

Research Article

Research on the Evolutionary Game Model and Stable Strategy of Urban Management Law Enforcement

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As a form of the informal economy, countries around the world have different policies towards street vendors. This paper constructs a law enforcement game model composed of the Chengguan, street vendors, and urban residents in China. Based on the evolutionary game theory, we achieved the evolutionary stable equilibrium points under complying with different constraint conditions by solving the replicator dynamic equations of parties in the dynamic system. Through the gradual stability analysis of the equilibrium point, the stable strategy of the evolutionary game can be calculated. It is found that the flexible law enforcement behavior of urban management departments plays an important leading role in urban street governance. Flexible law enforcement not only requires macro policy arrangements but also tests the executive wisdom of street bureaucrats.

1. Introduction

Under the rapid urbanization and social structure changes, China's urban street space is presenting a fragmented structure and gathering diversified social demands. A large number of landless peasants, laid-off workers, and freelancers poured into the streets to make a living by setting up stalls to sell products, which brought the order of urban streets out of control. In 1997, China's first urban management law enforcement was formally established to strengthen the management of street vendors. As street bureaucrats, officers of urban management law enforcement (they have a famous name "Chengguan" in China) have played a significant role in maintaining urban street orders [1] and protecting social and public interests. However, they also have been criticized for their unsound system, simple methods, and extensive behavior [2]. For a long time, the relationship between Chengguan and vendors has been like a cat-and-mouse game [3], which is a typical contradictory relationship.

Chengguan represents the executor of urban management rules and regulations. Street vendors are usually the group of law enforcement target. Surrounding residents are

directly or indirectly affected by law enforcement activities. There is a general agreement that the control and elimination of street vendors will lead to an increase of living costs, especially for low-income groups [4–6].

Most previous studies have explored the relationship between Chengguan and street vendors [7–9], our study discloses conflicts among three parties: Chengguan, street vendors, and surrounding residents. The demands of Chengguan, residents, and street vendors are not one-dimensional, including but not limited to: the interest relationship between one subject and the other two, and the interests within each other. Therefore, the interaction between Chengguan and vendors will affect the evaluation of public policy behavior from surrounding residents. This paper attempts to construct a three-party game relationship model among Chengguan, street vendors, and urban residents. The main objective of the study is to seek the equilibrium point and stable conditions of the tripartite game, so as to provide a rational solution for street governance in Chinese cities.

The rest of this study is organized as follows: we present the literature review in Section 2. Section 3 constructs the evolutionary game model of urban management law

enforcement. Section 4 discusses the evolutionary stability of the game model. Section 5 analyzes the scenario of the evolutionary games. Section 6 describes the conclusions and contributions of this study.

2. Literature Review

Street vending is regarded as an old and significant occupation in cities all over the world [10]. The research on street vendors usually includes multiple disciplinary perspectives, such as sociology, politics, geography, food science, economics, public health, urban planning, and so on [11]. In the existing research on vending, the primarily discuss is the conflicts between street vendors and the government [12, 13].

In many developing countries like China, Thailand, and Columbia, street vending forms an important part of urban economies, and most street vendors operate outside state regulation [14]. Selling wares on the streets is considered a way to make a living for the people at the bottom [8, 15, 16]. By making available ordinary articles of everyday use for a comparatively less price, street vending is regarded as one of the most visible occupations in the cities. Igudia [17] proposed that street vending also has positive benefits for consumers, including financial gains, maintaining social relations, and compensating for the formal economy. But the problem is how to balance the management of public space with the need for street vendors to support livelihoods. Unfortunately, there are very few cities succeeding in it [18].

The spatial politics of vending have received plenty of attention among the contemporary scholars [6, 19–21]. Turner et al. [22] examine the strengths and complexities of street vendors' everyday experiences. They find that street vendors are often targeted by state officials for fines or bribes. In most scenes of Chinese city daily life, the resulting vendor–Chengguan conflicts dramatize state power in public and carry the latent danger of crowd violence in response [23].

Street vending around the world continues to serve as market places with, and more often without, the consent of authorities [24, 25]. One mainstream explanation is that the local government tends to view street vendors as inefficient, disorderly, and unsanitary, which are opposed to the desired national image [26]. Li et al. [11] examined and compared the spatiotemporal patterns and occurrence mechanisms of street vending events from both the urban managers' "top-down" and the urban residents' "bottom-up" points of view.

