment and social organization development.

Resource governance capacity refers to the ability of government to develop, integrate and allocate governance resources in the process of governance, and is the foundation and primary condition for the government to exert its governance capacity. Resources of government governance include fiscal resources and human resources. The allocation of fiscal power between the national central and local governments has been gradually clarified since China's tax sharing system reform, so the daily fiscal revenues and expenditures of local governments mainly rely on themselves. Therefore, whether the government has high fiscal capacity affects the development of public

service (Choi,2021). In addition, the level of government governance is strongly correlated with the level of education and specialization of officials (Yao et al.,2020), whose ability to act permeates the whole process of government governance activities. Therefore, the comprehensive quality of government staff and the allocation of financial funds by the government reflect the resource governance ability. Specifically, the resource governance capacity dimension consists of two element layer indicators: the quality of cadres and fiscal control. The quality of cadres is expressed in terms of the mayors' years of education and professional match to reflect the professional requirements of the cadres training and selection mechanism. The fiscal regulation is expressed in terms of the fiscal revenue capacity and expenditure capacity, the fiscal revenue growth capacity and fiscal balance capacity.

Tool governance capacity refers to the ability of government to accurately grasp governance needs and flexibly apply matching governance tools to ensure the achievement of governance goals. Based on an "institutional-technical" perspective, Hu argued that there are two paths of institutional innovation and technical innovation in government governance tools (Hu,2021). On the one hand, a mature system means a smoothly functioning national institutional system, which can promote the improvement of governance capacity. In the process of modernization, the implementation of governance relies on laws, regulations, and other institutions, which are deeply integrated and constantly optimized (Termeer et al.,2016). On the other hand, the government can use digital technology to collect and integrate information in a scientific and legal way to achieve precise matching through information mining and analysis, which helps improve the targeting and effectiveness of public service provision. Therefore, the implementation of the government's legal system and the development and application of digital technology reflects the tool governance capacity. Specifically, the tool governance capacity dimension includes two element layer indicators: rule of law construction and technological innovation. The rule of law construction is expressed in terms of the degree of anti-corruption, the number of new local regulations and normative documents, while technological innovation is expressed in terms of the number of patents granted.

In summary, Table 1 depicts the layout of the local government governance capacity evaluation index system.

Table 1: Local government governance capacity evaluation index system

Subsystem	Criterion layer	Element Layer	Index layer	Attributes	Weights
Government Governance Capacity	Collaborative Governance Capacity	Government Performance	Relative size of government (X1)	Positive	0.0639
			Administrative efficiency (X2)	Positive	0.0514
		Social organization participation	Number of employees in public administration and social organizations (X3)	Positive	0.0764
			Number of industrial enterprises above the scale (X4)	Positive	0.0506
		Enterprise participation	Number of enterprises invested by Hong Kong, Macao, and Taiwan above scale (X5)	Positive	0.0583
			Number of foreign-invested enterprises above scale (X6)	Positive	0.0731
	Resource governance capacity	Quality of cadres	Mayors' years of education (X7)	Positive	0.1134
			Mayors' professional match (X8)	Positive	0.0638
		Fiscal regulation	Fiscal revenue capacity (X9)	Positive	0.0760
			Fiscal expenditure capacity (X10)	Positive	0.0857
			Fiscal revenue growth capacity (X11)	Positive	0.0518
			Fiscal balance capacity (X12)	Negative	0.0449
	Tool governance capacity	Rule of law construction	Degree of anti-corruption (X13)	Negative	0.0560
			Number of new local regulations and normative documents (X14)	Positive	0.0782
		Technological	Number of patents granted	Positive	0.0565

3. Methodology and data

3.1. Data sources

The regional scope of the statistical data used in this paper is the sixteen core cities in the YRD region from 2011 to 2020. The data are mainly obtained from the China City Statistical Yearbook, the statistical yearbooks of each prefecture-level city and the Statistical Bulletin of National Economic and Social Development, the work reports of the courts of each prefecture-level city and the portal of the people's government, as well as the Zhejiang Province Statistical Yearbook and Jiangsu Statistical Yearbook from 2012 to 2021. Considering the change in the statistical caliber of some data in individual statistical yearbooks or no longer included in the statistical caliber, the missing data of some indicators such as government performance, social organization participation, rule of law construction are filled by interpolation method.

3.2. Methodology

3.2.1. Entropy-weighted TOPSIS method

In this paper, we use the entropy method to calculate the index weights, and then conduct TOPSIS method analysis, which can effectively avoid the interference of human subjective factors. The steps are as follows.

