

ISSN: 2717-5626 (Online)

Volume 7 · Issue 3

August 2025

 ACCSCIENCE  
PUBLISHING

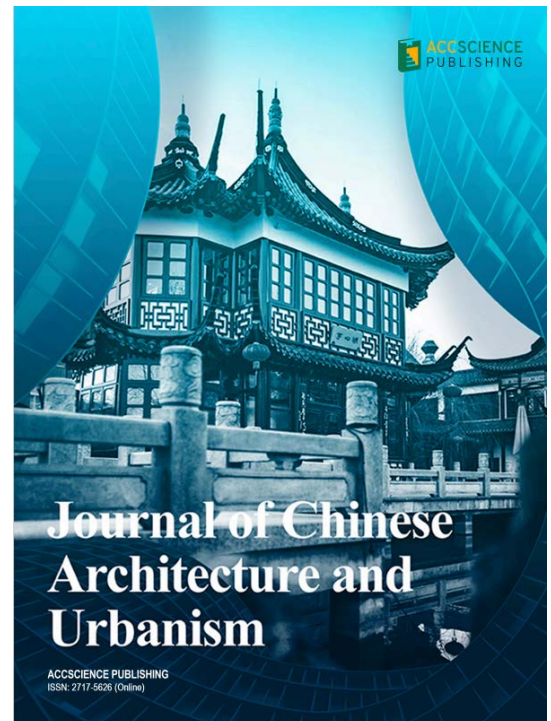


# Journal of Chinese Architecture and Urbanism

Online ISSN: 2717-5626

# Journal of Chinese Architecture and Urbanism

**The *Journal of Chinese Architecture and Urbanism (JCAU)*** is an international peer-reviewed academic journal which publishes original research articles, review articles, reports, viewpoints, book notes, and book reviews. The Journal presents new and original results of research, and provides a platform for discussion and debate relating to architectural heritage preservation, resilience and cultural sustainability of modern vernacular architecture in the Chinese context, as well as the cultural influence of Chinese architecture worldwide, past and present.



## About the Publisher

AccScience Publishing is a publishing company based in Singapore. We publish a range of high-quality, open-access, peer-reviewed journals and books from a broad spectrum of disciplines.

### Contact Us

**Managing Editor**

[jcau.office@accscience.sg](mailto:jcau.office@accscience.sg)

AccScience Publishing

9 Raffles Place, Republic Plaza 1 #06-00 Singapore 048619.

Volume 7 • Issue 3 • August 2025

ISSN 2717-5626 (online)

# Journal of Chinese Architecture and Urbanism

## **Editors-in-Chief**

**Jie Zhang**

*Tsinghua University, China*

**Donia Zhang**

*Neoland School of Chinese Culture, Canada*



Access Science Without Barriers

**Full issue copyright © 2025 AccScience Publishing**

All rights reserved. Without permission in writing from the publisher, this full issue publication in its entirety may not be reproduced or transmitted for commercial purposes in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system. Permissions may be sought from [jcau.office@accscience.sg](mailto:jcau.office@accscience.sg).

**Article copyright © Respective Author(s)**

See articles for copyright year. All articles in this full issue publication are open-access. Permission to reuse copyrighted materials of an article for commercial purposes is applicable if the article is licensed under Creative Commons Attribution-NonCommercial License. Check the specific license before reusing.

***JOURNAL OF CHINESE ARCHITECTURE AND URBANISM***

ISSN: 2717-5626 (online)

**Editorial and Production Credits**

Publisher: AccScience Publishing

Managing Editor: Alyssa Li

Production Editor: Chi Tat Poon

Article Layout and Typeset: Sinjore Technologies (India)

Cover Design: ProPub (China)

For all advertising queries, contact  
[jcau.office@accscience.sg](mailto:jcau.office@accscience.sg).

**Supplementary file**

Supplementary files of articles can be obtained at  
<https://accscience.com/journal/JCAU/7/3>.



**About the Cover**

A typical Chinese-styled building

**Disclaimer**

AccScience Publishing is not liable to the statements, perspectives, and opinions contained in the publications. The appearance of advertisements in the journal shall not be construed as a warranty, endorsement, or approval of the products or services advertised and/or the safety thereof. AccScience Publishing disclaims responsibility for any injury to persons or property resulting from any ideas or products referred to in the publications or advertisements. AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

# Journal of Chinese Architecture and Urbanism

## Editorial Board

### **Editors-in-Chief**

Jie Zhang, China  
Donia Zhang, Canada

### **Executive Editor**

Xianmin Mai, China

### **Associate Editors**

Guanghui Ding, China  
Cui Liu, China  
Gerardo Sempredon, Italy

### **Editorial Board**

#### **Members\***

Miguel Amado, Portugal  
Rachel Armstrong, Belgium  
Ding Wen 'Nic' Bao, Australia  
Umberto Berardi, Canada  
Jianming Cai, China  
Carolyn Cartier, Australia  
A.P.C. Chan, Hong Kong (China)  
Fei Chen, UK  
Sidney Cheung, Hong Kong  
Heng Chye Kiang, Singapore  
Marco D'orazio, Italy  
Anrong Dang, China  
Brian Deal, USA  
Yiping Dong, China  
S. Fung, Hong Kong (China)  
Zhonghua Gou, China  
Kai Gu, New Zealand  
ChengHe Guan, China  
Sunny Han Han, China  
Tim Heath, UK  
Michael Ulrich Hensel, Austria  
Xiao Hu, USA  
Beisi Jia, Hong Kong (China)

Ying Jin, UK  
Jian Kang, UK  
Delin Lai, USA  
Gino Lannace, Italy  
Fabio Lanza, USA  
Eshrar Latif, UK  
Andrew Law, UK  
Steffen Lehmann, USA  
Ute Lehrer, Canada  
Huan Li, China  
Zhigang Li, China  
Hao Li, China  
Mengbi Li, Australia  
Hongtao Liu, China  
Elena Lucchi, Italy  
Pedro Luengo, Spain  
Deyin Luo, China  
Carlos R.M. Duarte, Spain  
Naglaa Ali Megahed, Egypt  
Qing Mei, China  
E.S. Nelson, Hong Kong (China)  
Jianlei Liu, Hong Kong (China)  
Francesco Nocera, Italy  
Masa Noguchi, Australia  
Lei Ping, USA  
Deo Karan Prasad, Australia  
Zhu (Joe) Qian, Canada  
Xuefei Ren, USA  
Zhibin Ren, China  
Peter Rowe, USA  
Marc A. Schnabel, New Zealand  
Marichela Sepe, Italy  
Juan Serra, Spain  
Jessica Sewell, USA  
Ayyoob Sharifi, Japan  
Joseph H. M. Tah, UK  
Jinhua (Selia) Tan, China

Jin Tao, China  
Fernando Vegas, Spain  
David Wang, USA  
Fan Wang, UK  
June Wang, Hong Kong (China)  
Mo Wang, China  
Saige Wang, China  
Georgia Watson, UK  
Wah Sang Wong, China  
Yunqing Xu, China  
Yinong Xu, UK  
Yung Yau, China  
Yu Ye, China  
Jihui Yuan, Japan  
Qi Zhang, China  
Binsheng (Ben) Zhang, UK  
Miaoxi Zhao, China  
Jing Zheng, China  
Guangya Zhu, China  
Sisi Zlatanova, Australia  
Bruno de Meulder, Belgium

### **Youth Editorial Board**

#### **Members\***

Fei Chen, China  
Xinyuan Dang, Belgium  
Donizete Ferreira Beck, Brazil  
Ruoran Wang, China  
Xiaoliang Wang, China  
Yubin Xu, China  
Gaofeng Xu, China  
Qianru Yang, China  
Jiazhen Zhang, Belgium

### **Guest Editor**

Xinyuan Dang, Belgium

\*Editorial Board Members as of August 18, 2025

## CONTENTS

### REVIEW ARTICLES

- 1 **Urban resilience analysis in civil engineering: A systematic review**  
*Leticia Da Silva Souza Lima, Daiane Maria De Genaro Chirolí, Fernanda Cavicchioli Zola*
- 2 **Optimization of natural ventilation in courtyard-style residential buildings: Insights from inner Mongolian design principles**  
*Shangbing Ma, Sharifah Salwa Syed Mahdzar, Nor Izura Tukiman, Pau Chung Leng*

### ORIGINAL ARTICLES

- 3 **Top-down rural heritage revitalization and economic development: A case study of Tangwei village, Dongguan, Guangdong, China**  
*Lok-yin Law, Huiwei Chen, Shuwen Liu, Ming-hin Cheung*
- 4 **Dynamics and discrepancies in rural–urban village regeneration: A case study of a coastal community in Hong Kong SAR, China**  
*Jimmy T. W. Ho, Thomas W. L. Chung*
- 5 **“Creative” uses of heritage in the age of experiential tourism: The case of Tianjin’s former international concessions**  
*María Gravari-Barbas, Sandra Guinand, Yue Lu*
- 6 **Computational urbanism and the spatial evolution of Dashilar, Beijing, China**  
*Feng Xu, Liu Xiao, Pingshan Qu, Weiwei Mao, Yuchen Zhu*
- 7 **“Saving” Lizhuang: Local preservation and resistance in a historical Sichuan town under tourism development**  
*Ya Shu*
- 8 **Khmer shophouses: From Chinese origins to the present day**  
*Carlo Santoro*
- 9 **Numerical investigation of the seismic performance of steel shear plate walls reinforced with cross-shaped and circular stiffeners**  
*Morteza Naghipour, Abbasali Jahani, Seyed Mohammad Reza Hasani*
- 10 **Spatial analysis of urban garden space production in relation to rural land use: A case study of Zanjan City**  
*Manijeh Ahmadi, Zahra Khodakarami, Ahmad Asadi, Mohammad Taghi Heydari, Mohammad Sadeg Azizi*
- 11 **The intersection of culture and play: Evaluating children’s play spaces in Xi’an’s parks using the 7Cs framework**  
*Ke Chen, Chengyun Zhang, Mengyi Li, Ruhizal Roosli*
- 12 **Urban orientalism and informal urbanization in Jinan, Shandong, China**  
*Farooq Muhammad Sabil, Feroze Nazia, Cheng Tongshun, Hao Ruining, Faisal Feroze, Javed Muhammad Danish*

