

Coupled Coordination Scheduling Model of Urbanization under the Restrictions of Civil and Commercial Law

Yihan Wang*

College of Law, Sichuan University, Chengdu, 610207, China

*corresponding author email: bearwangyihan@126.com

Keywords: Civil and Commercial Law; Urbanization; Coupled Coordination Scheduling; Model; Economic Development; Ecological Environment

Abstract: The traditional coupled coordination scheduling model of urbanization based on quantitative analysis under the restrictions of the Civil and Commercial Law is mainly on urbanization, which mainly analyzes the economic volume in the process of urbanization. The analysis level and the content of the index are relatively simple, and the scheduling effect is poor. Therefore, a new model is constructed to analyze the coupled coordination of China's urbanization under the restriction of civil and commercial law.

1. Introduction

The improvement degree of urbanization reflects the development of social material and spiritual civilization. Starting from the vital interests of the peasants, under the rule of people oriented and civil and commercial law, the urban construction is developed with modern agricultural technology, which is not only the increase of urban population and size, but also the transformation to various aspects, such as the living environment, social security, life model and so on, so as to achieve the sustainable development of urban and rural areas. In the critical stage of industrialization and urbanization, relevant legal systems can be introduced to ensure the stability of economic development and further development of urbanization.

How to build a civil and commercial law system suitable for urbanization to change the mode of operation of rights, protect citizens' rights and interests, and enhance citizens' legal consciousness? The establishment of a complete legal system is the foundation for the steady and orderly development of urbanization. For example, whether the rural population can enjoy the same service as the urban population, the distribution mode of the land financial income, the maintenance method of the legitimate rights and interests, and the integration of the urban social environment are the key problems in the urbanization.

Against this background, the study of the relationship between urbanization, industrialization and modernization under the restriction of civil and commercial law system is of great significance for promoting the process of urbanization.

In this paper, the three systems coupling characteristics of economic development, social culture and ecological environment under the constraints of civil and commercial law are studied, and the coupled coordination scheduling model of urbanization construction under the constraint of civil and commercial law is constructed, which provides reference for the urbanization construction.

2. The Importance of the Constraint of Civil and Commercial Law on the Urbanization Construction

2.1. Problems Related to Rural Construction in the Construction of Urbanization

After the construction of towns in Latin America and other countries, the phenomenon of "urbanization trap" is appeared, that is, the problem of farmers' employment after entering the city is very serious. Although China has just begun to carry out the urbanization construction, we should also absorb the practical experiences of Latin American countries in the construction of

urbanization, in order to ensure the well development of the later urbanization construction, which needs to perfect the existing legal system of rural land and establish a complete legal system related to the Urbanization.

Whether the rural contracted households are legally recognized as a legal matter of the actual commercial subject. China's current general principles of civil law clearly stipulate that rural contracted households are civil subjects and enjoy civil rights and obligations prescribed by law. However, the rural contracted households can only enter the market with limited access to the sales and marketing activities of the products they produce.

The reason is that there is no market qualification for them, that is to say, they have not been recognized by the administrative department for Industry and commerce. It is concluded that farmers and other organizations also have the qualification of market access. For this reason, many small business activities developed by farmers in many places are banned by industry and commerce departments because of "unlicensed operation".

Rural collective owned land, forest, water and resources on collective land are also part of the capital in the process of urbanization. From the existing laws and some local rules, the licensing system must be enforced strictly for the use of these resources. For the use of these resources, from the existing laws and regulations and some local rules and regulations, we must strictly enforce the licensing system. Such as the use of land other than farming, logging and sales, and the construction and sale of urban housing are all controlled by the government's strict licensing system. Under this control situation, the market trading behavior of the farmers and rural economic organizations of these capital owners is bound, and the market construction is restricted, which eventually leads to the market inactivation and the rapid development of the economy.

2.2. The Current Situation of Civil and Commercial Law System Related to Urbanization in China

2.2.1. The Legal System at the Core of the Constitution

At present, the socialist legal system with the core of the Constitution has basically been completed, some of which involve the issue of urbanization. The basic rights of citizens and basic systems are preliminarily determined by the Constitution and the related laws. In the process of urbanization, the legal problems between equal subjects can be balanced through civil and commercial law; the act of constrain and regulate decision-makers is coordinated by administrative law; criminal acts in the course of urbanization are severely punished through criminal law; the control of special situations in actual problems is mediate through procedural law. In the process of urbanization, different legal departments have done their duty to create a complete protection system of relevant laws between cities and towns.

