خصائص وآليات وإشكالات العلاقة المكانية بين العمل والسكن من منظور شبكي

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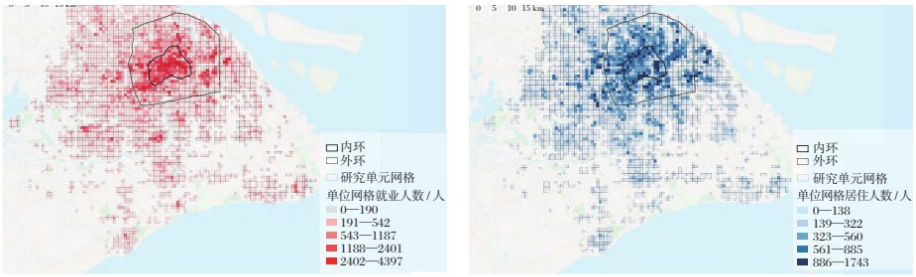
الملخص: باستخدام بيانات إشارات الهاتف المحمول في شنغهاي، تبني الدراسة شبكة العمل-السكن وتحلل العقد والروابط والتنظيم العام. وتظهر النتائج بنية ذات نواة واحدة وعدة عناقيد، حيث تحدد المسافة وأسعار السكن شدة التدفقات. وتدعم المحاكاة استراتيجيات تحسين القدرة على السكن ولا مركزية الوظائف.

الكلمات المفتاحية: العمل والسكن؛ الشبكات المعقدة؛ التنقل اليومي؛ القدرة على تحمل السكن؛ شنغهاي

1 مراجعة الأدبيات

تقلل مؤشرات التوازن التقليدية بين العمل والسكن من أهمية التدفقات بين الوحدات. ويصف المنظور الشبكي الوحدات المكانية كعقد والتنقلات كروابط موجهة.



（a）居住人口　　（b）与就业人口

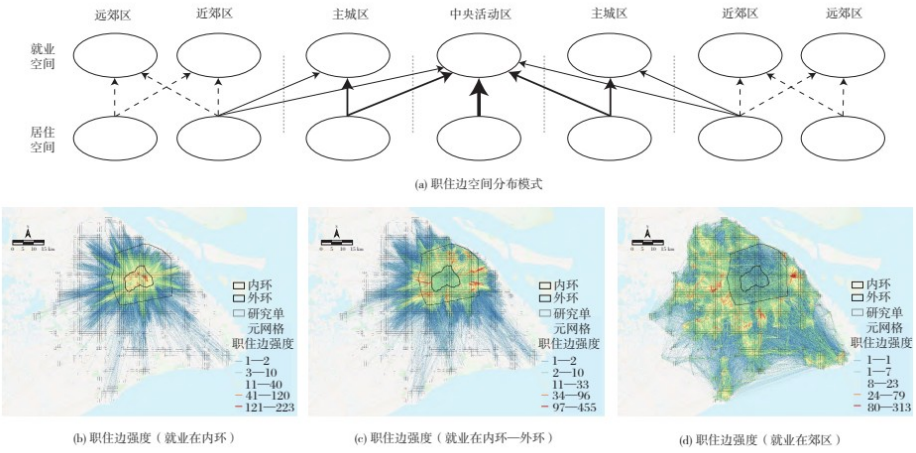
图1　居住人口与就业人口的分布特征

Spatial distribution of residential and employment populations　الشكل 1

2 تصميم البحث والبيانات

تستخدم الدراسة شبكة 1 كم وبيانات China Unicom لشهر أكتوبر 2023، مع التحقق ببيانات التعداد وإضافة أسعار المساكن.

3.3　一主与多团：职住网络的空间组织　　随着 r 值从 1 降低到 0.1，组团数量　　形成逻辑。



(a) 职住边空间分布模式

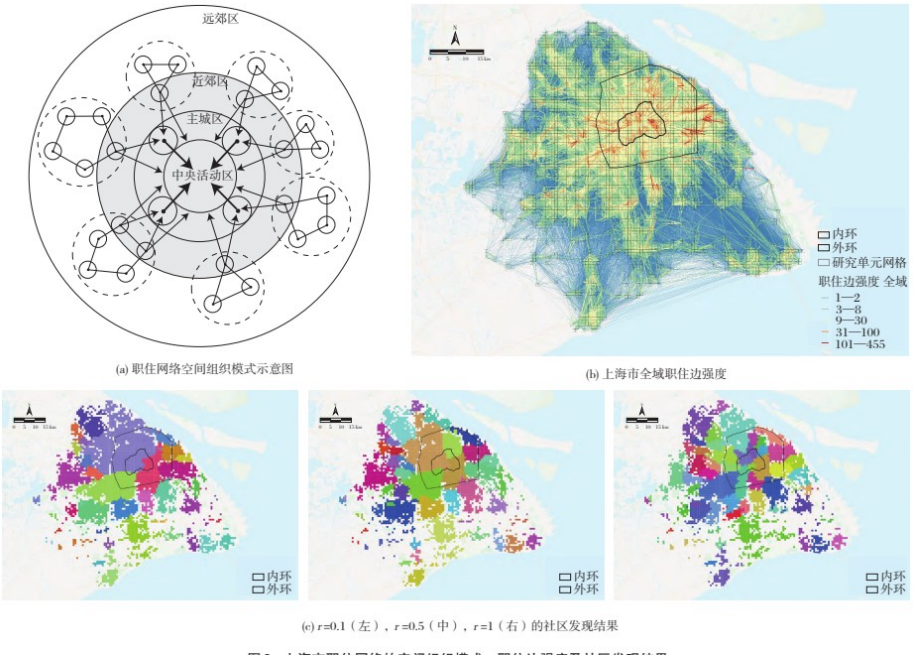
(b) 职住边强度（就业在内环）　(c) 职住边强度（就业在内环—外环）　(d) 职住边强度（就业在郊区）