Firstly, this paper adopts the extreme difference standardization method to standardize the original data for pre-processing in order to eliminate the influence of each indicator's dimension, and the formulas are as follows:

$$\text{Positive indicators: } X_{ij} = \frac{x_{ij} - x_{\min}}{x_{\max} - x_{\min}} \quad (1)$$

$$\text{Negative indicators: } X_{ij} = \frac{x_{\max} - x_{ij}}{x_{\max} - x_{\min}} \quad (2)$$

Next, the Entropy method is used to determine the information entropy value e_j and the information utility value d_j of the indicators to obtain the indicator weight W_j . Finally, the TOPSIS evaluation model is used to record the maximum and minimum values of the indicators in the weighting matrix are recorded as the best solution Z^+ and the worst solution Z^- , and the distance from each evaluation unit to the positive ideal solution and the negative ideal solution D^+ and D^- are determined, and the closeness C of each evaluation unit to the positive and negative ideal solutions is calculated. The range of the closeness is $[0,1]$, and the closer the value is to 1, the stronger the government governance capacity is.

3.2.2. The Obstacle Degree Model

The combined effect of various indicators results in the differences among the governance capacity of local governments in the YRD. Therefore, this paper measured the obstacle factors and the obstacle degree of each municipal government's governance capacity using the obstacle degree model, and then propose more targeted improvement strategies. In this paper, we measure the degree of constraint of indicators at different layers of the index system on the target indicators by determining the factor contribution and the deviation of indicators, and the greater the indicator's obstacle degree, the greater the constraint of the government governance capacity of a certain region by the indicator. The following are the specific calculation formula:

$$O_{ij} = \frac{F_j * I_{ij}}{\sum_{j=1}^m F_j * I_{ij}} * 100\% \quad (3)$$

$$U_i = \sum O_{ij} \quad (4)$$

where, O_{ij} is the obstacle degree of the j -th indicator of the i -th criterion layer, U_i is the obstacle degree of the i -th criterion layer; F_j is the factor contribution degree, expressed as the weight W_j of a single indicator j ; I_{ij} is the indicator deviation degree, expressed as the difference between the standardized value of an indicator j and 100%.

4. Results and discussion

4.1. Analysis on the temporal evolution of government governance capacity

4.1.1. Time-series changes of government governance capacity

Based on the above local government governance capacity evaluation index system, index weights and data attributes, the trend map of government governance capacity and its subsystem scores of sixteen core cities in YRD is calculated (see Figure 1).

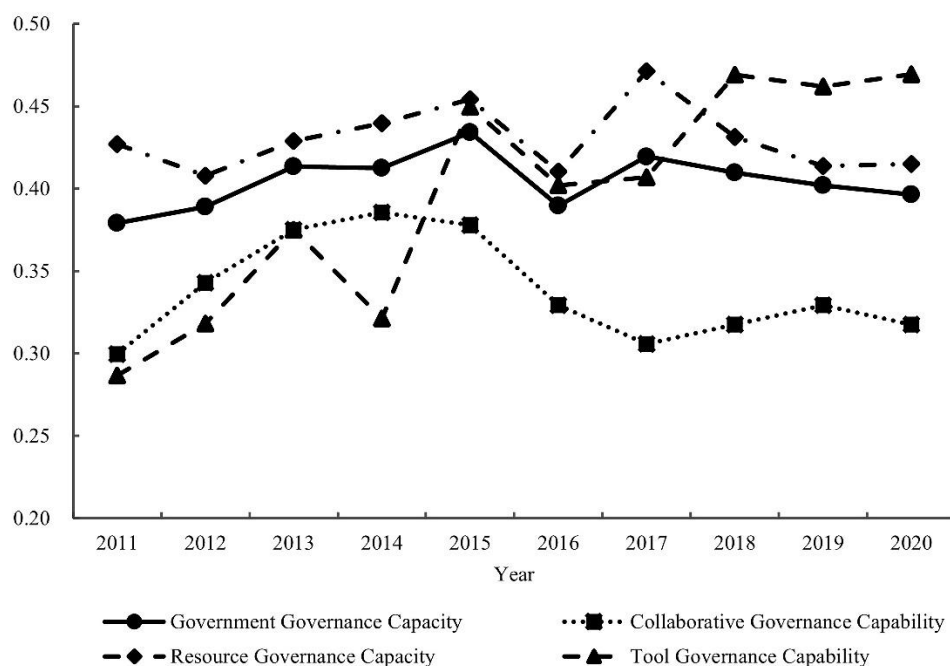


Figure 1: Trend of government governance capacity and criterion layer scores

From the comprehensive score of local government governance capacity in the YRD, the changes from 2011 to 2020 can be divided into four stages: ①from 2011 to 2015, government governance capacity was steadily improved, gradually rising from 0.3791 to 0.4342. Since the introduction of national governance capacity in 2013, local governments have promoted various reforms in crucial areas and links to deepen, which made government governance capacity greatly improved. ②the government governance capacity in 2016 was 0.3895, which produced a substantial decline compared with 2015. The reason may be that the government functions of local governments in the process of governing social affairs are unclear, and the unreasonable and irregular allocation expenditure duties between the central authority and districts as well as among different districts has gradually emerged. ③ In August 2016, the State Council promoted the reform of the division of fiscal affairs and expenditure duties between the central authority and districts to regulate the responsibilities of public service provision at all levels of government, so the governance capacity gained a small increase in 2017. ④After 2018, the government governance capacity decreased year by year, which may be attributed to the fact that the Yangtze River Delta Regional Cooperation Office was established, and collaborative governance among governments on the integrated development of the YRD is still in the exploration stage.