But we have to admit that street vending also has negative impacts on urban society. These impacts usually have two folds: first of all, from the perspective of the citizens, street vendors usually pay less attention to food safety, and the operation process usually has sanitation hazards [27, 28]. At the same time, vending activities usually bring about some nuisance issues such as noise and smoke, which affect the appearance of neighborhoods and residents' daily lives [29]. Trafialek et al. [30] found many noncompliances in the street food vendors' hygienic practices through a survey. Secondly, in the government's position, the occupation of public space, traffic jams, influence on the

appearance of the city, and unfair competition with formal businesses are significant issues caused by street vending.

Street vendors are often seen as an element to be purged in the whole world. Between the 1980s and 1990s, the tendency to reduce the street vendors' presence spread, in compliance with the neoliberal urban governance model promoted in the United States and later introduced to many developing countries [31–34]. Therefore, the recent public discourse on security have stimulated street trade criminalization and the adoption of exclusionary policies in a lot of developing countries [35].

According to analyzes of vendors' rights, interests, and strategies for coping with the eviction that affected their livelihood, Boonjubun [36] focused on street vendors' survival strategies in Bangkok and analysed various forms of conflicts over the streets. Ojeda and Pino presented [37] an in-depth view of social and spatial conflict identified by street vendors themselves and revealed the socio-spatial dispute over the use of public space.

From the existing literature, there is still a great debate on street vendors. Due to the complexity of street vendors, we need to re-examine the relationship between urban management and vendors from a dynamic point of view.

Referring to the calculation methods of Weixin Yang et al. [38, 39] and the evolutionary game of Ying Zhu et al. [40], especially the evolutionary game analysis of urban traffic environment governance made by Jun yi Liu et al. [41], this paper attempts to construct a multiparty dynamic game model to deconstruct the daily behavior of vendors and analyze the final evolutionary stable strategy of urban governance.

However, different from the existing literature, in view of the complexity of vendor governance, we do not think that strict law enforcement is a good choice. The complexity includes the conflict between Chengguan and street vendors, the huge number of street vendors in China's cities, and the ongoing reform of China's administrative law enforcement. Therefore, by constructing a three-party game model, this paper focuses on analyzing the strategic choices of Chengguan, residents, and vendors, that is, the stable point of the game system. Finally, we can get the most beneficial governance scheme for Chinese streets. Consequently, the innovation of this paper is to use the existing evolutionary game model to analyze the strategic actions of multiple subjects in China's urban streets. We believe that to maintain the stability and vitality of the social system, flexible rather than strict law enforcement is a realistic choice for Chengguan.

3. Research Hypotheses and Evolutionary Game Model

3.1. Evolutionary Game Participants. Some scholars focus on analyzing the relationship between state and citizens, insofar as the two are often seen to clash over how public street space is to be utilized [33, 42]. However, in the actual scene of daily life, the participation of residents will affect the relationship between urban management and vendors. Residents' positive or negative evaluation of vendors will affect the behavior

choice of urban management - loose or strict law enforcement. The participants in our evolutionary game include Chengguan, street vendors, and consumers. The three groups have their own strategic space. The strategic space of Chengguan is {Law enforcement, Not Law enforcement}, which means under various pressures, Chengguan may adopt different strategies to deal with vendors. The strategic space of street vendors is {Vending, Not Vending}, which means vendors can adopt different strategies to cope with the eviction law enforcement on their livelihood. The strategic space of residents is {Purchase, Not Purchase}, meaning residents' purchase behavior will be affected by many factors, such as price, safety, convenience, and so on.

3.2. Basic Assumptions of Evolutionary Game Model. Based on the three subjects and their respective strategic spaces, the following assumptions are made.

Assumption 1. Assuming that the probability of Chengguan choosing "Law Enforcement" is x , then the probability of not is $(1 - x)$; the probability of the street vendors choosing "Not Vending" is y , then the probability of "Vending" is $(1 - y)$; the probability of residents choosing "Not Purchase" at mobile stalls is z , then the probability of "Purchase" is $(1 - z)$.