## REVIEW ARTICLE

Urban resilience analysis in civil engineering:  
A systematic reviewLetícia Da Silva Souza Lima<sup>1†</sup>, Daiane Maria De Genaro Chirolí<sup>2\*</sup>, and  
Fernanda Cavicchioli Zola<sup>3†</sup><sup>1</sup>Department of Civil Engineering, Federal Technological University of Paraná, Apucarana, Paraná, Brazil<sup>2</sup>Department of Textile Engineering, Federal Technological University of Paraná, Apucarana, Paraná, Brazil<sup>3</sup>Department of Humanities, Federal Technological University of Paraná, Apucarana, Paraná, Brazil(This article belongs to the *Special Issue: Urban China 2030. Past Trajectories, Current Trends, and Future Challenges*)

## Abstract

Urban resilience is fundamental for cities to adapt and recover from challenges such as climate change, natural disasters, and rapid urbanization. This study conducts a systematic review to examine the intersection between urban resilience and civil engineering, applying the PRISMA methodology to analyze recent contributions to the field. The research focuses on studies published between 2014 and 2024, targeting four key areas of civil engineering: water resources, underground structures, transportation, and electricity systems. To assess urban infrastructure strategies and identify gaps in the literature, the study employs ISO 37,123 resilience indicators. The results reveal that while 31.2% of the analyzed studies address resilient infrastructure, significant gaps persist in specific fields, particularly underground constructions and electricity systems. These areas are critical for urban functionality during disasters but remain underexplored in the existing body of research. The findings underscore the need for multidisciplinary approaches and investments in innovative technologies to address these deficiencies. Furthermore, the integration of nature-based solutions, such as green infrastructure, emerges as an essential strategy for enhancing urban resilience. This review also identifies geographical disparities in research representation, with regions such as South America and Africa being underrepresented. In contrast, China stands out for advancements in renewable energy and sustainable urban planning, despite facing significant environmental challenges. The study emphasizes the importance of aligning resilience strategies with the United Nations Sustainable Development Goals (SDGs), particularly SDG 11 (sustainable cities and communities) and SDG 13 (climate action). By providing actionable insights for urban planners, policymakers, and civil engineers, this study contributes to the advancement of resilient and sustainable infrastructure. It advocates for the adoption of ISO 37123 as a framework for evaluating and improving urban resilience, fostering inclusive and efficient strategies to address the complex challenges of urbanization.

**Keywords:** Urban resilience; Smart cities; Sustainability; Urban planning; ISO 37123

†These authors contributed equally to this work.

**\*Corresponding author:**Daiane Maria De Genaro Chirolí  
(daianechirolí@utfpr.edu.br)

**Citation:** Lima, L. S. S., Chirolí, D. M. G., & Zola, F. C. (2025). Urban resilience analysis in civil engineering: A systematic review. *Journal of Chinese Architecture and Urbanism*, 7(3): 8088.  
<https://doi.org/10.36922/jcau.8088>

**Received:** December 20, 2024**1st revised:** January 22, 2025**2nd revised:** February 13, 2025**Accepted:** February 24, 2025**Published online:** March 13, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

Civil engineering in the 21<sup>st</sup> century seeks to mitigate its negative environmental and social impacts, including habitat destruction, soil degradation, water and air pollution, and contributions to climate change. The global community faces an array of challenges, from climate change and economic crises to pandemics. In this dynamic and complex context, urban resilience stands out as an essential concept for ensuring sustainability and quality of life in cities. Therefore, strengthening urban resilience has become a priority for planners, administrators, and communities around the world (Sharifi *et al.*, 2024). Achieving resilience in urban areas requires a comprehensive, interdisciplinary approach, integrating physical, social, economic, and environmental dimensions (De Genaro Chiroli *et al.*, 2023; Qiu *et al.*, 2022). In addition, active community participation is fundamental to creating resilient solutions that meet local needs and priorities. Building resilient cities is not only a necessity for survival but also an opportunity to foster innovation, social inclusion, and sustainable development (Datola *et al.*, 2021).

Brazil has made significant strides in resilient urban planning, with notable contributions from urban planners such as Jaime Lerner, who designed Vivapark, a fully sustainable neighborhood in Santa Catarina. This development features a comprehensive infrastructure, integrating recreation, commerce, education, and essential services while actively promoting biodiversity within the urban environment (De Mello *et al.*, 2022). As pressures on urban areas intensify due to population growth and rapid urbanization, the urgency of implementing resilient strategies becomes even more apparent. Addressing this challenge requires research-driven solutions and creative professionals who leverage the area's natural conditions, minimize energy consumption, enhance environmental quality both indoors and outdoors, utilize eco-efficient materials, incorporate technological innovations where feasible, and promote environmental education for all (Fiais & de Souza, 2017; Keeler & Vaidya, 2018).

Urban resilience is intrinsically linked to broader sustainable urban development goals. Frameworks such as the United Nations Sustainable Development Goals (SDGs) emphasize the importance of creating inclusive, safe, resilient, and sustainable cities (SDG 11) while addressing interconnected priorities such as climate action (SDG 13), clean water and sanitation (SDG 6), and affordable and clean energy (SDG 7). To monitor and guide these efforts, international standards such as ISO 37123 provide valuable resilience indicators that measure cities' capacity to adapt and recover from urban challenges. These indicators enable cities to assess their performance in areas

such as disaster risk reduction, emergency preparedness, and infrastructure robustness, ensuring that resilience strategies align with sustainability principles. For instance, cities leveraging ISO 37123 data can develop integrated approaches to traffic management, disaster response, and energy efficiency, directly supporting the achievement of SDG 11 by reducing congestion, lowering emissions, and mitigating vulnerabilities to climate-related risks.

Although the existing literature includes several studies related to this research topic, no systematic review has been identified that specifically examines the intersection between civil engineering and resilient cities.

In this sense, this research contributes to the field by addressing resilient urban infrastructure on a global scale. To structure the analysis, multiple criteria were defined:

- (i) Urban resilience planning, encompassing four key aspects related to city infrastructure: urban planning, energy efficiency and sustainability, emergency planning, and technology and innovation
- (ii) Civil engineering, categorized into four specific sectors: water resources, underground constructions, transportation, and electricity systems
- (iii) Sustainability perspectives, which examine: green infrastructure and nature-based solutions (NBS).

Considering these multiple criteria, this research aims to address the following questions:

- (i) To what extent can the implementation of resilient infrastructure mitigate the impact of natural disasters in urban areas?
- (ii) What are the main strategies to promote sustainability and energy efficiency in urban development projects?
- (iii) Are there notable examples of cities that have successfully incorporated urban resilience approaches?
- (iv) How are cities integrating technological solutions to strengthen the safety and effectiveness of urban systems?
- (v) How should cities adapt to environmental and climate challenges while taking into account economic and political implications?

By integrating the resilience metrics provided by ISO 37123 with innovative engineering solutions, this research seeks to bridge the gap between theoretical frameworks and practical applications. It highlights how cities can leverage these standards to evaluate progress, address existing gaps in critical infrastructure, and develop strategies that ensure long-term sustainability and resilience.

## 2. Systematic review methodology

A systematic review is a research method that examines, organizes, and structures existing studies. It systematically and meticulously analyzes all available evidence on a

specific research question. In this research, a systematic review of articles on resilient cities was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 framework. To establish a robust foundation for analysis, the evaluation of selected articles was guided by De Genaro Chirolì *et al.* (2023). This study leverages the ISO 37123 technical standard and the sustainability tripod as a framework to explore resilience in urban governance and disaster recovery strategies. It uses specific criteria to select and assess studies with notable impacts (Figure 1). The systematic review process was structured into three phases: identification, screening, and inclusion (De Genaro Chirolì *et al.*, 2023).

In the first stage, Scopus and Web of Science were selected as the primary databases for the research. Articles were retrieved using the following search syntax: “urban resilience” OR “resilient cities” OR “sustainable buildings” AND “innovation.” Both databases were searched using this combination of keywords. Once identified, the search results were processed using the Mendeley Reference Manager software (Elsevier, Netherlands) to consolidate records and remove duplicates, as well as documents that did not meet the search criteria. At this stage, 133 duplicate documents were excluded from the analysis, along with 27 documents that

lacked identifiable authors. To ensure the inclusion of recent research, only papers published between 2014 and 2024 were considered. In addition, only English-language documents in journal article format were included in the final dataset. Following this screening process, 485 records were excluded, leaving 1,859 articles for further review. Abstracts were then examined to assess the relevance and contextual fit of each article, marking the beginning of the selection phase.

During the systematic reading stage, articles were evaluated based on their relevance and citation count, considering their year of publication. Of the 1,859 articles, a total of 292 were deemed eligible for full-text analysis. This selection was conducted by integrating bibliometric analysis (quantitative) to assess citation impact and content analysis (qualitative) to evaluate thematic relevance. Ultimately, 48 articles were cited in this work.

Figure 2 summarizes the methodological approach, including the research questions addressed, the databases used, and the criteria applied for article selection.