From Figure 1, it can be seen that: ①Over the study period, the tool governance capacity showed a general tendency of rising with an average growth rate of 6.72%. Since the Shanghai government established the first domestic government data open platform in China, other cities have successively completed the platform construction, which greatly promoted the process of data sharing. After the overall acceleration of regional integration development in the YRD in 2018, the governments at all levels have signed numerous intergovernmental administrative agreements for this purpose. The enhancement of digital technology and the gradual improvement of the policy system have made the tool governance capacity a major contributing factor to the development of the government governance capacity after 2018. ②From 2011 to 2020, resource governance

capacity was above the average of the comprehensive level of government governance capacity in the YRD, and was the main contributing factor to the development of the comprehensive level of government governance capacity from 2011 to 2017.③The collaborative governance capacity is the main contributing factor that pulls down the comprehensive level of government governance capacity in the YRD. The possible causes include a lack of uniformity and operability of programs and standards when local governments purchase public services from social forces, a lack of synergy among the government, enterprises and social organizations, and an imperfect supervision and evaluation mechanism that led to the evaluation being a formality. Therefore, it is urgent to enhance the government's synergy with social forces when providing public services in order to boost the government governance capacity.

4.1.2. Comparison of Government Governance Capacity by Region

Figure 2 shows that local government governance capacity had significant regional variability and was related to economic development level: local government governance capacity in economically developed regions was generally higher than that in sub-developed regions, which is consistent with existing research literature findings (Liu et al.,2021).

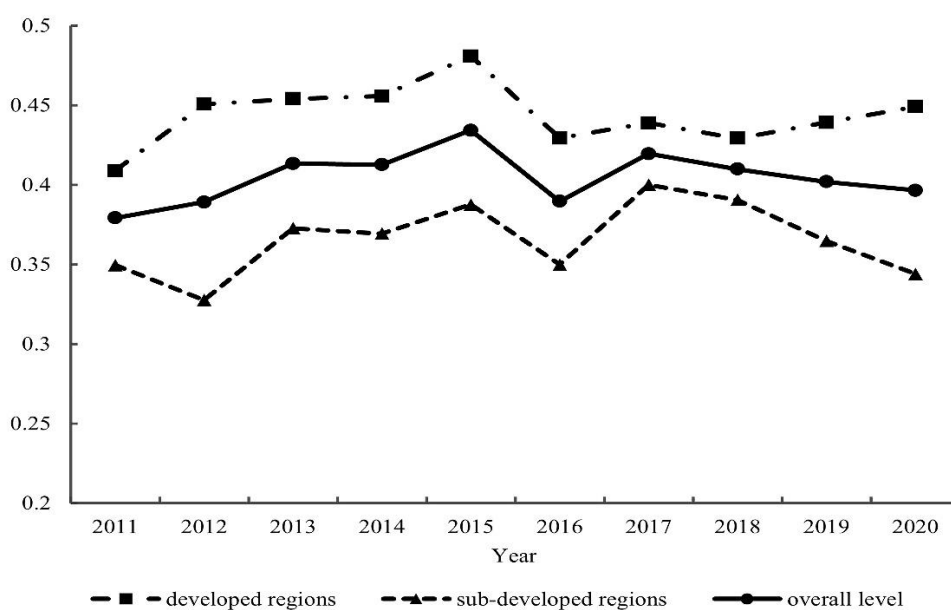


Figure 2: Trends in government governance capacity by region

Specifically, from 2011 to 2020, the mean value of local government governance capacity in the core cities of the YRD was 0.405, with 0.444 in developed regions and 0.365 in sub-developed regions, and this difference revealed an overall trend of initially narrowing and then widening. The possible reasons for this phenomenon are that the developed regions, because of their higher economic development level and abundant material resources, have a stronger will to improve their governance capacity to promote overall economic and social development (Dinh & Nguyen,2021). Meanwhile, the new situation brought about by economic development presents certain risks and uncertainties, which forces the government to carry out governance innovation and improve governance capacity (Morgan,2010). For the sub-developed regions, their primary task is still economic development and promoting the improvement of the government management system in order to lay a solid material foundation for government governance. In addition, the difference in government governance capacity between developed and sub-developed regions tended to expand after 2018. The possible reason is that in the process of building regional integration in the YRD, the first focus on the development of high-level cities like Shanghai, Suzhou, Nanjing, Ningbo and Hangzhou, and the efforts to construct a modern economic system with their solid economic strength and good business environment have further contributed to the government governance capacity. There is a certain link between local government governance capacity and economic development level, and there is a phenomenon that the strong are getting stronger and the weak are getting weaker between developed and sub-developed regions, thus the gap between local government governance capacity and economic development level

between them increases rather than decreases.