Assumption 2. When Chengguan chooses "Law Enforcement," there will be a warning effect on street vendors. Penalty mechanisms such as fines and confiscations reduce the number of vendors, thereby improving the city's image, and the positive impact on urban governance is a . Chengguan's law enforcement will lead to the reduction of mobile stalls in urban streets. Residents who are accustomed to buying goods at stalls will complain about the behavior of eviction and punishment from Chengguan as d . Residents who do not buy items at the stalls have good feedback on the proper law enforcement behavior of the Chengguan as b , but they will have negative feedback on scant enforcement of Chengguan, and the negative effects such as complaints and bad reviews are set as c . In addition, the cost of Chengguan's enforcement on street vendors is set to be e .

Assumption 3. When street vendors choose to spread out goods for sale in a booth, they will receive income f . The loss caused by the Chengguan's punishment is g . The negative impact of street vendors on the city's image is h .

Assumption 4. For urban residents, shopping at stalls will give them a sense of satisfaction due to convenience and benefits. This sense of satisfaction is set to be m . However, Chengguan's law enforcement may have mediated adverse effects on ongoing transactions. For example, consumers have already paid the money but the items are confiscated by the Chengguan, resulting in losses, or facing the nervousness and discomfort caused by the Chengguan's law enforcement. Such negative effects are recorded as n .

3.3. Payoff Matrix of the Tripartite Game Model. In the case of the Chengguan having obligations to maintain the street order, all players incur different costs depending on the strategies adopted. Regarding the above assumptions, the payoff matrix of players is shown in Table 1.

4. Evolutionary Stability Analysis

4.1. Replicator Dynamic Equations of Players. According to the evolutionary game theory, we let the expected return of Chengguan choosing "Law Enforcement" be U_a , and let the expected return of choosing "Not Law Enforcement" be U_b . Then, we can obtain the expected return of Chengguan that "Law Enforcement" and "Not Law Enforcement" as follows:

$$\begin{aligned} U_a &= byz + (-d) \cdot y(1 - z) + (a + b)(1 - y)z + a(1 - y)(1 - z), \\ &= dyz - (d + a)y + bz + a, \\ U_b &= eyz + ey(1 - z) + (e - c)(1 - y)z + e(1 - y)(1 - z), \\ &= cyz - cz + e. \end{aligned} \quad (1)$$

The average expected return is as follows:

$$U_x = xU_a + (1 - x)U_b. \quad (2)$$

Therefore, according to the dynamic equation of Malthusian, the replicator dynamics equation of Chengguan's strategy is

$$\begin{aligned} \frac{dx}{dt} &= x(U_a - U_x) = x(1 - x)(U_a - U_b) \\ &= x(1 - x)[(d - c)yz - (d + a)y + (b + c)z + a - e]. \end{aligned} \quad (3)$$

Let U_c represent the expected return of street vendors if they choose "Not Vending" and U_d represent the expected return of street vendors if they choose "Vending." We can obtain the expected return of street vendors as follows:

$$\begin{aligned} U_c &= 0 \cdot xz + 0 \cdot x(1 - z) + 0 \cdot (1 - x)z + 0 \cdot (1 - x)(1 - z) = 0, \\ U_d &= (-g)xz + (f - g)x(1 - z) + 0 \cdot (1 - x)z + f(1 - x)(1 - z) \\ &= -gx - fz + f. \end{aligned} \quad (4)$$

Let U_y represent the average expected return of street vendors that can be written as follows:

$$U_y = yU_c + (1 - y)U_d. \quad (5)$$

The replication dynamic equation of street vendors' strategy can be expressed as follows:

$$\frac{dy}{dt} = y(U_c - U_y) = y(1 - y)(U_c - U_d) = y(1 - y)(gx - f + fz). \quad (6)$$

Let U_e represent the expected return of residents if they choose "Not Purchase" and U_f represent the expected return of residents if they choose "Purchase." We can obtain the expected return of residents as follows:

TABLE 1: Payoff matrix of the tripartite game.