### 3. Findings and discussion

To address the five research questions presented in Section 1, the 292 reviewed papers were categorized into five major areas of urban resilience: resilient infrastructure

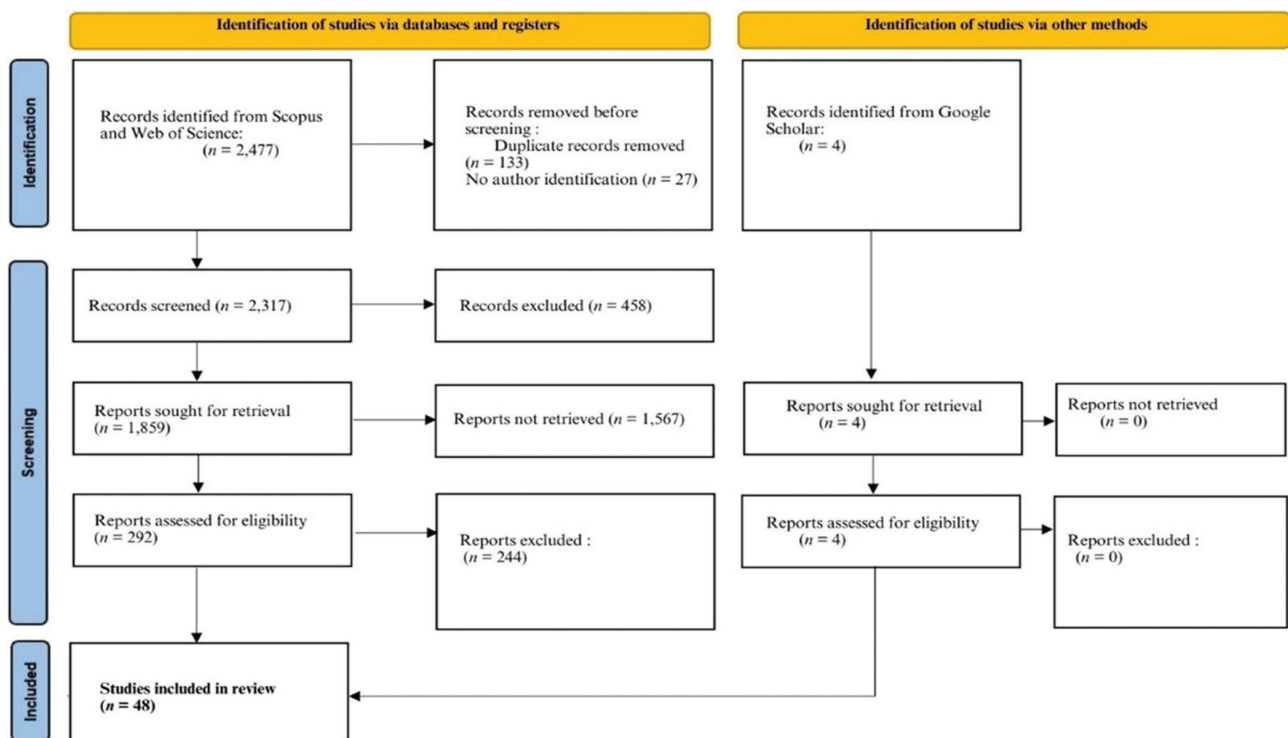


Figure 1. PRISMA flow diagram  
Source: Diagram by the authors.

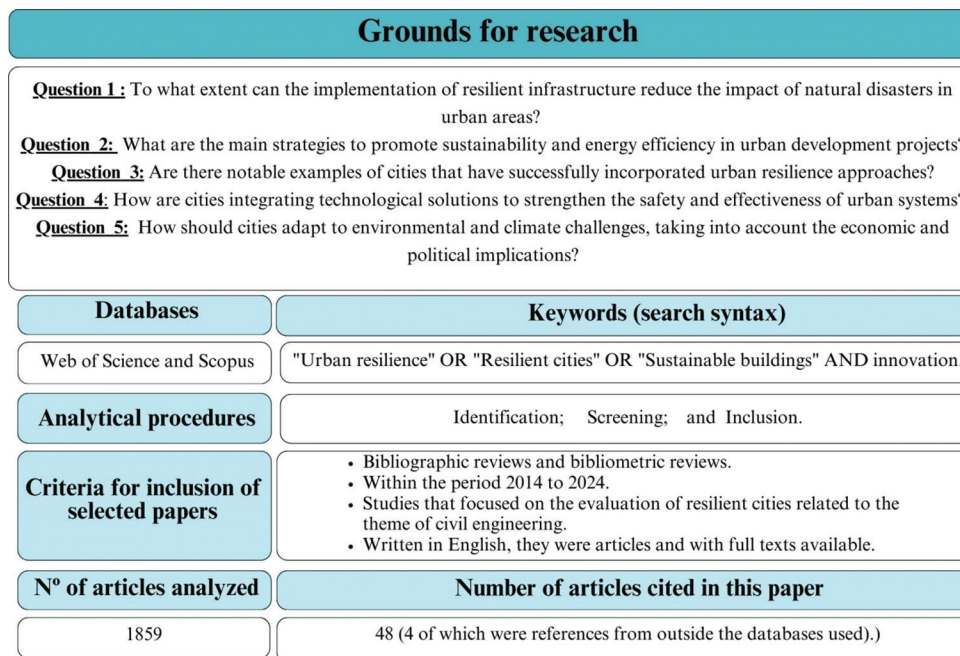


Figure 2. Detailed methodology  
Source: Diagram by the authors.

(31.2%), sustainability and energy efficiency (21.2%), urban planning (24%), technology and innovation (13.4%), and emergency planning (10.3%). Of the 292 articles, resilient infrastructure emerged as the most frequently covered topic, accounting for 31.2% of the total articles (Figure 3). Within this context, a more detailed analysis was conducted focusing on specific civil engineering topics, which were distributed as follows: water resources (44.4%), underground structures (16.7%), transportation (33.3%), and electricity systems (5.6%) (Figure 4).

Incorporating the ISO 37123 framework into this analysis adds an important dimension to understanding urban resilience. The standard provides a structured approach for assessing cities' capacity to adapt and recover, particularly in key areas such as infrastructure robustness, emergency preparedness, and resource efficiency. The findings reveal that while resilient infrastructure dominates the research landscape, significant gaps remain in addressing critical systems, particularly underground structures and electricity systems. These disparities align with previous observations of De Genaro Chiroli *et al.* (2023), who emphasized the need for greater investments in disaster prevention and recovery strategies, particularly in underrepresented areas.

### 3.1. Resilient infrastructure in the context of overall planning

The mind map presented in Figure 5 summarizes key challenges and the corresponding measures proposed to

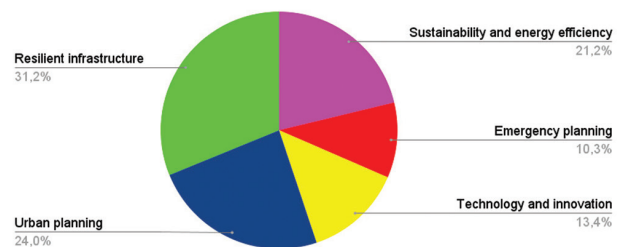


Figure 3. Classification of articles in the areas of urban resilience  
Source: Chart by the authors.

address them. The environmental and climate challenges currently facing the world require adjustments to urban infrastructure, which will have economic and political repercussions globally. One of the most pressing issues associated with urban population growth is the proliferation of slums in developing countries. Proposed solutions include housing policies and investments in sustainable urban development. Among the region's most frequently analyzed in the reviewed studies, China and its provinces emerged as focal points for case studies (Chen *et al.*, 2020; Sun *et al.*, 2023; Xiang *et al.*, 2019; Zhang *et al.*, 2021; Zhao *et al.* 2022). In densely populated areas such as China, India, and São Paulo, Brazil, vertical urban expansion has become an essential strategy for urban growth (Da Silva *et al.*, 2020). Engineers worldwide are developing sustainable building methods to accommodate rapid urbanization while minimizing environmental impacts.

In the category of energy efficiency and sustainability, various strategies are being explored to integrate these principles into urban projects. The ISO 37123 standard underscores the importance of integrating resilience indicators into urban planning strategies. For instance, the standard highlights metrics such as the percentage of critical infrastructure with resilience plans and the proportion of the population covered by emergency preparedness programs. These metrics can guide cities in prioritizing interventions to mitigate vulnerabilities, as demonstrated in studies addressing slum rehabilitation and vertical urban growth in high-density areas (Ossola *et al.*, 2021). The research aligns with the sustainability tripod, emphasizing social and environmental benefits while addressing economic constraints (Ossola *et al.*, 2021).

Several studies explore the impacts of rising CO<sub>2</sub> levels and the potential of zero-carbon buildings to

minimize ecological footprints (Adamson & Medeiros, 2023; Almusaed *et al.*, 2023; Leoncini *et al.*, 2016; Lu *et al.*, 2020). These structures represent an effective approach for developers to enhance energy efficiency while attracting investment. Technologies such as solar panels are becoming more widespread, offering long-term benefits despite high initial costs (Elgendawy *et al.*, 2020). Almusaed *et al.* (2023) discuss the application of BIO-GREEN panels, made from organic materials such as coconut fiber and pine wood. These panels optimize energy use, enhance thermal comfort, and reduce CO<sub>2</sub> emissions, supporting more efficient and sustainable building practices.

The work by Borie *et al.* (2019), categorized under emergency planning, maps the cities of Nairobi and Cape Town, highlighting the importance of considering multiple interpretations of urban challenges when developing resilience strategies. While the study identified flood hotspots and safety risks to the population from a technical perspective (technical view), it also emphasized the need to engage with local communities to explain potential resilience-building measures (social view). In general, resilience maps focused on natural disasters have overlooked societal perspectives; however, the study demonstrated that a participatory approach and the recognition of diverse perspectives can yield positive indicators and outcomes. Although the COVID-19 pandemic is a relatively recent event, numerous studies

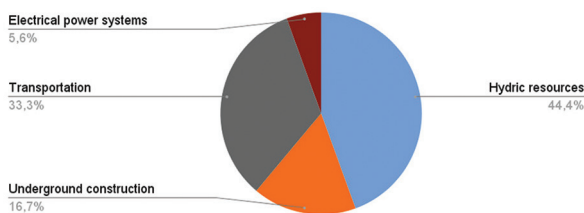


Figure 4. Classification of articles in the areas of civil engineering  
Source: Chart by the authors.