4.2. Analysis on the spatial evolution of government governance capacity

To further demonstrate the spatial distribution characteristics of government governance capacity in the YRD's core cities, ArcGIS software is used to classify the government governance capacity levels of sixteen core cities into four years of 2011, 2014, 2017 and 2020 by using the equal interval method. The calculated results were divided into 0. 2-0. 3, 0.3-0.4, 0.4-0.5, 0.5-0.6, and 0.6-0.7, and the five bands represent low, relatively low, medium, relatively high, high levels respectively, and are represented by light and dark color blocks for spatial visualization (see Figure 3).

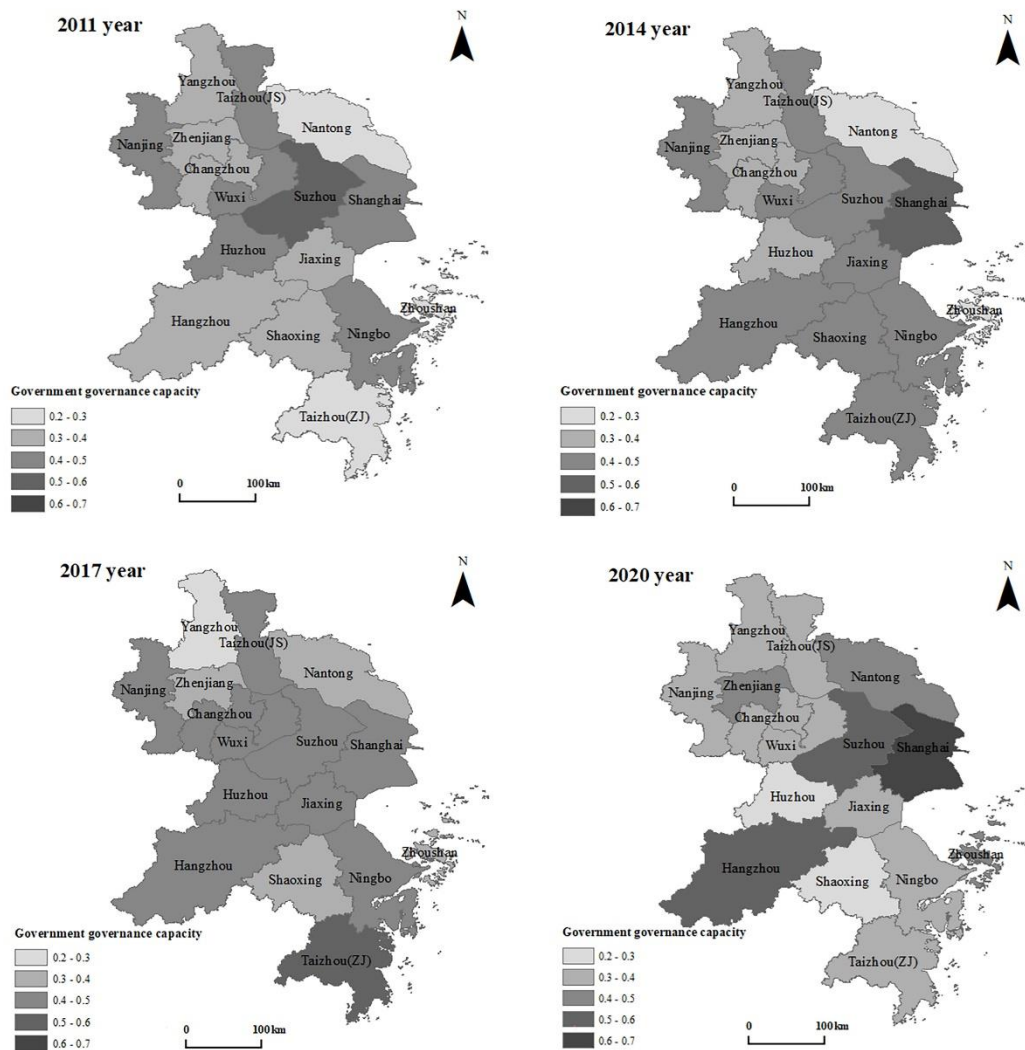


Figure 3: Spatial distribution of government governance capacity

In terms of the region, most core cities in the YRD had relatively low government governance capacity during the study period. The changing characteristics of government governance capacity in each city can be seen Figure 3.