Chengguan	Vendors	Residents	
		not purchase z	purchase $(1 - z)$
Law enforcement x	Vending $(1 - y)$	b	$-d$
		0	0
	Not vending y	0	0
		$a + b$	a
		$-g$	$f - g$
		$-h$	$m - h - n$
Not law enforcement $(1 - x)$	Vending $(1 - y)$	e	e
		0	0
	Not vending y	0	0
		$e - c$	e
		0	f
		$-h$	$m - h$

$$U_e = 0 \cdot xy + (-h)x(1 - y) + 0 \cdot (1 - x)y + (-h)(1 - x)(1 - y) = hy - h,$$

$$U_f = 0 \cdot xy + (-h - n + m)x(1 - y) + 0 \cdot (1 - x)y + (-h + m)(1 - x)(1 - y) = nxy - nx + (h - m)y - h + m. \quad (7)$$

The average expected return for consumers is

$$U_z = zU_e + (1 - z)U_f. \quad (8)$$

The replication dynamic equation of street vendors' strategy can be expressed as follows:

$$\begin{aligned} \frac{dz}{dt} &= z(U_e - U_z) = z(1 - z)(U_e - U_f) \\ &= z(1 - z)(nxy - nx + my - m). \end{aligned} \quad (9)$$

The replicator dynamic (3), (6), and (9) constitute a three-dimensional dynamic system as follows:

$$\begin{cases} F(x) = \frac{dx}{dt} = x(1 - x)[(d - c)yz + (-d - a)y + (b + c)z + a - e], \\ F(y) = \frac{dy}{dt} = y(1 - y)(gx - f + fz), \\ F(z) = \frac{dz}{dt} = z(1 - z)(-nxy + nx + my - m). \end{cases} \quad (10)$$

4.2. Evolutionary Stability Strategy of Players. According to the replicator dynamic equations of the model, the probability of "Law Enforcement" by Chengguan $x(t)$, the probability of "Not Vending" by vendors $y(t)$, and the probability of "Not Purchase" by residents $z(t)$ all depend on time, and $x(t), y(t), z(t) \in [0, 1]$. In the system, we let $F(x) = 0, F(y) = 0, F(z) = 0$, the dynamical system has eight local equilibrium points of adopting pure strategies as follows:

$$A_1 = [0, 0, 0], A_2 = [0, 0, 1], A_3 = [0, 1, 0], A_4 = [0, 1, 1], A_5 = [1, 1, 1], A_6 = [1, 0, 1], A_7 = [1, 1, 0], A_8 = [1, 0, 0].$$

4.2.1. The Evolutionarily Stable Strategy of One Group. The dynamical system may have three equilibrium points where one group adopts a pure strategy:

$$A_9 = [m/n, 0, -a - e/b + c], A_{10} = [f/g, a - e/d + a, 0], A_{11} = [B_1, 1, d + e/d + b]$$

in the equilibrium point A9.

$$0 < m/n < 1, 0 < -a - e/b + c < 1;$$

in the equilibrium point A10.

$$0 < f/g < 1, 0 < a - e/d + a < 1;$$

in the equilibrium point A11.

$$0 < B_1 < 1, 0 < d + e/d + b < 1.$$

4.2.2. The Evolutionarily Stable Strategy of Two Groups. The dynamical system may have three equilibrium points where two-party groups adopt a pure strategy:

$$A_{12} = [1, 1, B_2], A_{13} = [0, 1, B_3], A_{14} = [0, B_4, 1].$$

$$\text{Among them, } 0 < B_2 < 1, 0 < B_3 < 1, 0 < B_4 < 1.$$

If the dynamical system satisfies $F(x) = 0, F(y) = 0, F(z) = 0$, and the values of x, y , and z are not 0 or 1, we can obtain the following equation:

$$\begin{cases} C(x_1, y_1, z_1) = (d - c)yz - (d + a)y + (b + c)z + a - e = 0, \\ D(x_1, y_1, z_1) = -gx + f - fz = 0, \\ E(x_1, y_1, z_1) = -nxy + nx + my = 0. \end{cases} \quad (11)$$

4.2.3. The Hybrid Strategy Analysis. The three-dimensional dynamical system (10) may have a hybrid adoption strategy equilibrium point: $A_{15} = [x_1, y_1, z_1]$.

We solve equation (11) and obtain the following equation:

$$\begin{cases} x_1 = \frac{m}{n}, \\ y_1 = \frac{(b+c)(1-gm/fn) + a - e}{(d-c)(1-gm/fn) - d - a}, \\ z_1 = 1 - \frac{gm}{fn}. \end{cases} \quad (12)$$

So the equilibrium point A_{15} is $[m/n, (b+c)(1-gm/fn) + a - e / (d-c)(1-gm/fn) - d - a, 1 - gm/fn]$.