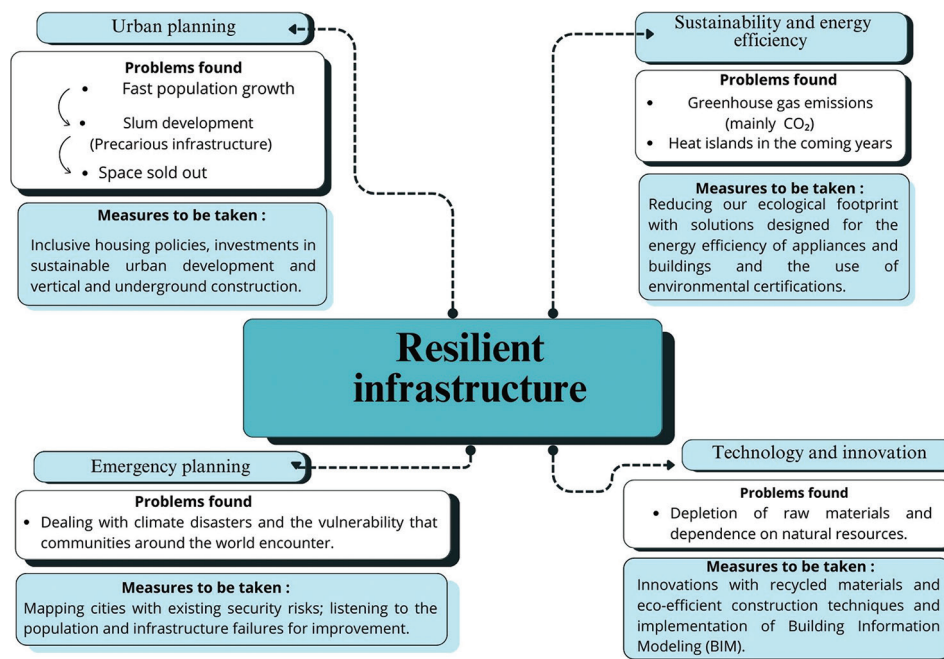


Figure 5. Mind map of issues and proposed solutions  
Source: Mind map by the authors.

have already examined its implications for urban resilience, including those by Majewska *et al.* (2022), Qiu *et al.* (2022), and Zhang and Wang (2023).

A central question in the final categories is: How are cities integrating technological solutions to strengthen the safety and effectiveness of urban systems? This category focuses on the efficient planning of resilient infrastructure. Innovations aimed at mitigating the impact of raw material depletion and promoting sustainability in the construction industry include the adoption of circular economy practices, material reuse, and advances in modular construction and 3D printing. Zhao *et al.* (2017) and Elnour *et al.* (2022) comment on emerging technologies and innovations in the field. The use of sustainable technologies not only reduces environmental impact but also strengthens the resilience of urban communities. Building information modeling (BIM) provides an integrated approach across all phases of a building's life cycle, facilitating energy performance analysis, material selection, and waste management. Moreover, BIM enhances collaboration between project phases, reducing errors and resulting in more efficient and integrated projects. Its 3D visualization capabilities improve project understanding and communication among stakeholders, fostering innovative and sustainable solutions throughout the building lifecycle (Araszkiewicz, 2016). The Nordic region exemplifies the effectiveness of BIM, with projects receiving LEED (Leadership in Energy and Environmental Design) certification, showing how developed countries are investing in technology to improve community well-being and promote sustainable construction practices. These initiatives suggest that other countries should follow suit, starting with the development of sustainable neighborhoods and improved urban planning strategies.

### 3.2. Resilient infrastructure in civil engineering

In the context of civil engineering, a central question arises: To what extent can the implementation of resilient infrastructure mitigate the impact of natural disasters in urban areas? To address this, the present study identifies the civil engineering sectors with the most significant challenges and impacts on cities: water resources, underground structures, transportation, and electricity, as illustrated in Table 1.

By leveraging the ISO 37123 indicators, this study categorizes these civil engineering areas based on their contributions to urban resilience. For instance, the standard emphasizes the need for resilient water management systems to mitigate risks such as floods and droughts. However, findings highlight significant research gaps in underground structures and electricity systems. As De Genaro Chiroli *et al.* (2023) highlight, these areas require greater attention

due to their critical role in maintaining urban functionality during disasters. For example, underground structures can provide shelter and drainage solutions, while robust electricity systems are essential for communication and emergency response. The lack of comprehensive studies addressing these areas underscores the need for future research to explore innovative engineering solutions aligned with ISO 37123 guidelines.

The categorization in Table 1 aligns with the ISO 37123 framework, which provides specific indicators for assessing the resilience of critical infrastructure. These indicators emphasize the importance of monitoring water quality and ensuring a reliable energy supply during adverse events. By following these guidelines, cities can prioritize investments and develop integrated strategies to enhance urban resilience. For example, urban transportation is a major contributor to greenhouse gas emissions, exacerbating climate change. One approach to mitigating these impacts is investing in alternative mobility solutions, which include enhancing public transportation, promoting ridesharing habits, redesigning urban spaces, and adopting renewable fuels. These strategies not only mitigate environmental impacts but also contribute to the development of sustainable and resilient urban spaces.

#### 3.2.1. Hydric resources

Water, an essential element for human life, is a central theme in the literature and the most frequently encountered theme. Research on climate-related disasters and urban resilience often examines hydrological phenomena such as floods, droughts, storms, and tsunamis – natural events that significantly impact communities around the world, affecting not only the physical environment but also public safety, economic stability, and quality of life. Several studies, including those by Balsells *et al.* (2015), Fastiggi *et al.* (2021), Lee *et al.* (2021), McGrail *et al.* (2015), Sharma *et al.* (2023), Touili (2021), and Zahoor *et al.* (2023), explore hydrological events such as flooding and inundation. These studies highlight the importance of preserving natural drainage systems and addressing the impact of urbanization on water quality. Given the increasing frequency and severity of extreme weather events due to climate instability and global warming, proactive adaptation and mitigation strategies are crucial. This issue is closely linked to energy efficiency and sustainability, which are integral to broader urban planning initiatives.

Urban infrastructure must be resilient to the scarcity of water, food, and energy, which can be exacerbated by extreme weather events. Mariano and Marino (2022) review projects that implement strategies to mitigate and adapt to heavy rainfall, river flooding, and rising sea levels. Coastal communities, in particular, face significant

**Table 1. Environmental impacts and sustainable solutions for resilient infrastructure**

| Area of resilient infrastructure | Environmental impacts   | Sustainable solutions   |
|----------------------------------|---|---|
| Hydric resources                 | Floods, droughts, storms, rising sea levels, tornadoes.   | Preservation of natural drainage systems, development of drinking water quality monitoring systems.                 |
| Underground construction         | Soil displacement, geotechnical risks.  | Optimization of underground space utilization, improved climate-resilient structural security.                      |
| Transportation                   | Greenhouse gas emissions.   | Development of suspended infrastructure for cyclists and pedestrians, investment in alternative mobility solutions. |
| Electrical power systems         | Power grid failures during extreme weather events (e.g., heavy storms), causing accidents and environmental damage. | Underground wiring, satellite-based monitoring for grid security.   |

environmental challenges due to sea level rise, requiring protective measures to safeguard local infrastructure. Defensive strategies include the construction of artificial hills to elevate buildings and the creation of suspended infrastructure for cyclists and pedestrians. These solutions aim to mitigate the effects of coastal flooding while ensuring the safety and functionality of affected areas.

The ISO 37123 standard provides specific indicators for monitoring the resilience of water systems, such as the percentage of urban areas protected from floods and the availability of emergency water supply systems. Incorporating these metrics into urban planning can guide cities in implementing adaptive measures to enhance water management, especially in areas vulnerable to extreme hydrological events. For instance, maintaining natural drainage systems aligns with the standard's emphasis on sustainability and disaster preparedness. This highlights the critical role of resilient hydric resources in supporting broader urban resilience goals.

### 3.2.2. Underground construction

Resilient infrastructure includes underground construction, yet this area remains underexplored in academic literature. Subway systems, for instance, are often discussed in the context of space constraints on the ground surface, but their significance extends beyond this limitation. Liu *et al.* (2021) highlight seismic events in which underground tunnels remained unaffected, demonstrating their structural resilience. Historically, such spaces have also served as shelters during crises. In addition, the study examines underground drainage systems, including the Parisian sewer network, which play a crucial role in urban resilience. However, while the natural protection offered by underground construction enhances safety and isolation, these structures are often prohibitively expensive to build. As a result, they receive less attention in research, and global investment remains limited beyond key areas such as transportation and drainage (Nelson, 2016).

According to ISO 37123, indicators related to the resilience of underground structures focus on their ability to withstand seismic events and provide secure spaces during emergencies. These metrics are critical for evaluating the structural integrity and functionality of underground infrastructure under stress conditions. As noted in the present study, the limited research on this topic underscores the importance of advancing innovative designs and construction techniques that align with international resilience standards.