2.2.2. The Introduction of A Targeted Legal System

The transition of large scale rural areas to cities and towns is the core content of urbanization, and the legal system introduced in this transitional stage can affect the development of urbanization. For example, the urban and rural planning law, promulgated in 2008, standardized urbanization. The law clearly defines implements, adjusts and monitors urban and rural planning, and makes clear the corresponding legal responsibilities. Most importantly, this Law guarantees the rights and interests of the people involved in the planning.

2.2.3. The Special Laws and Regulations

The introduction of a large number of special laws and regulations will further alleviate the problems in the process of urbanization. A series of laws and regulations, such as land management law and household registration regulations and so on, can regulate the problem of land distribution, housing demolition and population flow in urban construction.

2.2.4. The Introduction of the Planning Accountability

The layout and planning of the earliest urbanization are chaotic and unscientific. Even, the

leaders of some regions are randomly planning to create personal achievements, resulting in the low utilization rate of state construction funds and land resources, which seriously depleted the land resources rights and interests of regional farmers. The decision record file of the decision maker and the later pursuit of its related responsibility can effectively avoid the wrong decision, avoid the loss to the farmers and reduce the loss to the state.

2.3. Coupled Coordination Scheduling Relationship of Urbanization under the Restriction of Civil and Commercial Law

In recent years, the phenomenon of coupling is paid more and more attention by humanities scholars, especially when analyzing the relationship between different systems. The urbanization construction under the restriction of civil and commercial law is a systematic project, which ensures the construction of social culture and ecological environment at the same time of economic development. The three subsystems of economic development, social culture and ecological environment interact with each other, and there is a coupled coordinated scheduling system.

The three parties jointly promote the further development of urbanization under the restriction of civil and commercial law, as shown in Figure 1.

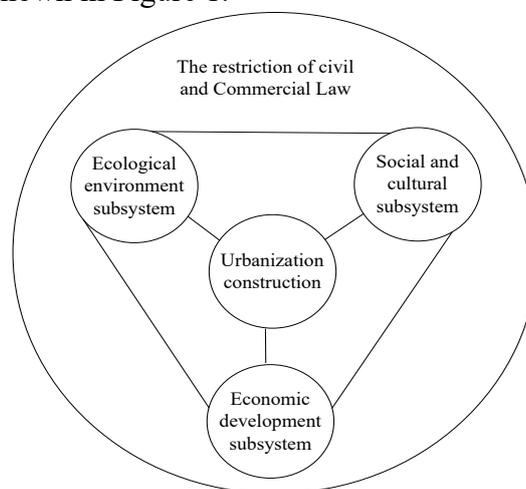


Figure 1 Coupling relationship between urbanization and construction subsystem under the restriction of civil and commercial law.

On the one hand, the healthy and orderly economic development provides financial support for the protection of the ecological environment. On the other hand, the protection of a good ecological environment is conducive to the healthy and orderly development of the economy.

Unsustainable economic development destroys the ecological environment, and the destruction of ecological environment will hinder economic development. From the relation of ecological environment and social culture, on the one hand, the protection of the ecological environment has promoted the progress of social culture. On the other hand, the progressive social culture is beneficial to the protection of the ecological environment.

From the perspective of the relationship between economic development and social culture, on the one hand, the economic development has led to the progress of social culture. on the other hand, the progress of social culture has promoted the economic development.

The progress or retrogression of any system will affect the other two systems through coupling.

The urbanization construction under the civil and commercial law is the pace coordination of economic growth and social development, harmonious development between man and nature, and the realization of the high unity of material civilization, spiritual civilization and ecological civilization.

The urbanization construction under the restriction of civil and commercial law is to straighten out the relationship between the three subsystems, and to carry out effective coupled coordination scheduling of the three subsystems, so that the three subsystems are coordinated and developed to achieve optimal and benign operation. The measurement index of coordinated development is the

coupling degree and coordination degree of the three subsystems. The higher the coupling degree and coordination degree is, the stronger the coupling coordination scheduling performance of the urbanization construction is. Under such circumstances, the economic development is faster, the ecological environment is better, and the progress of social culture is faster. The goal of urbanization under the restriction of civil and commercial law is easier to achieve.

3. Coupled Coordination Scheduling Model of Urbanization under the Restriction of Civil and Commercial Law

3.1. Selection of Evaluation Index

According to the principles of scientificity, representativeness and availability of data.

