

Research on Urban Public Management and Public Services based on SPSS Software Data Analysis: Taking Heilongjiang Province as an Example

Ping Liu¹ and Hanjie Jiang^{2*}

¹The Administrative Management, Harbin University of Commerce, Harbin, China

²Heilongjiang Province Public Management, Harbin University of Commerce, No. 1 Xuehai Street, Songbei District, Harbin City, China

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Abstract: The coupled coordination degree model was constructed to study the coordination degree of urban public management and public services by integrating data through data analysis of the SPSS and RESSET research database. The study shows that the level of urban public management is positively correlated with the level of public services. The higher the level of urban public management, the better the public services provided. The level of urban public management is the main reason for the regional differences in the degree of coordination between urban public management and public services.

1 INTRODUCTION

In recent years, with the urban economy's continuous development, government governance's defects have gradually been paid attention to. It is hoped that the government can perform public responsibilities and safeguard public interests under statutory authorization. At the same time, it can pay attention to social needs, provide public goods, and ensure social fairness. Therefore, urban public management and public services have become a new way of government governance and are still developing and improving. For example, Hilhorst Cokky, Deschamps Carl, and others have successively put forward cutting-edge theories on public management and public services, helping the government to better serve urban residents through public management and public services.

However, people lack specific awareness of urban public management and public services and an understanding of the relationship between the two. This is likely to lead to unnecessary waste of resources when the government promulgates policies and weakens the effectiveness of policy implementation. Therefore, this paper uses SPSS software for data analysis and intuitively understands the connection between the two through data, hoping to assist leaders in making optimal

decisions suitable for local cities.

2 ANALYSIS OF THE COUPLING AND COORDINATION MECHANISM BETWEEN URBAN PUBLIC MANAGEMENT AND PUBLIC SERVICES

Urban public management is the basis for developing public services, and it can provide policy support for improving urban public services. The rise in the level of urban public services will promote the more effective development of urban public management, and the interaction between the two is conducive to the good progress of urban public life. (Zhao et al., 2022)

Figure 1 shows the coupling coordination mechanism of urban public management and public services.

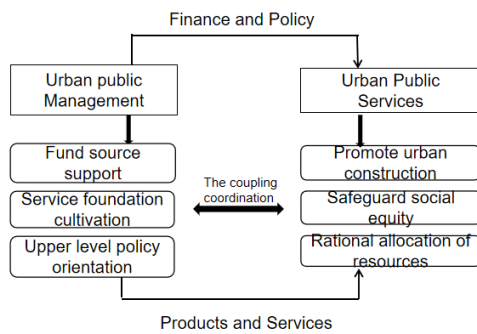


Figure 1: Coupling coordination mechanism of urban public service and public management.

Generally, the two systems of urban public management and public services are in a state of mutual coupling and coordination. Urban public management provides financial and policy support for urban public services and promotes the continuous improvement and development of urban public services. (Ohemeng, Frank, Akonnor, 2022) And urban public services provide products and services for urban public management, which helps urban public management to advance smoothly.

Of course, the coupling relationship between the two is not always stable but changes in stages. At the initial stage of urban public management, it is difficult for the government to perform public functions because of the low level of public management. When the level of urban public management reaches a certain stage, the government recognizes the importance of urban public services to society, so it will have corresponding policies to improve the level of urban public services. (Papcunová Viera, Dvořák, 2021) However, due to its level, the degree of coupling and coordination between the two is at the level of mild disorder or medium coordination. This stage enters a virtuous level of coordination.

3 ESTABLISHING RESEARCH METHODOLOGY BASED ON SPSS SOFTWARE

3.1 Coupling Degree Model

The coupling degree model is the most commonly

used data analysis model relying on Internet information technology and refers to the quantitative index of mutual coupling and coordination between two or more systems and subsystems. It contains coupling degree C value, matching degree D value and matching degree indicator T value.