### 3.2.3. Transportation

Transportation, as a component of resilient infrastructure, remains an underexplored topic in this research, with only a few relevant articles identified. Wang *et al.* (2020) examine the effects of climate change on road networks in a case study; however, their research does not address urban resilience in other modes of transportation. Similarly, studies by Wu *et al.* (2022), Fonseca *et al.* (2017), Ge and Zhang (2022), Comert *et al.* (2018), and Lee *et al.* (2022) also fail to cover this broader aspect. Among the selected studies, none specifically focus on alternative mobility, a transportation approach that aligns closely with urban resilience. Sustainable transportation solutions not only provide environmentally friendly alternatives and alleviate congestion in large cities but also contribute to improved air quality, reduced greenhouse gas emissions, and the development of more connected and accessible communities. Ultimately, these measures enhance the overall quality of life.

ISO 37123 includes key indicators for resilient transportation systems, such as the percentage of urban areas served by sustainable public transport and the resilience of critical transport infrastructure during extreme weather events. These indicators highlight the necessity of integrating alternative mobility solutions, such as cycling infrastructure and electric public transport, into urban resilience strategies. Addressing these gaps in the

literature is essential for fostering sustainable and resilient cities.

### 3.2.4. Electrical power systems

This systematic review found no materials discussing the importance of grounding electrical wires in countries such as Brazil to prevent disasters caused by severe storms in recent years. However, Sá (2017) specifically addresses this issue in their dissertation, which was included in the database for analysis. The study emphasizes the relevance of energy security and the vulnerability of critical infrastructure, much of which was designed decades ago without accounting for future changes that could disrupt electricity transmission and distribution networks. Europe, the United States, Brazil, and Russia have experienced recurring blackouts and power system failures over the past decade. The consequences of such vulnerabilities extend beyond environmental damage, leading to significant political and economic disruptions. In an era where global communication and technological systems are heavily dependent on a reliable power supply, government investment in preventive measures and energy security is necessary. Network security solutions are presented as key investment areas to enhance grid stability and resilience.

Electrical power systems are critical components of urban resilience, as highlighted by ISO 37123. Indicators such as grid reliability during adverse events and the integration of renewable energy sources are central to ensuring energy security. These findings align with the present study's conclusions, which emphasize the urgent need to modernize infrastructure to withstand climate-related challenges. The identified gaps in research on grounding systems and energy grid resilience underscore the urgency for targeted investments and further studies in this area.

### 3.3. Situation in China, the world's most populous country

China is the world's leading country in industrial production and a global hub for technological innovation. It is also the largest producer of solar energy, positioning itself at the forefront of the renewable energy transition due to its extensive solar panel production. In addition, China ranks first in global exports, maintaining a dominant position in international trade. ISO 37123 highlights the integration of renewable energy as a key indicator for resilient cities. China's leadership in solar energy production and its advancements in electric vehicle technology establish it as a global reference for aligning renewable energy adoption with resilience strategies. These efforts align with the standard's focus on reducing emissions and fostering sustainable urban development.

Studies by Cui *et al.* (2019), Ge and Zhang (2022), Wang *et al.* (2020), and Zhao *et al.* (2022) examine the environmental challenges faced by China's cities, including air pollution – primarily from transportation – global warming, sandstorms, and increasing noise pollution from construction sites and vehicular traffic. The combination of high gas emissions, disorderly urbanization, and inadequate infrastructure aggravates traffic congestion and environmental degradation. Wang *et al.* (2020) analyze and measure the resilience of different types of transport networks, including rail and air systems, based on network diversity characteristics. Indicators from ISO 37123 related to transportation resilience can help assess and improve the diversity and efficiency of these systems. For instance, metrics on public transport accessibility and emission reductions can guide the development of more sustainable and resilient transport networks in China's urban centers.

A major challenge is the lack of synchronization between governance and environmental management, which hinders the implementation of effective and resilient urban solutions. The literature proposes the development of more detailed and rigorous urban planning strategies, incorporating analytical frameworks such as Strengths, Weaknesses, Opportunities, and Threats (SWOT) to align economic and environmental objectives. This approach is already becoming evident through China's increasing investment in electric vehicles and low-emission transportation solutions (Ge & Zhang, 2022). ISO 37123 emphasizes the role of governance in fostering resilience through integrated urban planning and cross-sectoral collaboration. This aligns with the SWOT-based approach proposed in the literature, which seeks to harmonize economic and environmental goals to achieve sustainable urban resilience.

The study by Cui *et al.* (2019) examines urban metabolism with a focus on material flows and presents a methodological framework for understanding resource use, stocks, and emissions in urban systems. Using Guangzhou, China, as a case study, they identify a pattern of intensive resource consumption, especially of non-renewable materials such as fossil fuels and non-metallic minerals. Industrial and construction activities are highlighted as the primary drivers of excessive energy consumption, solid waste generation, and CO<sub>2</sub> emissions, while agriculture and daily activities exhibit an increasing dependence on external resources. This dependency heightens the city's vulnerability and poses challenges to its resilience and long-term sustainability. Cui *et al.* propose solutions to enhance urban metabolism sustainability, including the implementation of green technologies such as renewable energy systems and more efficient construction techniques.

It also recommends implementing integrated policies that prioritize material efficiency, regulate emissions, and reduce dependence on imported resources. By adopting ISO 37123 indicators related to resource efficiency and emission control, cities such as Guangzhou can better evaluate their urban metabolism and implement policies that mitigate vulnerabilities while fostering sustainable growth.

According to Zhao *et al.* (2022), urban resilience in China has been gradually improving; however, significant regional disparities remain, with cities in eastern China demonstrating greater resilience compared to those in central and western regions. These results offer insights for policymakers seeking to enhance urban resilience, optimize resource allocation, and promote balanced urban development.

China's advancements in urban resilience can also be assessed through the framework of ISO 37123, particularly regarding its adoption of renewable energy and sustainable transportation technologies. The disparities among regions in China, as identified in the current study, highlight the importance of standardized indicators for evaluating and improving resilience across diverse urban contexts. For example, cities in eastern China demonstrate a higher alignment with resilience metrics, serving as valuable case studies for global application.

### 3.4. Green infrastructure: Nature-related solutions for urban resilience

NBSs play an important role in mitigating the damage caused by climate change and reducing hydrological risks, high temperatures, and human discomfort. The study by Beyer and Anderson (2020), which was included outside the database search, highlights how water utilities can invest in green infrastructure, such as rain gardens, stream restoration, and green streets, instead of relying solely on conventional infrastructure. These solutions not only address rainwater collection and retention needs but also provide benefits to other municipal departments, such as health, transportation, and education. Collaboration between departments, from identifying needs to implementing solutions, can result in projects that simultaneously address stormwater management, recreation, education, urban heat reduction, biodiversity enhancement, mobility improvement, and housing expansion. This is achieved by revitalizing rivers and green spaces, such as parks, that require ecosystem restoration and integrating solutions that work in conjunction with nature. Hardy *et al.* (2022) introduce a set of tools and processes known as the connectivity benefits framework (CBF), which helps professionals identify the ecological and social

values associated with improving ecosystem functions. This framework also offers models for evaluating and classifying management actions that promote connectivity. Unlike other models that primarily focus on the biophysical aspects of ecosystems, the CBF stands out for its ability to identify direct benefits to people through functional and connected ecosystems. To implement this tool effectively, specific goals and actions are planned, and functions and resources are clearly delineated. The framework was tested in the expansion of the Portland Metro rail system, aiming to reduce passenger vehicle traffic, alleviate congestion, lower air pollution, and support carbon reduction targets, among other objectives.

The ISO 37123 framework provides a structured approach to assessing urban resilience through indicators that incorporate NBS. For example, metrics related to stormwater management, urban heat mitigation, and biodiversity enhancement align closely with the benefits provided by green infrastructure projects. These indicators help quantify the effectiveness of solutions such as rain gardens and green streets, ensuring their implementation contributes to both environmental and social resilience.

Several benefits were identified, such as the accessibility of green spaces within walking distance of neighborhoods, which enhances public health. In addition, the creation of green jobs can support local economies and promote economically resilient communities. The construction of cycling and walking trails surrounded by diverse vegetation offers recreational opportunities and improves urban aesthetics. These paths also help reduce surface runoff. However, the risks associated with planning and implementing the CBF tool were analyzed, such as potential damage to systems caused by tree roots and the ongoing costs of tree maintenance. By incorporating ISO 37123 metrics, urban planners can better evaluate the long-term performance of these projects, ensuring that risks – such as maintenance challenges and potential ecosystem disruptions – are effectively managed. For instance, the framework highlights the importance of monitoring ecological connectivity and social engagement, both of which are key to maximizing the benefits of green infrastructure. These insights reinforce the role of NBS in fostering sustainable and resilient cities. Given the identified risks, strategic solutions and adaptive responses were explored, demonstrating that the CBF is an effective tool for urban planning.

## 4. Conclusion

The primary aim of this study was to explore urban resilience and its link to various areas of civil engineering, such as electricity infrastructure. The analysis examined

how cities can adapt and strengthen their infrastructures to address environmental, climatic, and social challenges. By addressing key questions, various strategies, and innovations were identified that can be implemented to promote urban resilience in different contexts.

In the field of electricity infrastructure, the present study highlighted the importance of investing in security and modernization to address growing climate challenges and ensure the continuity of energy supply. The integration of ISO 37123 indicators into this analysis provided a structured approach for evaluating the resilience of critical infrastructure, emphasizing the role of renewable energy sources and advanced technologies in strengthening urban electricity grids. These metrics offer actionable insights for improving grid reliability and minimizing vulnerabilities to extreme events.

With regard to water resources, transportation, and underground construction, a dearth of specific research was identified, highlighting areas that require greater attention and study. However, these aspects are integral to urban resilience, as they play key roles in the sustainability and responsiveness of cities to natural disasters and extreme events. The application of ISO 37123 metrics in these areas underscores the need for comprehensive evaluations and targeted investments to address existing gaps, particularly in regions with limited resources.