In this paper, 3 subsystems and 30 indicators are selected to build a coupled coordinated operation model of urbanization under the restriction of civil and commercial law. The model is described in Table 1:

In Table 1, the economic development subsystem mainly reflects the overall level of regional economic development. Therefore, the 8 major economic indicators, including gross domestic product, gross domestic product, urbanization level, fixed assets investment, public finance budget income, industrial added value, total retail sales of social consumer goods and single GDP energy consumption are selected to be measured. The social cultural subsystem mainly reflects the ability of local government to provide social public service and the level of people's culture and living standards. It selects public finance budget, road mileage total, total number of vehicles, post and telecommunications, Internet users, service industry income, interstellar guesthouses and records, the number of students in colleges and universities and public, the amount of library collection, the number of health organization personnel, the coverage rate of the TV comprehensive population and the disposable income of urban residents with pure income of farmers to be measured. The ecological environment subsystem mainly reflects the ability of the ecosystem to provide the function of ecological service. It is measured by 9 indexes, such as gas regulation, climate regulation, water conservation, soil formation and protection, waste disposal, biodiversity conservation, physical production, raw materials, entertainment culture and so on. The method of calculation is based on the method of Costanza, Xie Gaodi and other scholars.

Table 1. Evaluation index system of urbanization under the restriction of civil and commercial law.

Target layer	Subsystem layer	Evaluating indicator	Weight
Evaluation of urbanization construction	Economic development subsystem (weight: 0.33)	Gross Regional Product	0.126
		Per capita GDP	0.124
		Urbanization level	0.12
		Investment in fixed assets	0.127
		Budgetary income of public finance	0.124
		Industrial added value	0.125
		Total retail sales of consumer goods	0.13
		Gdp energy intensity	0.123
	Ecological environment subsystem (weight: 0.33)	Gas regulation	0.121
		Climate regulation	0.136
		Water conservation	0.137
		Soil formation and protection	0.139
		Waste disposal	0.127
		Biodiversity conservation	0.122
		Food production	0.048
	Social and cultural subsystem (weight: 0.33)	Raw material	0.094
		Entertainment culture	0.075
		Budgetary expenditure of public finance	0.073
		Road mileage	0.076

		Total number of vehicles	0.076
		Post and telecommunications business	0.076
		Number of Internet users	0.075
		Service industry income	0.076
		Star rated hotel	0.075
		The number of students in Colleges and Universities	0.113
		Volume of library collection in Public Libraries	0.075
		Number of health agencies	0.075
		Television comprehensive population coverage	0.07
		Pure income of farmers	0.07
		Disposable income of urban residents	0.07

3.2. Weight Assignment of Evaluation Index

In the weight process of measuring subsystems, subjective judgment method, expert consultation method and analytic hierarchy process are usually adopted, but these methods often have strong subjectivity and randomness. In order to avoid the interference of human factors, the entropy weighting method is used to determine the weights of each index. Entropy weighting method is the objective environment based on the original information. The weight of the index is determined by analyzing the correlation degree of each index and the amount of provided information, and the weight can be copied objectively. The basic steps are as follows:

3.2.1. The Index is Treated with Extreme Standardization

Positive indicators:

$$X_i = (x_i - x_{\min}) / (x_{\max} - x_{\min}) \quad (1)$$

Negative indicators:

$$X_i = (x_{\max} - x_i) / (x_{\max} - x_{\min}) \quad (2)$$

3.2.2. The Index is Transformed into Specific Gravity

$$S_{ij} = X_{ij} / \sum_{i=1}^n X_{ij} \quad (3)$$

3.2.3. Calculating the Entropy Value of the Index

$$h_j = \sum_{i=1}^n S_{ij} \ln S_{ij} \quad (4)$$

3.2.4. Standardization of Entropy

$$\alpha_j = \max(h_j) / h_j \quad (j = 1, 2, \dots, p) \quad (5)$$

3.2.5. Calculating the Weight of the Index

$$w = \alpha_j / \sum_{j=1}^p \alpha_j \quad (6)$$

Where the X_i is the value after normalization; the x_i means the actual value; the x_{\max} is the maximum real value; the x_{\min} is the minimum actual value; the X_{ij} is the j -th index value ($i = 1, 2, \dots, n$, $j = 1, 2, \dots, p$) of sample i ; the n and p are the sample number and index number respectively; w_j is the weight of the j -th index number.