图2　上海市职住边空间分布模式及强度分布特征

Spatial patterns and intensity of jobs-housing edges in Shanghai　الشكل 2

3 خصائص الشبكة

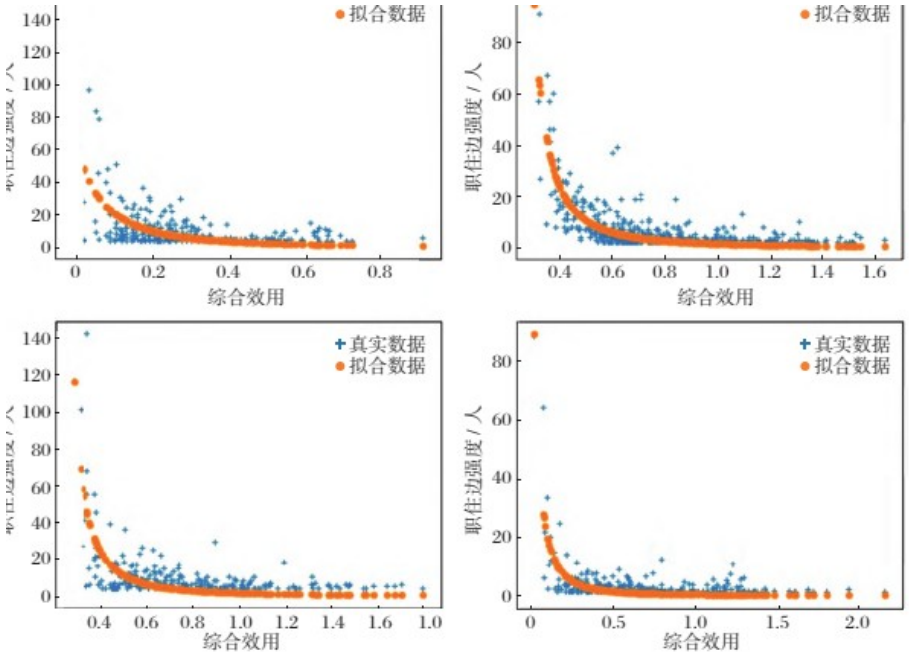
تتركز الوظائف أكثر من السكن. الروابط المتجهة إلى المركز ذات طابع جذبي قوي، بينما تبقى الروابط الضاحوية أكثر محلية. وتتكون الشبكة من نواة واحدة وعدة عناقيد.



الشكل 3 Network organization, edge intensity, and community-detection results

4 الآليات

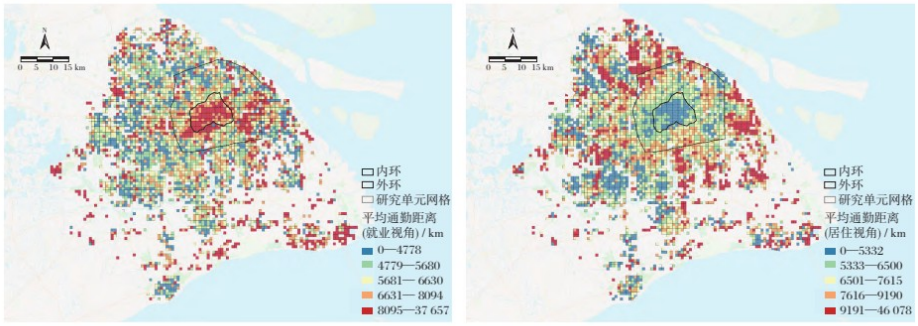
يتبع تكوين الروابط قانون قوة. وتخفض المسافة وسعر السكن شدة الرابط؛ كما تشكل مركزية الوظائف وتدرج الأسعار الأحادي الشبكة.



الشكل 4 Model fits for the six largest employment nodes

5 الإشكالات

تشمل القضايا الرئيسية عدم التوافق المكاني، واختناقات النقل، واللامساواة الاجتماعية، ولا سيما فقر الوقت لدى الفئات منخفضة الدخل.