①In terms of spatial distribution, only Suzhou was at a high level in 2011, with the characteristic of "single core" prominent and the spatial structure showing significant unevenness. In 2014, only Shanghai was at a high level, and most of the neighboring areas were at a medium level, especially in Zhejiang Province, where the government governance capacity of most cities was improved. In 2017, most cities were at medium level, and these prefecture-level cities were in the center of the YRD, expanding from the middle to the north and south. ②In 2020, under the influence of COVID-19, the governance capacity of cities in the YRD showed two trends of change: partly represented by Shanghai, Suzhou, and Hangzhou, which have formed a smart anti-epidemic model through

integrated governance, greatly improving their own governance capacity during the epidemic. The other part is the cities represented by Taizhou (Zhejiang Province) and Huzhou. Due to their lack of cognitive ability and emergency response ability, there are still many weaknesses in the government governance ability.

4.3. Identification of major obstacle factors for government governance capacity

Based on the results of China's YRD core cities' governance capacity measurement and spatial-temporal evolution characteristics analysis, in order to further explore the main restrictions of the local government governance capacity, the degree of obstacles in the local government governance capacity indicator system for 2011-2020 was estimated by using the obstacle degree model.

4.3.1. Obstacle degree analysis on criterion layer

In accordance with the obstacle degree model, the obstacle degree of each criterion layer of government governance capacity in the core cities of YRD from 2011 to 2020 is diagnosed (see Figure 4).

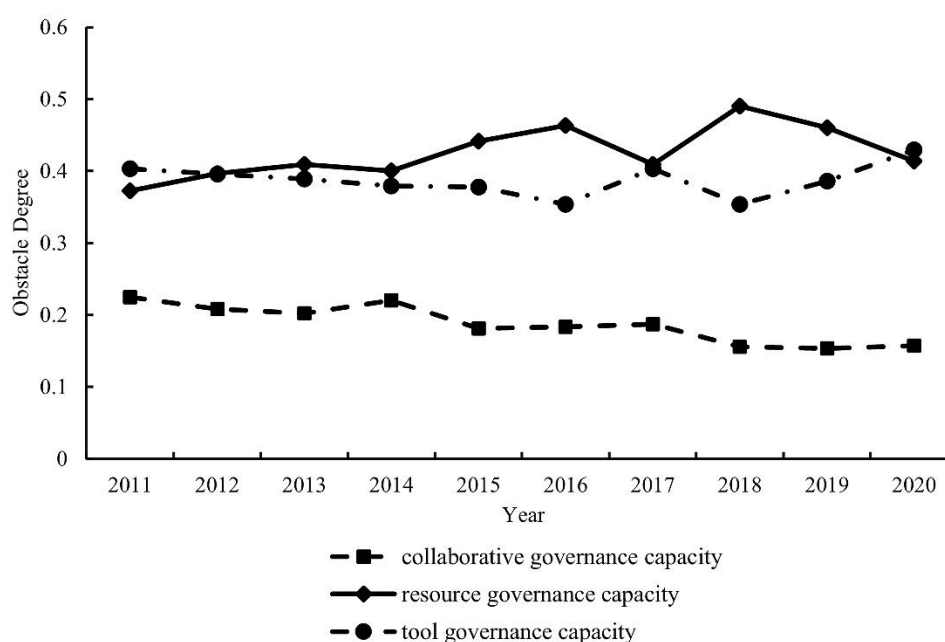


Figure 4: Trends in the obstacle degree on criterion layer level

Figure 4 showed that from 2011 to 2016 and from 2017 to 2018, the obstacle degree of resource governance capacity gradually increased. From 2013 to 2019, it was much higher than other criterion layers, reaching the highest obstacle degree of 49.04% in 2018. Following that, the obstacle degree of resource governance capacity gradually decreased to 41.39% in 2020. The obstacle degree of collaborative governance capacity decreased and then gradually increased during the study period, with a brief increase in 2017 and reaching the highest among the criterion layers at 42.92% in 2011 and 2020. In addition, the obstacle degree of tool governance capability fluctuated downward during the study period, from 22.47% to 15.69%. Meanwhile, from 2011 to 2020, the ranking of the average obstacle degree of each criterion layer was resource governance capacity (44.65%), collaborative governance capacity (38.39%), and tool governance capacity (16.96%). This indicates that resource governance capacity and collaborative governance capacity are still key constraints to local government governance capacity in recent years. The reasons may be that, firstly, although the capacity of the government to lead the collaborative governance of multiple participants has slightly increased in recent years, the governance system of multi subject co governance has not yet matured and finalized, and the government's leading role in it needs to be constantly strengthened. Secondly, although the resource governance capacity of local governments is at a high level, due to the public and Scarce nature of the resources included in government governance, the government is prone to problems such as unbalanced resource allocation in the governance process. Thirdly, with the help of the "Smart City" construction platform, the innovation of information technology and the use of new government media have greatly improved the government's e-government level, and implemented efficient

governance. Therefore, the degree of constraint on tool governance capabilities is gradually weakening.