In addition, NBS were explored as a means to strengthen urban resilience by fostering healthy, connected ecosystems that offer a range of environmental and social benefits. The study highlighted that aligning NBS initiatives with ISO 37123 indicators enables cities to measure and enhance the effectiveness of these solutions, ensuring their scalability and long-term impact.

The present study also emphasized the relevance of public policies that encourage collaboration across different sectors and levels of government to facilitate the effective implementation of these strategies. Standardized frameworks such as ISO 37123 can support this collaboration by providing clear benchmarks and fostering data-driven decision-making. Ultimately, this study underlined the complexity of urban resilience and the need for holistic approaches that consider a broad spectrum of factors, from physical infrastructure to social and environmental aspects. By leveraging the comprehensive framework of ISO 37123, cities can systematically address these factors, ensuring that resilience-building efforts are both effective and inclusive. To meet the challenges posed by climate change and urban growth, it is essential to adopt a proactive and collaborative mindset, working together to build more resilient and sustainable cities for the future.

In addition, education and public awareness of urban resilience are key to ensuring that communities are prepared and can adapt to emerging challenges. This study highlights the importance of fostering a culture of resilience through knowledge dissemination and stakeholder engagement, aligning with the broader objectives of global sustainability frameworks, such as the United Nations SDGs.

## Acknowledgments

None.

## Funding

None.

## Conflict of interest

The authors declare that they have no competing interests.

## Author contributions

*Conceptualization:* All authors

*Formal analysis:* All authors

*Methodology:* All authors

*Writing – original draft:* All authors

*Writing – review & editing:* All authors

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

The articles retrieved from the literature search are accessible through the Scopus and Web of Science databases.

## Further disclosure

Part of the results was presented at the 5<sup>th</sup> Luso-Brazilian Congress on Sustainable Building Materials (CLBMCS 2024), held in Lisboa, Portugal, on November 6-8<sup>th</sup>.

## References

- Adamson, S., & Medeiros, A. S. (2023). The greenlight for government buildings: Strategies for a low-carbon building portfolio. *FACETS*, 8:1-10.  
<https://doi.org/10.1139/facets-2022-0193>
- Almusaed, A., Almssad, A., Alasadi, A., Yitmen, I., & Al-Samaraee, S. (2023). Assessing the role and efficiency of thermal insulation by the “bio-green panel” in enhancing sustainability in a built environment. *Sustainability*, 15(13):10418.

- <https://doi.org/10.3390/su151310418>
- Araszkiwicz, K. (2016). Green BIM concept-Scandinavian inspirations. *Archives of Civil Engineering*, 62(1):1-15.
- <https://doi.org/10.1515/ace-2015-0054>
- Balsells, M., Barroca, B., Becue, V., & Serre, D. (2015). Making urban flood resilience more operational: Current practice. *Proceedings of the Institution of Civil Engineers-Water Management*, 168(1):57-65.
- <https://doi.org/10.1680/wama.14.00051>
- Beyer, L., & Anderson, J. (2020). *Planejamento Integrado de Soluções Baseadas na Natureza é Essencial para Resiliência Urbana*. Brazil: WRI Brasil.
- Borie, M., Ziervogel, G., Taylor, F. E., Millington, J. D., Sitas, R., & Pelling, M. (2019). Mapping (for) resilience across city scales: An opportunity to open-up conversations for more inclusive resilience policy? *Environmental Science Policy*, 99:1-9.
- <https://doi.org/10.1016/j.envsci.2019.05.014>
- Chen, C., Xu, L., Zhao, D., Xu, T., & Lei, P. (2020). A new model for describing the urban resilience considering adaptability, resistance and recovery. *Safety Science*, 128:104756.
- <https://doi.org/10.1016/j.ssci.2020.104756>
- Comert, G., Pollard, J., Nicol, D. M., Palani, K., & Vignesh, B. (2018). Modeling cyberattacks at intelligent traffic signals. *Transportation Research Record*, 2672(1):76-89.
- <https://doi.org/10.1177/0361198118784378>
- Cui, X., Wang, X., & Feng, Y. (2019). Examining urban metabolism: A material flow perspective on cities and their sustainability. *Journal of Cleaner Production*, 214:767-781.
- <https://doi.org/10.1016/j.jclepro.2019.01.021>
- Da Silva, C. A., dos Santos, E. A., Maier, S. M., & da Rosa, F. S. (2020). Urban resilience and sustainable development policies: An analysis of smart cities in the state of São Paulo. *Revista de Gestão*, 27(1):61-78.
- <https://doi.org/10.1108/REG-12-2018-0117>
- Datola, G., Bottero, M., & de Angelis, E. (2021). Enhancing urban resilience capacities: An analytic network process-based application. *Environmental and Climate Technologies*, 25(1):1270-1283.
- <https://doi.org/10.2478/rtuct-2021-0096>
- De Genaro Chiroli, D. M., Menezes, M. G., Zola, F. C., Aragão, F. V., de Almeida, R. D., & Tebcherani, S. M. (2023). Integrating resilience and sustainability: A systematic analysis of resilient cities using ISO 37123. *International Journal of Disaster Risk Reduction*, 96:103960.
- <https://doi.org/10.1016/j.ijdr.2023.103960>
- De Mello, F. L. B. (2022). *Regulação e Planejamento Urbano-ambiental em Processos de Suburbanização: O Caso do Projeto CSul Lagoa dos Ingleses*. RMBH.
- Elgendawy, A., Davies, P., & Chang, H. C. (2020). Planning for cooler cities: A plan quality evaluation for urban heat island consideration. *Journal of Environmental Policy and Planning*, 22(4):531-553.
- <https://doi.org/10.1080/1523908X.2020.1781605>
- Elnour, M., Fadli, F., Himeur, Y., Petri, I., Rezgui, Y., Meskin, N., et al. (2022). Performance and energy optimization of building automation and management systems: Towards smart sustainable carbon-neutral sports facilities. *Renewable and Sustainable Energy Reviews*, 162:112401.
- <https://doi.org/10.1016/j.rser.2022.112401>
- Fastiggi, M., Meerow, S., & Miller, T. R. (2021). Governing urban resilience: Organisational structures and coordination strategies in 20 North american city governments. *Urban Studies*, 58(6):1262-1285.
- <https://doi.org/10.1177/0042098020907277>
- Fiais, B. B., & de Souza, D. S. (2017). Sustainable construction with ecological bricks (Construção sustentável com tijolo ecológico). *Journal Engineering in Action UniToledo (Revista Engenharia em Ação UniToledo)*, 2(1):94-108.
- Fonseca, J. A., Estévez-Mauriz, L., Forgaci, C., & Björling, N. (2017). Spatial heterogeneity for environmental performance and resilient behavior in energy and transportation systems. *Computers, Environment and Urban Systems*, 62:136-145.
- <https://doi.org/10.1016/j.compenvurbsys.2016.11.001>
- Ge, W., & Zhang, G. (2022). Resilient public transport construction in mega cities from the perspective of ecological environment governance. *Journal of Environmental and Public Health*, 2022:9143618.
- <https://doi.org/10.1155/2022/9143618>
- Hardy, C., de Rivera, C., Bliss-Ketchum, L., Butler, E. P., Dissanayake, S., Horn, D. A., et al. (2022). Ecosystem connectivity for livable cities: A connectivity benefits framework for urban planning. *Ecology and Society*, 27:36.
- <https://doi.org/10.5751/ES-13371-270236>
- Keeler, M., & Vaidya, P. (2018). *Fundamentos de Projeto de Edificações Sustentáveis*. 2ª ed. Rio Grande do Sul: Bookman Editora.
- Lee, H., Song, K., Kim, G., & Chon, J. (2021). Flood-adaptive green infrastructure planning for urban resilience. *Landscape and Ecological Engineering*, 17:427-437.
- <https://doi.org/10.1007/s11355-021-00458-7>
- Lee, Y. H., Kim, Y. C., & Seo, H. (2022). Selecting disaster waste transportation routes to reduce overlapping of transportation routes after floods. *Sustainability*, 14(5):2866.
- <https://doi.org/10.3390/su14052866>
- Leoncini, R., Montresor, S., & Rentocchini, F. (2016). CO<sub>2</sub>-reducing innovations and outsourcing: Evidence from photovoltaics and green construction in North-East Italy.