Systems are dynamic and unstable existences, and coupling degree can only be used to represent the degree of interaction between two systems. To detect the good or bad degree of coupling and coordination between urban public management and public services and the benign relationship between them, it is also necessary to construct a coupling coordination degree model through SPSS software. Its calculation formula is as follows. The system coupling value is denoted by C and is calculated as follows.

$$U_i = \sum_{j=1}^n \delta_{ij} x_{ij} \sum_{j=1}^n \delta_{ij} = 1, i = 1, 2 \quad (1)$$

U_i in the formula indicates the comprehensive evaluation index. U_1 is the total score of urban public management, and U_2 is the total score of urban public service. δ_{ij} is the corresponding weight of each indicator.

$$C = 2 \times \sqrt{u_1 \times u_2} / (u_1 + u_2) \quad (2)$$

The formula $C \in [0, 1]$ indicates the coupling degree; when $C=0$, there is no association between two systems, and the larger the value of C, the greater the association degree between systems. When $C=1$, the coupling degree reaches saturation; at this time, the system is completely in the state of fit between, towards the direction of the ordered structure.

According to the existing classification methods for the degree of coupling, this paper classifies the degree of coupling into four stages.

3.2 Coupling Coordination Degree Model

Systems are dynamic and unstable existences, and the coupling degree can only represent the degree of interaction between two systems.

A coupling coordination degree model also needs to be introduced to detect the good or bad degree of coupling and coordination between urban public management and public services and the benign

Table 1: Coupling level and classification criteria.

Coupling degree classification hierarchy	Low Coupling level	Fly down level	Break-in level	High coupling level
C-value	0.1 - 0.3	0.3-0.5	0.5-0.8	0.8-1

relationship between them. Its calculation formula is as follows.

$$D = \sqrt{C \times T} \tag{3}$$

$$T = aU_a + bU_s \tag{4}$$

In the formula, D is the coupling coordination degree, C is the coupling degree, and T represents the comprehensive evaluation index of urban public management and public services, which U_a and we determine. “A” indicates the importance of urban public management, and b indicates the importance of urban public services. Considering that this article detects the coordinated development of urban public management and public services, both are equally important. Therefore, both a and b are assigned a value of 0.5. The coupling coordination degree of urban public management and public services is classified into the following ten levels regarding the accepted decile method of coupling coordination degree (see Table 2).

Table 2: Ranking criteria of the coupling coordination degree.

Coupling coordination degree D value interval	Coordination level	Degree of coupling coordination
(0.0~0.09)	1	Extreme disorder
(0.1~0.19)	2	Severe disorder
(0.2~0.29)	3	Moderate disorder
(0.3~0.39)	4	Mild disorder
(0.4~0.49)	5	Nearly dysfunctional
(0.5~0.59)	6	Barely coordinated
(0.6~0.69)	7	Primary coordination

(0.7~0.79)	8	Intermediate coordination
(0.8~0.89)	9	Good
(0.9~1.00)	10	High-quality coordination

3.3 Entropy Method

This paper adopts the entropy value method to ensure that each evaluation index can objectively represent the calculation results. The specific calculation formula is as follows: in formula (1), S_j represents the comprehensive score of the j th index, W_j is the weight of the j th index, and P_{ij} indicates the weight of the j th index in the i -th region.

$$S_j = \sum_{i=1}^m W_j P_{ij} \times 100 \tag{5}$$

4 ANALYSIS OF THE RESULTS OF COUPLED COORDINATION MODEL BASED ON SPSS SOFTWARE

The weights of each index were determined by SPSS software using the entropy value method. Then the comprehensive score of urban public management and public service was calculated by using equation (1). Then the coupling degree and coordination degree of urban public management and public service were calculated by equation (2)(3).

From the coupling degree data, most cities can reach a high level of coupling ($C > 0.8$), but among the 13 cities, the coupling degree of Qiqihar is poor.

Table 3: Coupling and coupling coordination of public services and public management in 13 cities, 2017-2021.