4.3. Stability Analysis of Equilibrium Point. According to the first theorem of Lyapunov requirements for system stability:

$$\begin{bmatrix} (1-2x)[(d-c)yz - (d+a)y + (b+c)z + a - e] & x(1-x)[(d-c)z - d - a] & x(1-x)(dy - cy + b + c) \\ gy(1-y) & (1-2y)(-gx + f - fz) & fy(1-y) \\ z(1-z)(n - ny) & z(1-z)(-nx + m) & (1-2z)(-nxy + nx + my - m) \end{bmatrix}. \quad (13)$$

Then, we can calculate the eigenvalue of the Jacobian matrix corresponding to each equilibrium point of equation (10) through equation (13). The main equilibrium point can be shown in Table 2.

5. Scenario Analysis of the Evolutionary Games

Through the group evolution model and the asymptotic stability of the equilibrium point of the three-party game among Chengguan, street vendors, and residents, the stable strategy of the evolutionary game is obtained. Under different stability conditions, all participants in urban streets will adopt their own strategies which eventually tend to be stable. Next, we will analyze the three situations that tend to be stable in order to find the optimal urban street governance scenario.

5.1. Chaotic Street Order. In this scenario, Chengguan chooses “Not Law Enforcement,” street vendors choose “Vending,” and the residents have consumption behavior, that is, $A_1=(0, 0, 0)$. In this scenario, the condition that must be met is $a - e < 0$, which means the cost of law enforcement is greater than the social benefits brought by law-enforcement. In the practice of urban governance, when the cost of public governance is higher than the public benefit, it means that there is a problem with the governance mechanism. People do not recognize the law enforcement behavior of Chengguan. Therefore, Chengguan eventually tends not to enforce the law, vendors go to the streets, and residents then choose to purchase, so that the urban streets enter a vicious circle. To avoid this, Chengguan should reasonably control the cost of law enforcement and appropriately increase social benefits, so that the condition $a - e < 0$ is not established. It can be

(1) x_e is unstable

One eigenvalue of the Jacobian matrix $\text{Re}(\lambda_k) > 0$, or the eigenvalues of $\text{Re}(\lambda_k) = 0$ have multiple roots;

(2) The asymptotic stability of x_e

All eigenvalues $\text{Re}(\lambda_k) < 0$ in the Jacobian matrix;

(3) The Lyapunov stability of x_e

All eigenvalues of the Jacobian matrix $\text{Re}(\lambda_k) \leq 0$, and the eigenvalues of $\text{Re}(\lambda_k) = 0$ have no multiple roots.

Regarding the above-given conditions, 15 equilibrium of the system formula (10) can be judged. Calculating the Jacobian matrix of system (10), equation (13) can be obtained as follows:

concluded that the evolution path of the system will not tend to the evolutionary stable point of $A_1 = [0, 0, 0]$.

5.2. Fragile Informal Economy due to Strict Law Enforcement. When Chengguan chooses “Law Enforcement,” street vendors choose “Not Vending,” and the residents have no consumption behavior, that is, $A_5 = [1, 1, 1]$, the condition $-b + e < 0$, $-g < 0$ must be satisfied. At this scenario, the cost of Chengguan enforcement is less than the social reputation formed by urban residents for enforcement. At the same time, Chengguan will make fines when investigating and dealing with vendors, which will lead to the loss of street vendors. The behavior of the Chengguan tends to be severely law enforcement, the vendors tend not to vend, and the residents cannot consume. Although this is the optimal strategy from the perspective of the system model, it is significantly different from the actual situation of China. According to data from the seventh census released in 2021, by the end of 2020, China’s urban population will be over 901 million, accounting for 63.89% of the total population. The floating population in China is 376 million, and the number of flexible employment has reached 200 million. With such a large floating population and flexible employment, strict law enforcement against vendors will lead to many consequences, so it is not feasible. Consequently, the evolutionary path of the system will not tend to the stable point of condition 3.

5.3. Flexible Law Enforcement. In this scenario, Chengguan enforces the law to street vendors, but street vendors and consumers both participate in, that is, $A_8 = [1, 0, 0]$, and the condition $-a + e < 0$, $g - f < 0$, $n - m < 0$ must be satisfied. The law enforcement cost is less than the social benefits. At

TABLE 2: Eigenvalues and asymptotic stability conditions of the Jacobian matrix.