4.3.2. Obstacle degree analysis on index layer

The top five indicators in the evaluation index system with the highest obstacle degree each year are identified as the main obstacle factors in order to clarify the key obstacle factors affecting local government governance capacity in the YRD. The findings of key obstacle factors and their obstacle degrees for government governance capacity of core cities in the YRD are demonstrated on Table 2.

Table 2: Obstacle Factors and their Obstacle Degrees of Government Governance Capacity

Obstacle Factor	Obstacle Degree (%) / (Year)										Top5 Frequency
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
X1	8.46	7.15	7.27	7.16	7.1	6.39	8.16	7.8	5.88	5.68	2
X2	3.69	4.84	4.47	3.53	3.47	5.33	5.51	4.9	4.46	6.5	0
X3	9.2	7.89	8.88	10.65	11	8.14	8.28	7.05	7.97	7.43	6
X4	6.93	6.31	5.22	3.9	3.6	4.22	4.27	4.4	3.84	4.04	0
X5	4.73	5.39	5.01	4.64	4.55	3.81	5.07	4.57	6.88	8.32	1
X6	7.3	7.96	8.07	8.06	8.02	7.44	9.03	6.66	9.58	10.95	6
X7	7.47	9.84	10.4	10.49	11.5	14.37	9.74	0.01	12.82	9.76	8
X8	3.06	3.19	1.79	1.83	1.83	2.19	2.16	0	4.32	2.77	0
X9	8.63	9.3	9.26	9.28	10.3	10.39	10.1	49.02	9.18	8.16	9
X10	12.66	10.26	10.81	10.74	12.2	12.04	11.9	0.01	10.52	9.29	9
X11	3.17	4.77	5.78	5.35	5.16	4.99	4.05	0	4.23	6.19	0
X12	2.23	2.25	2.88	2.35	2.92	2.36	2.94	0	4.96	5.23	0
X13	6.07	5.05	4.77	5.82	4.24	6.73	4.62	3.32	1.78	2.78	0
X14	8.75	9.11	8.17	10.4	8.61	6.55	8.4	8.4	8.79	8.86	9
X15	7.65	6.69	7.26	5.82	5.26	5.03	5.71	3.86	4.805	4.06	0

It can be seen from Table 4, from 2011 to 2020, fiscal revenue capacity (X9), fiscal expenditure capacity (X10), the number of new local regulations and normative documents (X14) became the main obstacle factors for nine times; mayors' years of education (X7) became the main obstacle factors for eight times; the number of employees in public administration and social organizations (X3) and the number of foreign-invested enterprises above the scale (X6) became the main obstacle factors for six times. The ranking based on the average of the obstacle degree of each indicator showed that fiscal revenue capacity (X9) was the highest, with an average of obstacle degree was 13.37%; followed by the fiscal expenditure capacity (X10), with an average of obstacle degree was 10.05%; the mayors' years of education (X7), the number of employees in public administration and social organizations (X3) and the number of new local regulations and normative documents (X14) respectively took the third to fifth spots.

Through the analysis of the obstacle factors, the results revealed that the key constraints of local government governance capacity in the YRD are resource governance capacity and tool governance capacity. Specifically, they were mainly reflected in the factors of fiscal revenue capacity, fiscal expenditure capacity, mayors' years of education and the number of new local regulations and normative documents. This research conclusion is consistent with existing studies, including Fan and Guo (2022), who stated that fiscal revenues are the material basis of local government governance effectiveness, and the slow growth of local revenues over recent years has affected the state of survival of local fiscal; Liu et al. (2021) found that the public expenditure structure has a bias to directly affect the governance capacity of local governments. The number of new local regulations and

normative documents is the basis for measuring the legitimacy of government actions and reflects its level of rule of law construction, which is an important support for promoting government governance. In addition, the length of education of cadres is a measure of their knowledge and learning ability to a certain extent. Their stronger general quality and information judgment make them more receptive to changes and innovations (Tan et al.,2021), which are essential for the improvement of local government governance.

5. Conclusions, countermeasures, and limitations

5.1. Conclusion

This paper analyses the composite score, the spatial-temporal evolution characteristics, and obstacle factors of government governance capacity of core cities in the YRD from 2011 to 2020. The key findings are listed below. (1) In 2011-2020, the government governance capacity remained relatively low; trends in resource governance capacity are more moderate; the collaborative governance capacity showed a rising and then falling trend; the tool governance capacity showed an erratic upward trend. Meanwhile, the study finds that local government governance capacity has significant regional differences and is associated with the economic development level. (2) Before 2020, the YRD had an expanding range of medium and above levels of government governance capacity and were concentrated in the middle zone, showing the distribution characteristics of "prominent core and local contiguity". After the occurrence of COVID-19, the areas at the middle and above levels decreased significantly. (3) The key factors that constrain the development of local government governance capacity are resource governance capacity and tool governance capacity, which is reflected in the factors of revenue capacity, fiscal expenditure capacity, mayors' years of education and the number of new local regulations and normative documents.