Local	2017		2018		2019		2020		2021	
	C	D	C	D	C	D	C	D	C	D
JMS	0.993	0.327	0.996	0.357	0.972	0.389	0.983	0.397	0.996	0.393
QTH	0.999	0.368	0.998	0.389	0.998	0.419	0.998	0.414	0.999	0.452
HRB	0.941	0.376	0.896	0.437	0.985	0.455	0.994	0.481	0.998	0.481
HG	0.977	0.349	0.984	0.375	0.983	0.382	0.984	0.405	0.974	0.42
DXAL	0.983	0.392	0.979	0.41	0.979	0.418	0.977	0.415	0.93	0.381
YC	0.942	0.368	0.946	0.395	0.938	0.462	0.95	0.457	0.95	0.47
HR	0.947	0.374	0.946	0.447	0.925	0.442	0.951	0.473	0.908	0.451
SH	0.968	0.383	0.984	0.421	0.97	0.398	0.984	0.416	0.984	0.428
JX	0.795	0.331	0.816	0.363	0.867	0.4	0.867	0.401	0.944	0.441
MDJ	0.953	0.383	0.971	0.419	0.977	0.413	0.759	0.675	0.96	0.421
QQHR	0.912	0.392	0.92	0.461	0.92	0.483	0.875	0.47	0.837	0.463
DQ	0.843	0.395	0.86	0.442	0.844	0.449	0.896	0.457	0.862	0.476
SYS	0.84	0.345	0.919	0.388	0.905	0.406	0.927	0.429	0.947	0.445

This indicates that the connection between urban public management and public services in Qiqihar is not strong enough, and the two have not yet formed benign coordination. However, from a global perspective, the coupling degree between urban public management and public services in Heilongjiang province is maintained at a high level, which indicates that, in general, urban public services and public management in Heilongjiang province are closely linked. There exists a high degree of dependence between them, laying the foundation for the peaceful and coordinated development of the two and creating a state of high coupling and coordination.

5 CONCLUSION

Based on the panel data of 13 cities in Heilongjiang Province from 2017 to 2021, through the construction of the coupling coordination degree model of urban public management and public services and analysis from multiple perspectives such as time and space, this paper draws the following conclusions: First, in general, It can be seen that there is enormous potential and room for improvement in the improvement of urban public management and public coupling and coordination in Heilongjiang Province, and it shows a state of "high coupling and low coupling and coordination," that is, there is a certain degree of public management and public services in most cities. However, due to the city's economic conditions and general management level, it isn't easy to achieve sound development. Therefore, the coupling between urban public management and public services in Heilongjiang Province has enormous development potential and room for improvement. Second, from the perspective of Heilongjiang Province, the coupling and coordination of general urban management and public services in the thirteen cities are polarized. Specifically, the western cities are higher, and the eastern and northwestern cities are lower, and in general, they are affected by geographical restrictions and their economic development. Third, from the empirical results, the level of urban public management between cities is the main reason for the large regional gap in the coupling and coordination degree of general urban control. Based on the research conclusions, this paper proposes the following policy implications.

1. Take the lead in realizing high-quality coordination between public management and public services in western cities. First, we should continue

to increase the implementation of shared service policies, take the lead in realizing the high-quality supply of public services in Harbin, Daqing, and Qiqihar, and serve as models for other cities to learn from. Second, we should continue to give full play to the advantages of these urban industrial structures, provide an environment for participation in urban public management with excellent infrastructure, and pursue high-quality coordination between urban public administration and services.

2. For cities with a low degree of coordination between urban public management and services, the government should first pay more attention to the construction of urban public services and implement relevant policies and significant projects as opportunities to make up for the lack of urban public services. Build weak links so that the infrastructure of its public services can be further improved. Second, the optimization and upgrading of the industrial structure should be promoted as soon as possible so that the construction of public service infrastructure can be upgraded, like urban economic development, and provide the continuous impetus for the construction of public services. Third, attention should be paid to the provision of general management levels in cities with low coupling coordination and the expansion of related public service infrastructure to narrow the gap between them and developed cities.

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