- Research Policy*, 45(8):1649-1659.  
<https://doi.org/10.1016/j.respol.2016.04.010>
- Liu, S. C., Peng, F. L., Qiao, Y. K., & Zhang, J. B. (2021) Evaluating disaster prevention benefits of underground space from the perspective of urban resilience. *International Journal of Disaster Risk Reduction*, 58:102206.  
<https://doi.org/10.1016/j.ijdrr.2021.102206>
- Lu, W., Tam, V. W., Chen, H., & Du, L. (2020). A holistic review of research on carbon emissions of green building construction industry. *Engineering, Construction and Architectural Management*, 27(5):1065-1092.  
<https://doi.org/10.1108/ECAM-06-2019-0283>
- Majewska, A., Denis, M., Jarecka-Bidzińska, E., Jaroszewicz, J., & Krupowicz, W. (2022). Pandemic resilient cities: Possibilities of repairing Polish towns and cities during COVID-19 pandemic. *Land Use Policy*, 113:105904.  
<https://doi.org/10.1016/j.landusepol.2021.105904>
- Mariano, C., & Marino, M. (2022). Urban planning for climate change: A toolkit of actions for an integrated strategy of adaptation to heavy rains, river floods, and sea level rise. *Urban Science*, 6(3):35.  
<https://doi.org/10.3390/urbansci6030063>
- McGrail, S., Gaziulusoy, A. I., & Twomey, P. (2015). Framing processes in the envisioning of low-carbon, resilient cities: Results from two visioning exercises. *Sustainability*, 7(7):8649-8683.  
<https://doi.org/10.3390/su7078649>
- Nelson, P. P. (2016). A framework for the future of urban underground engineering. *Tunnelling and Underground Space Technology*, 55:32-39.  
<https://doi.org/10.1016/j.tust.2015.10.023>
- Ossola, A., & Lin, B. B. (2021). Making nature-based solutions climate-ready for the 50 °C world. *Environmental Science Policy*, 123:151-159.  
<https://doi.org/10.1016/j.envsci.2021.05.026>
- Qiu, D., Lv, B., & Chan, C. M. (2022). How digital platforms enhance urban resilience. *Sustainability*, 14(3):1285.  
<https://doi.org/10.3390/su14031285>
- Sá, O. O. (2017). *A Segurança das Infraestruturas Críticas de Energia no Brasil*. PhD thesis, Universidade de São Paulo.
- Sharifi, A., Allam, Z., Bibri, S. E., & Khavarian-Garmsir, A. R. (2024). Smart cities and sustainable development goals (SDGs): A systematic literature review of co-benefits and trade-offs. *Cities*, 146:104659.  
<https://doi.org/10.1016/j.cities.2023.104659>
- Sharma, S., Kumar, S., & Singh, A. (2023). Assessment of green infrastructure for sustainable urban water management. *Environment, Development and Sustainability*, 25(1):1-10.  
<https://doi.org/10.1007/s10668-023-03411-w>
- Sun, Y., Wang, Y., Zhou, X., & Chen, W. (2023). Are shrinking populations stifling urban resilience? Evidence from 111 resource-based cities in China. *Cities*, 141:104458.  
<https://doi.org/10.1016/j.cities.2023.104458>
- Touili, N. (2021). Hazards, infrastructure networks and unspecific resilience. *Sustainability*, 13(9):4972.  
<https://doi.org/10.3390/su13094972>
- Wang, L., Xue, X., & Zhou, X. (2020). A new approach for measuring the resilience of transport infrastructure networks. *Complexity*, 2020(1):7952309.  
<https://doi.org/10.1155/2020/7952309>
- Wu, Q., Han, Z., Cui, C., Liu, F., Zhao, Y., & Xie, Z. (2022). Vulnerability identification and cascading failure spatiotemporal patterns on road network under the rainstorm disaster. *ISPRS International Journal of Geo-Information*, 11(11):564.  
<https://doi.org/10.3390/ijgi11110564>
- Xiang, C., Liu, J., Shao, W., Mei, C., & Zhou, J. (2019) Sponge city construction in china: Policy and implementation experiences. *Water Policy*, 21(1):19-37.  
<https://doi.org/10.2166/wp.2018.021>
- Zahoor, A., Xu, T., Wang, M., Dawood, M., Afrane, S., Li, Y., et al. (2023). Natural and artificial green infrastructure (GI) for sustainable resilient cities: A scientometric analysis. *Environmental Impact Assessment Review*, 101:107139.  
<https://doi.org/10.1016/j.eiar.2023.107139>
- Zhang, J., & Wang, T. (2023). Urban resilience under the COVID-19 pandemic: A quantitative assessment framework based on system dynamics. *Cities*, 136:104265.  
<https://doi.org/10.1016/j.cities.2023.104265>
- Zhang, J., Zhang, M., & Li, G. (2021). Multi-stage composition of urban resilience and the influence of pre-disaster urban functionality on urban resilience. *Natural Hazards*, 107:447-473.  
<https://doi.org/10.1007/s11069-021-04590-3>
- Zhao, R., Fang, C., Liu, J., & Zhang, L. (2022). The evaluation and obstacle analysis of urban resilience from the multidimensional perspective in Chinese cities. *Sustainable Cities and Society*, 86:104160.  
<https://doi.org/10.1016/j.scs.2022.104160>
- Zhao, X., Chang, T., Hwang, B. G., & Deng, X. (2017). Critical factors influencing business model innovation for sustainable buildings. *Sustainability*, 10(1):33.  
<https://doi.org/10.3390/su10010033>

## REVIEW ARTICLE

## Optimization of natural ventilation in courtyard-style residential buildings: Insights from inner Mongolian design principles

Shangbing Ma<sup>1</sup>, Sharifah Salwa Syed Mahdzar<sup>1,2\*</sup>, Nor Izura Tukiman<sup>1</sup>,  
and Pau Chung Leng<sup>1</sup><sup>1</sup>Department of Architecture, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia<sup>2</sup>Center for the Study of Built Environment in the Malay World (KALAM), Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, Skudai, Johor, Malaysia

## Abstract

Traditional courtyard houses in China—particularly in regions such as Inner Mongolia, Gansu, Henan, and Sichuan—represent vernacular architectural responses to local climatic conditions. As sustainable residential design gains momentum, especially in hot temperate climates, there is growing interest in how these traditional spatial configurations can inform contemporary strategies for natural ventilation and thermal comfort. This study investigates the potential of courtyard design, spatial configuration, and building geometry to regulate airflow, energy, and indoor thermal comfort in residential buildings. A combination of field measurements, case studies, and computational fluid dynamics (CFD) simulations was employed to systematically assess the key factors influencing ventilation performance in courtyard-style buildings. The results underscore the importance of spatial disposition—particularly the orientation of openings and courtyards relative to prevailing wind patterns. Greater courtyard width and length, when paired with windward openings, were proven to significantly enhance wind flow. Increased building height also contributed positively to stack ventilation; however, improper vertical proportions may hamper air movement at lower levels. These findings underscore the need for height optimization based on functional airflow patterns rather than aesthetic preference alone. Moreover, the study highlights the importance of correlating CFD models with empirical field data to ensure accuracy in real-world scenarios, accounting for elements such as surrounding vegetation and adjacent structures. These insights offer valuable guidance for architects and urban planners seeking climate-adaptive design solutions in residential architecture. Ultimately, this research contributes to a framework for improving thermal comfort and energy efficiency in regions with comparable environmental climates.

**Keywords:** Courtyard houses; Natural ventilation; Sustainability; Computational fluid dynamics; Vegetation; Thermal comfort and climate

**\*Corresponding author:**  
Sharifah Salwa Syed Mahdzar  
(ssmahdzar@utm.my)

**Citation:** Ma, S., Mahdzar, S.S.S., Tukiman, N.I., & Leng, P.C. (2025). Optimization of natural ventilation in courtyard-style residential buildings: Insights from inner Mongolian design principles. *Journal of Chinese Architecture and Urbanism*, 7(3): 7226.  
<https://doi.org/10.36922/jcau.7226>

**Received:** December 10, 2024

**1st revised:** February 27, 2025

**2nd revised:** April 1, 2025

**Accepted:** May 23, 2025

**Published online:** July 2, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

### 1.1. Background

Fresh air strategies are receiving increasing attention in modern green design, particularly for their role in improving energy efficiency and the thermal comfort of residential occupants. In regions with hot climates, such as parts of the Mediterranean, certain construction forms—such as courtyard-style housing—have been shown to support effective natural ventilation (Xu *et al.*, 2018). Insights from these traditional designs reveal how courtyard houses can adapt to improve indoor climate by passively cooling or warming interior spaces, aligning with the principles of the New Theory of Architecture within climatically distinctive regions such as Inner Mongolia. Specifically, courtyard houses, which are longstanding features of Inner Mongolian residential architecture, provide conducive settings for such studies due to their spatial organization and adaption to environmental conditions (Chandel *et al.*, 2016). By examining these traditional designs, modern architectural practices can learn from and incorporate their principles to address current sustainability and comfort goals.

### 1.2. Research problem

Despite the abundance of research on courtyard architecture and natural ventilation across different climates, little has been done to apply these principles to the unique environmental conditions of Inner Mongolia. The region faces distinctive seasonal challenges that require ventilation strategies tailored for cooling in summer and heat retention in winter (Tafti *et al.*, 2018). Although previous studies conducted in the Mediterranean and the Middle East offer comprehensive insights, their findings are not readily transferable to Inner Mongolia due to significant disparities in wind regimes, temperature variability, and seasonal climate patterns.

This discussion can be further extended to other Chinese provinces with courtyard traditions, such as Gansu, Henan, and Sichuan. For example, Gansu shares arid and semi-arid climatic zones with Inner Mongolia, but its milder winters influence the size and openness of courtyards (Azimi & Shafaat, 2024). In contrast, Sichuan's humid subtropical climate promotes denser urban courtyard arrangements that incorporate passive cooling. The hybrid courtyard, prevalent in temperate regions, illustrates how architectural design can balance thermal mass and ventilation efficiency across seasons. These regional differences highlight the necessity of adopting courtyard ventilation strategies that are responsive to both microclimatic and sociocultural conditions.

Furthermore, most existing studies on natural ventilation in courtyard-style buildings rely solely on either computational fluid dynamics (CFD) simulations or field measurements, without integration of the two. The lack of comparative analysis between simulation data and empirical field measurements hinders a comprehensive understanding of how courtyard designs perform under local climatic conditions, revealing a critical gap in this domain.

### 1.3. Aims and objectives

The primary objective of this study is to review existing literature on natural ventilation in courtyard-based residential buildings in the Inner Mongolia region. The aim is to synthesize findings from CFD models, field measurement investigations, and previous studies to develop a consolidated understanding of strategies that enhance natural ventilation in such structures. Furthermore, this research aims to propose architectural design suggestions for improving thermal comfort in buildings located in similar climatic zones via spatial planning and integrated design approaches.