5.2. Countermeasures

Combining the evaluation results of government governance capacity in YRD, the following suggestions are made to enhance the government governance capacity.

(1) To bring into play the synergy and enhance risk response capabilities. In order to increase regional government governance capacity, each government must attach importance to the concept of collaborative governance, and build a unified platform for communication, decision-making and implementation, so that the governments with low governance capacity can learn and exchange their governance experiences with those with high governance to further exert the positive spillover effects.

(2) To fully exploit the radiative and driving power of the central cities and build a high-level economic system. Economic and social development is an important condition for promoting the government's ability to govern. Under the condition that the economy reaches a high level and has complete material wealth, the government can govern social problems with more abundant and effective means. Therefore, it is vital to fully exploit the radiative and driving power of the central cities, accelerating high-quality economic development, and firming up the economic foundation.

(3) To accelerate the integrated fiscal development of the YRD. Fiscal revenue and expenditure capacity is the primary factor limiting government governance capacity, so it is necessary to build an integrated fiscal mechanism that breaks administrative boundaries without breaking administrative subordination, strengthens the unified planning of fiscal policies such as budget management and fiscal subsidies, and ensures a legal guarantee mechanism for fiscal policy implementation.

(4) To promote government administrative effectiveness. The mayors' years of education and the number of new local regulations and normative documents reflect the administrative level of the government, so it is crucial to focus on the development of these aspects to improve government governance capacity, including the improvement of government regulations and the career development of officials.

5.3. Limitations

Although we have measured the government governance capacity of core cities in the YRD, there are still the following limitations. Firstly, because local government governance capacity has rich connotations and has not yet formed a unified definition, it is possible that some indicators are not sufficiently precise and refined. Based on

the clarification of the concepts to local government governance capacity, future studies will try to explore a more perfect evaluation index system. Additionally, in terms of spatial effect research, with the development of spatial measurement methods and the improvement of spatial weight matrix, multiple spatial weight matrices can be combined with various factors in future research on the governance capacity of Chinese local governments, thereby enhancing the credibility of the study results.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the 22nd Batch of Student Research Projects of Jiangsu University (No.22C228).

References

1. Acharya, K.K. (2018). The capacity of local governments in Nepal: from government to governance and governability? *Asia Pacific Journal of Public Administration*, 40(3),186–197. <https://doi.org/10.1080/23276665.2018.1525842>
2. Amit, R., & Schoemaker, P.T.H. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal*,1(14),33-46. <http://www.jstor.org/stable/2486548>
3. Anselin, L., Florax, R., & Rey, S. (2004). *Advances in Spatial Econometrics: Methodology, Tools, and Applications*. Springer Verlag.
4. Cepparulo, A., & Giuriato, L. (2016). Responses to global challenges: trends in aid-financed global public goods. *Development Policy Review*, 34(4),483–507. <https://doi.org/10.1111/dpr.12163>
5. Choi N. (2021). Analyzing Local Government Capacity and Performance: Implications for Sustainable Development. *Sustainability*, 13(7), 3862. <https://doi.org/10.3390/su13073862>
6. Chu, D.Y., & Fei, M.S. (2021). Vertical Fiscal Imbalance, Transfer Payment, and Local Governance. *Finance & Trade Economics*, 42(2),51-66. <https://doi.org/10.19795/j.cnki.cn11-1166/f.20210207.006>
7. Dai, J.H. (2020). Modernization of Governance Capacity from the Perspective of Smart Government. *Theory and Reform*, 234(4),126-138. <https://doi.org/10.13553/j.cnki.llygg.2020.04.012>
8. Dinh, S.T., & Nguyen, C.P. (2021). Local government capacity and total factor productivity growth: evidence from an Asian emerging economy. *Journal of the Asia Pacific Economy*,1–31. <https://doi.org/10.1080/13547860.2021.1942412>
9. Fan, L.M., & Guo, J. (2022). Choices of Main Local Tax Category: Theoretical Logic, International Experience and Strategic Trade-offs. *International Taxation in China*, 113(11),3-10. <https://doi.org/10.19376/j.cnki.cn10-1142/f.2022.11.001>
10. Graycar, A. (2014). Awareness of Corruption in the Community and Public Service: A Victorian Study. *Australian Journal of Public Administration*, 73(2),271–281. <https://doi.org/10.1111/1467-8500.12081>
11. Horigue, V., Fabinyi, M., Pressey, R. L., Foale, S., & Aliño, P. M. (2016). Influence of Governance Context on the Management Performance of Marine Protected Area Networks. *Coastal Management*, 44(1), 71-91. <https://doi.org/10.1080/08920753.2016.1116678>
12. Hu, X.G. (2021). On the System of Government Governance Tool Innovation——Technical Logic. *Anhui Rural Revitalization Studies*, 61(01),39-44. <https://doi.org/10.13454/j.issn.1674-8638.2021.01.006>
13. Kaufmann, D., & Kraay, A. (2007). Governance Indicators: Where Are We, Where Should We Be Going? *The World Bank Research Observer*, 23(1),1–30. <https://doi.org/10.1093/wbro/lkm012>
14. Li, J., Li, C.S., & Dong, W.W. (2020). Evaluation and Optimization of Local Government Governance Capability in China: An Empirical Research of Jilin Province. *Jilin University Journal Social Sciences Edition*, 60(04):62-72+236. <https://doi.org/10.15939/j.jujss.2020.04.zz2>
15. Li, Y., & Teng, Y.C. (2021). How Does Government Governance Affect the Spatial Supply of Public Service——Based on Dynamic Spatial Durbin Model. *Journal of Gansu Administration Institute*, 147(5),53-67+126-127.
16. Liu, F.Q., Chu, D.Y., & Jiang, C.N. (2021). Fiscal Transparency, Public Expenditure Structure, and the Governance Capacity of Local Governments. *Economic Perspectives*, 722(4),107-123.
17. Liu, G.L., & Ren, Z.W. (2011). A Review of Research on Government Governance Capacity. *Journal of the*