3.3. Calculation of the Coupling Degree of Systems

The coupled coordination scheduling model of urbanization construction based on the restriction of civil and commercial law can judge the intensity of its coupled coordination scheduling by the coupling degree of the economic development subsystem, the social cultural subsystem and the ecological environment subsystem. The calculation formula is as follows:

$$C = \sqrt[3]{\frac{U_1 \times U_2 \times U_3}{(U_1 + U_2)(U_2 + U_3)(U_1 + U_3)}} \quad (7)$$

When $C = 0$, it is shown that the system is in a disordered state, and the direction and structure of the three subsystems are in disorder; when $C = 1$, the system was in a fully ordered state, and the three subsystems were benign resonance. According to the value C and referring to the criteria of other scholars, the coupling degree of the system can be divided into several stages:

While $0 < C \leq 0.3$, the system was in a low level coupling stage; while $0.3 < C \leq 0.5$, the system was in the phase of antagonism; while $0.5 < C \leq 0.8$, the system was in the phase of running in; and $0.8 < C \leq 1$, the system was in a high level coupling stage.

3.4. Calculation of the Coupled Coordination Degree of Systems

The coupling degree can reflect the resonance relationship between systems, but it is difficult to reflect the overall "efficiency" and "cooperative scheduling effect" between systems sometimes. If only relying on the coupling degree of the system to distinguish the urbanization based on civil and commercial law, there are shortcomings, therefore, the coupled coordination degree is introduced to reflect the degree of coordinated scheduling between the three subsystems. The calculation formula is as follows:

$$\begin{cases} D = \sqrt{C \times T} \\ T = aU_1 + bU_2 + cU_3 \end{cases} \quad (8)$$

Where, the D is the coordination degree of system; the C is coupling degree; the T is the comprehensive coordination index of three subsystems; the a , b and c are the undetermined coefficient. Considering the importance of the three subsystems, the values are all selected as $1/3$. The value D is also between $[0,1]$.

According to the value of D and referring to the criteria of other scholars, the coordination stage of the system can be divided into 4 types, and the corresponding urbanization can be divided into four stages too, and the subsystems of each stage are different, as shown in Table 2.

Table 2. Division of urbanization and basic characteristics of urbanization.

Level of coordination	Coordination type	Stage division	Basic feature
$0 < D \leq 0.4$	Low degree coordination stage	Low level stage	The economy and society are at a low level of development, and the ecological environment is within controllable limits.
$0.4 < D \leq 0.5$	Moderate coordination stage	Middle level	The economy and society are in the stage of rapid development, the pressure of the ecological environment is large, and the internal contradictions of the system are outstanding.
$0.5 < D \leq 0.8$	Good coordination stage	Higher level stage	The economy and society are in a stage of rapid development, and the ecological environment has been effectively protected, and the system has begun to develop in a healthy and orderly way.
$0.8 < D \leq 1$	High coordination stage	High level stage	The economic, social and ecological environment is in a benign resonance stage, and the system is highly coupled and coordinated.

4. Experimental Analyses

In order to detect the working effect of the model designed in this paper, the following experiments are carried out.

4.1. Experimental Data

The experimental data were selected from different regions of Jiangxi Province, all of which came from the Jiangxi Statistical Yearbook (2014).

The basic data of the value calculation of the ecological environment service function are the vector data of Jiangxi province based on the Landsat8 land imager OLI30m remote sensing image production and the scale is 1:10 million, in 2013.

The classification precision is above 85% basically can meet the needs of this research.

4.2. Experiment Process

According to the formula (1) - (6) in the text, after the standardization of 30 indexes in Jiangxi Province, the weight of each index is calculated by entropy value weighting method, and then the standard index and weighting are calculated. The comprehensive work of economic development, social culture and ecological environment in each region is obtained, which is described in Table 3.

4.3. Experimental Results and Analysis

4.3.1. Coupling Coordination Scheduling Level of Urbanization in Different Regions of Jiangxi Province

The experimental results are as follows:

Table 3 The value of regional economic development, social culture and ecological environment subsystem and the stage of urbanization construction.