Equilibrium points	Eigenvalues λ_1	Eigenvalues λ_2	Eigenvalues λ_3	Asymptotic stability condition
$A1 = (0, 0, 0)$	$a - e$	f	$-m$	$a - e < 0$
$A2 = (0, 0, 1)$	$b + c + a - e$	0	$-m$	Unstable point
$A3 = (0, 1, 0)$	$-d - m$	f	0	Unstable point
$A4 = (0, 1, 1)$	$b - e$	0	0	Unstable point
$A5 = (1, 1, 1)$	$-b + e$	$-g$	0	$-b + e < 0; -n < 0$
$A6 = (1, 0, 1)$	$-b - c - a + e$	n	$-n + m$	Unstable point
$A7 = (1, 1, 0)$	$d + e$	$-g + f$	0	Unstable point
$A8 = (1, 0, 0)$	$-a + e$	$g - f$	$n - m$	$-a + e < 0; g - f < 0; n - m < 0$

this time, on the basis of scenario 1, the social benefits are reasonably increased. Therefore, Chengguan has changed the decision-making behavior and actively participated in the governance of urban streets. However, the income of the vendors is greater than the fines punished by the Chengguan, so vendors will choose to continue to set up stalls on the streets, but due to the enforcement behavior of Chengguan, there will be a “cat-and-mouse” scene, that is, when Chengguan appears at streets, the vendors will quickly flee, or conflict behavior occurs. For residents, the benefits brought by the purchase behavior at the stall are greater than the adverse effects, so they will eventually tend to purchase. The urban street governance has been better improved due to the active participation of Chengguan, but due to the behavior of street vendors, there will be violent conflicts and chaos in urban management law enforcement. Therefore, Chengguan’s law enforcement behavior needs to have appropriate flexibility, so that the three parties of the Chengguan, street vendors, and residents can maintain in a dynamic, stable, and balanced state.

6. Conclusions

We use the evolutionary game replication equation to construct an evolutionary game model of urban street governance with Chengguan, street vendors, and consumers as the main players of the game, and analyze the evolutionarily stable strategy of the system. For decades, street vendors have been considered as marginal individuals who passively practice their activities [31]. But our research shows that the stability of the equilibrium point of a single group is not only affected by itself but also affected by the other two groups. According to the evolutionarily stable state obtained through the scenario analysis, the law enforcement of Chengguan plays an important leading role in the urban street governance. But the important thing is maintaining appropriate and flexible policies to reserve a certain living space for street vendors, which tests the law enforcement wisdom of the street bureaucrats.

Therefore, the flexible law enforcement of Chengguan is of great significance. On the one hand, it satisfies the efficiency pursuit of urban development and realizes the overall effective and orderly street space. On the other hand, it also accommodates the livelihood needs of the bottom groups, which will alleviate the poverty of them to a certain extent. In the process of rapid urbanization in China, there has not been a large number of slums like in some developing

countries. Although this is a phenomenon with multiple causes and effects, the transfer of the right to earn a living space for the bottom groups is one of the reasons. Although informal employment such as vendors and tricycle workers infringes upon the spatial order of the city, it provides survival opportunities for a large number of low skilled groups who are excluded or failed in urban vocational competition. Our research results are consistent with these studies, mainly conducted in the global South, having emphasized the role of the street vendors’ agency, highlighting the strategies of resistance and negotiation they employ to confront exclusionary policies and guarantee their right to work in street [34, 42, 43].

In fact, the newly revised “Administrative Punishment Law of the People’s Republic of China” in 2021 clearly stipulates the rule of “first violation without punishment” for urban management law enforcement “those who violate the law for the first time and have minor harmful consequences can not be punished.” This is a very beneficial institutional innovation. “First violation without punishment” is a reasonable tolerance that conforms to the spirit of the law and belongs to law enforcement using noncoercive means such as persuasion and education. This will not only help reduce resistance but also conduce to improving the efficiency of law enforcement. Therefore, in the normal management of street vendors, the boundaries of street space should be constantly adjusted in the process of the game. The power-right structure of street space should evolve gradually with the change of urban social space. Finally, the overall harmony and stability of urban public space in the rapidly changing environment of China can be realized by these manners.

Data Availability

The data used for the numerical analysis are included within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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