- Party School of Leshan Municipal Committee of CPC, 13(5),50-53+58.
18. Lou, S.P. (2010). Capacity Challenges to Local Governance: A Framework of Governance Capacity and its Key Elements. *Chinese Public Administration*, 303(09):97-100.
19. Merilee, S. G. (1996). *Challenging the State: Crisis and Innovation in Latin America and Africa*. Cambridge University Press.
20. Morgan, J. Q. (2010). Governance, Policy Innovation, and Local Economic Development in North Carolina. *Policy Studies Journal*, 38(4),679–702. <https://doi.org/10.1111/j.1541-0072.2010.00379.x>
21. Salamon, L. M. (2002). *Tools of Government : A Guide to the New Governance*. Oxford University Press.
22. Tan, S.X., Yang, Y., & Chen, W.C. (2021). Does Official Heterogeneity Affect Government Financial Disclosure? *Friends of Accounting*, 669(21),25-32.
23. Termeer, C. J. A. M., Dewulf, A., & Biesbroek, G. R. (2016). Transformational change: governance interventions for climate change adaptation from a continuous change perspective. *Journal of Environmental Planning and Management*, 60(4),558–576. <https://doi.org/10.1080/09640568.2016.1168288>
24. Thanh, D. S., & Nguyen, C. P. (2021). Local government capacity and total factor productivity growth: evidence from an Asian emerging economy. *Journal of the Asia Pacific Economy*, 28(2),619-649. <https://doi.org/10.1080/13547860.2021.1942412>
25. Troy, D.G., Diana, C.P., & Kimberly, J.S. (2005). Building Relationships, Accessing Resources: Mobilizing Social Capital in Community Carden Contests. *Journal of Leisure Research*, 37(4):450-474. <https://doi.org/10.1080/00222216.2005.11950062>
26. van Popering-Verkerk, J., Molenveld, A., and Duijn, M., van Leeuwen, C., & van Buuren, A. (2022). A Framework for Governance Capacity: A Broad Perspective on Steering Efforts in Society. *Administration & Society*, 5(9) ,1767-1794.<https://doi.org/10.1177/00953997211069932>
27. Williams, D.S., Rosendo, S., Sadasing, O., & Celliers, L. (2020). Identifying local governance capacity needs for implementing climate change adaptation in Mauritius. *Climate Policy* 20(5),548-562. <https://doi.org/10.1080/14693062.2020.1745743>.
28. Xiang, G.D., Zhu, P.F., & Zhang, Z.Y. (2011). Economic structure, R&D investment, and R&D spatial spill over effect. *Studies in Science of Science*, 29(2),206-214. <https://doi.org/10.16192/j.cnki.1003-2053.2011.02.007>
29. Yao, Y., Xi, T.Y., Li, L.X., Wang, H., Wan, F., Zhang, Q., Liu, S.R., & Zhang, S.D. (2020). Selection, Training, and Incentivizing ——Evidence from the CCER Officials Dataset. *China Economic Quarterly*, 19(03),1017-1040. <https://doi.org/10.13821/j.cnki.ceq.2020.02.12>
30. Zhang, Y.J., & Wang, Z.L. (2022). Value Connotation and Function Realization of Administrative Ethics in the Process of Building Government Governance capacity. *Leadership Science*, 815(6),96-99. <https://doi.org/10.19572/j.cnki.ldkx.2022.06.015>