（a）就业节点　　（b）和居住节点

图5　就业节点（左）和居住节点（右）平均通勤距离

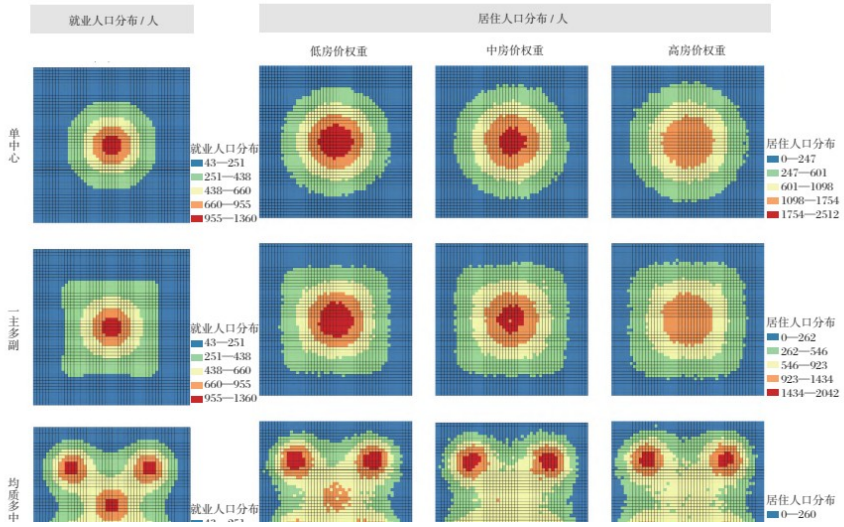
Fig.5　Average commuting distance of employment nodes (left) and residential nodes (right)

6　应对　　不纳入场景考虑范围。　　距离分布呈现出中间低、四周高的典型模式。然而，随着就业多中心化趋势的

Average commuting distance of employment and residential nodes الشكل 5

6 الاستجابات

تشير المحاكاة إلى أن تحسين القدرة على السكن ولا مركزية الوظائف يقللان متوسط مسافة التنقل ويوازنان التدفقات.



Simulated employment and residential population under alternative scenarios الشكل 6

7 الخلاصات

يربط المنظور الشبكي الشكل الحضري وسوق السكن وتنظيم الوظائف، ويوفر أداة لتخطيط أكثر عدالة لعلاقة العمل والسكن.

图6 不同场景下的就业人口、居住人口分布

Fig.6 Distributional patterns of working and residential population under different scenarios

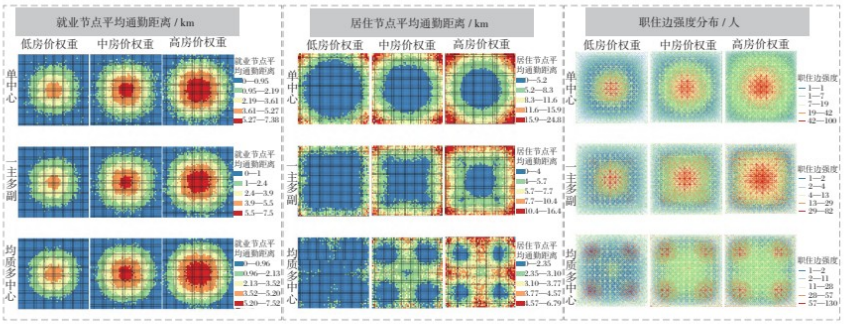


图7 不同场景下的就业节点平均通勤距离、居住节点平均通勤距离及职住边强度

Fig.7 Average commuting distances of employment nodes, residential nodes, and job–housing edge intensity under different scenarios

“一主多副”结构下那样突出。

住房价格可接受程度的变化对职住网络的结构特征亦具有一定的影响。尽管这一变化不会直接导致职住网络边的结构特征发生显著改变，但其向心趋势减弱。

6.2 应对策略

6.2.1 住房价格接受程度提升：多维度策略组合

接受程度提升能直接促进居民就近居住，减少空间平均通勤距离和减弱向心流强度。一是持续强化保障性住房体系建设。针对上海市当前情况，应进一步加大保障性住房的投资与建设力度，确保住房

Average commuting distances and edge intensity under different scenarios 7 الشكل

表1 不同场景下节点平均通勤距离的均值

Tab.1 Mean commuting distance of nodes across scenarios

场景	低房价权重		中房价权重		高房价权重	
	就业节点	居住节点	就业节点	居住节点	就业节点	居住节点
单中心	1.06	5.50	1.68	7.16	2.26	8.26

Mean node commuting distance across simulation scenarios 1 الجدول

.1 The ring-based zones are the central activity area inside the Inner Ring, the main city between the Inner and Outer rings, and suburbs outside the Outer Ring. 2. The terms central activity area, main city, and new city follow the Shanghai Master Plan (2017-2035). 3. Comprehensive node city follows the same plan.

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