Region	Economic development	Social culture	Ecological environment	C value	D value	Coordination stage	Construction stage
Nanchang	0.862	0.786	0.213	0.434	0.519	Good coordination	Higher level
Jingdezhen	0.187	0.232	0.028	0.372	0.235	Low degree coordination	Low-level
Pingxiang	0.24	0.253	0.001	0.108	0.146	Low degree coordination	Low-level
Jiujiang	0.382	0.522	0.776	0.485	0.521	Good coordination	Higher level
Xinyu	0.406	0.223	0.029	0.336	0.272	Low degree coordination	Low-level
Yingtian	0.14	0.076	0.019	0.396	0.176	Low degree coordination	Low-level
Ganzhou	0.282	0.609	0.952	0.457	0.530	Good coordination	Higher level
Ji'an	0.164	0.409	0.615	0.448	0.421	Moderate coordination	Medium level
Yichun	0.264	0.398	0.57	0.482	0.445	Moderate coordination	Medium level
Fuzhou	0.111	0.315	0.369	0.452	0.346	Low degree coordination	Low-level
Shangrao	0.238	0.474	0.517	0.478	0.446	Moderate coordination	Medium level

From table 3, we can see that Nanchang, Xinyu and Jiujiang are ranked in the top three from the comprehensive efficiency value of economic development, and Fuzhou, Yingtian and Jian were the last three, which can show that the main motive force of economic development comes from the development of industry.

From the comprehensive efficiency value of ecological environment, the top three are the cities of Ganzhou, Ji'an and Jiujiang, and Pingxiang, Yingtan and Jingdezhen are the last three. According to the index value, the rankings of woodland and wetland area are basically consistent with the comprehensive efficacy values of the ecological environment, and the main causes of the comprehensive effects of the ecological environment are the forest and the wetland.

Conclusions

Based on the three subsystems of economic development, social culture and ecological environment and 30 index layers, this paper analyzes the coupled coordination scheduling model of urbanization under the restrictions of the Civil and Commercial Law. The value of coupled coordination degree and the coupling degree between three subsystems are calculated by using the comprehensive efficiency value, and the level of urbanization construction is judged by the threshold of system coupled coordination degree. The higher the system coupled coordination degree is, the higher the urbanization level is.

References

- [1]. Mu, P., Zuo, T. and Zhou, N.J. (2016) Study on the Relationship between Urbanization and Economic Development based on Coordinate Coupling Degree Model in Xinjiang. *Areal Research and Development*, 35(3), 19-22.
- [2]. Liu, B., Qie, R., Wang, D. and Guo, J.J. (2016) Analysis of Coupling Coordination Degree between Urbanization and Land-water Resources System in Changchun-Jilin-Tumen Pilot Zone. *Journal of Jilin Agricultural University*, 38(1), 80-86.
- [3]. Song, Q. and Bin, J. (2017) Coupling Coordinating between Carbon Emissions and Urbanization—A Case of Chinese Low Carbon Pilot Cities. *Journal of Beijing Institute of Technology (Social Sciences Edition)*, 19(2), 20-27.
- [4]. Rong, A., Chen, C. and Dong, Z.J. (2016) Evaluation of Urbanization Level in Inner Mongolia Autonomous Region. *Journal of Arid Land Resources and Environment*, 30(10), 26-32.
- [5]. Fan, L., Liang, C. and She, W.J. (2016) Coupling Model and Its Algorithm for Coordinated Scheduling of Quay Crane and Truck under Uncertain Environment. *Journal of Computer Applications*, 36(3), 843-848.
- [6]. Cui, Y., Chen, Z., Yan, G. and Mu, G.J. (2016) Coordinated Dispatching Model of Abandoned Wind based on Heat Storage Cogeneration Unit and Electric Boiler. *Chinese Journal of Electrical Engineering*, 36(15), 4072-4080.
- [7]. Wang, B., Xia, Y. and Xia, Q.J. (2016) Security Constrained Economic Dispatch of AC / DC Interconnected Power Network based on Benders Decomposition Method. *Chinese Journal of Electrical Engineering*, 36(6), 1588-1595.
- [8]. Yuan, X., Wang, H., Li, Q. and Feng, Y.J. (2016) Analysis on Interconnection between Water Resources of Hongze Lake and Luoma Lake and Study on Coupled Model for Its Optimal Regulation. *Water Resources and Hydropower Engineering*, 47(2), 9-14.
- [9]. Xiong, J., Chen, D., Peng, B., Deng, S. and Xie, X.J. (2014) Spatio-temporal Difference of Coupling Coordinative Degree of Ecological Carrying Capacity in the Dongting Lake Region. *Scientia Geographica Sinica*, 34(9), 1108-1116.
- [10]. Ge, X. and Zhang, L.J. (2014) Wind-Hydro-Thermal Stochastic Unit Commitment Problem Considering the Peak Regulation Constraints. *Transactions of China Electrotechnical Society*, 29(10), 222-230.