### 1.4. Research question

This research aims to address the following research question:

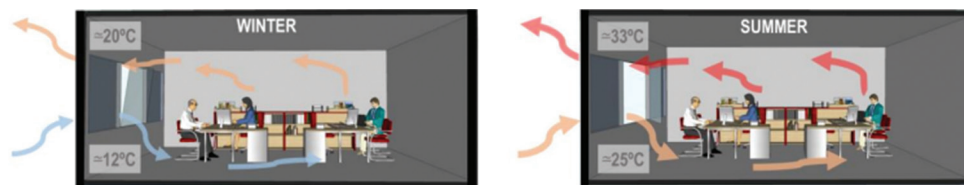
“What strategies can be applied to provide natural ventilation in courtyard-style residential buildings in Inner Mongolia to enhance thermal comfort and minimize energy use?”

### 1.5. Research rationale

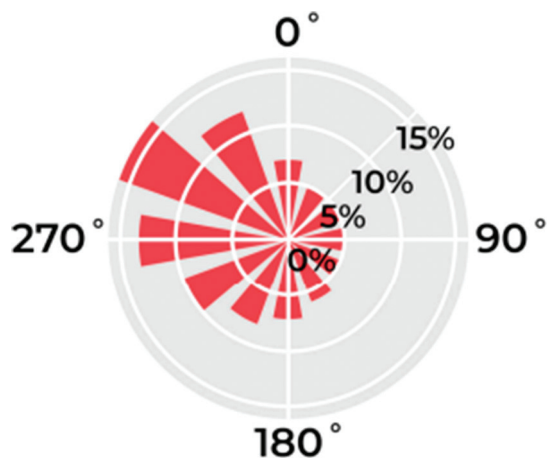
Amid growing awareness of energy efficiency and sustainability, this research is both timely and necessary. It contributes to the discussion of sustainable architectural approaches in extreme climates by examining the relevance of premodern courtyard designs and their contemporary applications. Additionally, it addresses a knowledge gap in the existing literature regarding how specific courtyard typologies in Inner Mongolia can be improved to optimize natural ventilation.

### 1.6. Significance of the research

This study is particularly relevant to architects, planners, and researchers engaged in sustainable residential architecture. Its findings aim to inform design strategies that enhance natural ventilation in courtyard structures, minimize reliance on mechanical conditioning systems, and improve perceived indoor environmental quality. Furthermore, the insights generated can help guide architectural decision-making in the planning of residential developments in regions facing similar climatic challenges.



**Figure 1.** Single-sided natural ventilation in winter and summer in an office building. Source: Da Graça & Linden, 2016. Copyright © 2016 Building and Environment.



**Figure 2.** Wind rose diagram of Inner Mongolia. Source: Maeng & Hyun, 2020. Copyright ©2020 Applied Sciences.

### 1.7. Structure of the research

This article is structured as follows:

- Section 1: Introduction - Outlines the research problem, objectives, and the rationale for conducting the study
- Section 2: Literature review - Reviews key studies on natural ventilation in courtyard buildings
- Section 3: Methodology - Describes the systematic review approach and synthesis framework
- Sections 4 and 5: Presentation and discussion of findings - Analyze the reviewed literature and case studies, with a focus on implications for design practice and innovation in established firms
- Section 6: Conclusion - Summarizes the research and presents design recommendations.

## 2. Literature review

### 2.1. Natural ventilation in residential buildings

Natural ventilation is generally referred to as an integrative ventilation technique that relies on the architectural aspects of a building to influence the indoor environment and enhance airflow for both cooling and ventilation. Typically, naturally ventilated buildings are designed to minimize the use of mechanical ventilation and cooling

systems, thereby saving energy (Maghrabie *et al.*, 2022). In hot temperate zones, natural ventilation is imperative to sustaining thermal comfort without relying on heating, ventilation, and air conditioning (HVAC) systems. It is most effective when the building design aligns with local climatic conditions, including wind direction and speed, temperature variation, and humidity (Figure 1).

Inner Mongolia experiences a continental climate characterized by hot summers, significant diurnal temperature fluctuations, and moderate winds. Average annual temperatures range from  $-20^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ , and relative humidity is approximately 30% (Rakhmanov *et al.*, 2022). To assess the effects of these climatic factors on traditional courtyard house architecture, wind rose diagrams were created (Figure 2). These diagrams indicate that westerly winds dominate in winter, while northwesterly and southeasterly winds prevail in summer (Xu *et al.*, 2020). This climatic data underscores the need for architectural solutions tailored to seasonal variations.

In residential buildings, natural ventilation typically involves the strategic placement of openings such as windows and doors, as well as spatial layouts that facilitate natural ventilation throughout the building. Elshafei *et al.* (2017) emphasized that the design of external spaces provides the required orientation for effective air circulation. This is especially evident in courtyard layouts, where central open spaces function as air inlets and outlets, enabling the wind to pass through the built form and promoting natural airflow.

### 2.2. Courtyard architecture and natural ventilation

The architectural design style examined in this study—courtyard-style architecture—is a culturally embedded design principle intended to enhance natural ventilation and thermal comfort. Traditional 2- and 3-story courtyard dwellings in Inner Mongolia represent a historically and environmentally responsive model for integrating natural ventilation in residential structures (Zhang, 2015). The orientation of these courtyards in relation to prevailing wind directions is critical to enhancing airflow within the building. The flow of natural ventilation is further influenced by the size and distribution of the courtyards, the number and openness of the inner courtyards, and the overall spatial alignment of the building.

Courtyard architecture in Inner Mongolia is more than a passive environmental strategy, since it is deeply rooted in socio-cultural values. The courtyard serves not only as a climatic buffer but also as a gathering space for families, intergenerational interactions, and community rituals. Reflecting Confucian ideals of harmony, order, and relational living, the spatial hierarchy of these compounds includes outer walls, side rooms for extended family, and a central courtyard for daily life. Similar courtyard systems exist in provinces such as Henan and Sichuan, where spatial ideologies also emphasize the linkage between private and communal functions (Wang *et al.*, 2016). Some of these designs incorporate principles of geomatics (*feng shui*) or solar access strategies, such as placing the main hall to the north and guest rooms to the east and west to optimize energy flow and lighting.

Cultural traditions continue to influence design choices, particularly in rural or peri-urban housing developments. An architectural reading that accounts for cultural symbolism and everyday courtyard usage reveals how spatial forms can support social resilience, identity, and continuity—while also maintaining functional ventilation performance (Qureshi *et al.*, 2019). Courtyards should therefore not be viewed merely as spatial units, but rather as parts of a broader dialectical framework that merges culture, environment, and architecture.

Inner Mongolia encompasses diverse meteorological zones—arid, semi-arid, and sub-humid—each shaping vernacular construction patterns. Traditional courtyard houses in other provinces, such as Gansu and Henan, also exhibit region-specific adaptations. In Gansu, where diurnal temperature variation is pronounced, houses often use thick earthen walls and sunken courtyards for insulation (Li *et al.*, 2023). In Henan, where winters are milder and the southern region receives more rainfall, the internal courtyards tend to be narrower, with overhanging eaves to collect rainwater and facilitate ventilation. In Sichuan's humid subtropical climate, courtyards are more compact, with an emphasis on shading and cross-ventilation to manage high humidity levels. These regional adaptations illustrate how local geography and microclimate influence courtyard geometry, material selection, and ventilation strategies. Comparative analysis reveals that courtyard features in Inner Mongolia—such as north-south orientation, high thermal mass walls, and flexibility in opening sizes—share similarities with vernacular architecture across other regions of China, while also reflecting unique regional distinctions.

Traditionally, courtyard houses are constructed with thick walls for thermal retention, narrow floor plans oriented away from prevailing winds, and strategically

placed windows to allow for cross-ventilation. In terms of zonal conception, courtyards tend to be larger in semi-arid zones to enhance cooling during hot periods, whereas in arid zones, they are smaller to retain heat during cold nights. These adaptations exemplify how cultural practices and environmental considerations are integrated into architectural solutions.

Functionally, courtyards serve as intermediary thermal buffers, regulating indoor temperatures by facilitating air exchange. They act as natural venting systems, expelling warm air and admitting cooler, fresh air into the building (Zamani *et al.*, 2018). Traditional courtyard buildings—especially common in arid and semi-arid areas such as Inner Mongolia—are designed to manage wind flow through the courtyard, thereby facilitating passive cooling via airflow and pressure differentials.

Abass *et al.* (2016) noted that courtyard configurations could be adapted to meet specific climatic conditions. In dry environments, introverted courtyard layouts allow cool air to circulate within the interior spaces, preserving thermal comfort. In contrast, extroverted courtyards in moderate climates promote greater air movements and thermal comfort (Passe & Battaglia, 2015). This design flexibility is especially important to Inner Mongolia, where pronounced seasonal temperature changes require architectural strategies that accommodate both cooling and heating needs.

### 2.3. CFDs and natural ventilation analysis

CFDs tools play a crucial role in analyzing airflow tendencies and improving natural ventilation strategies in courtyard-style buildings. This review identified commonly used software such as ANSYS Fluent and OpenFOAM for modeling airflow, thermal distribution, and stack ventilation (Borro *et al.*, 2021). Nevertheless, several studies have pointed out that assumptions such as steady-state conditions, simplified geometries, and uniform wind profiles can significantly limit simulation accuracy (Ricci *et al.*, 2016). Neglecting elements like adjacent structures, vegetation, or microclimatic influences may lead to discrepancies between simulation results and actual field conditions.

ANSYS Fluent is widely recognized for its ability to solve complex geometries under various environmental conditions, making it particularly valuable for detailed ventilation studies. OpenFOAM, as an open-source platform, offers flexibility by allowing users to modify simulations to suit specific architectural configurations.

Most previous studies rely on Reynolds-averaged Navier-Stokes (RANS) models, which are computationally efficient but may fail to accurately predict turbulence

intensity in complex courtyard airflow environments. Recent advances in hybrid modeling techniques, such as detached eddy simulation or large eddy simulation (LES), have improved predictive accuracy for transient wind conditions. However, these models are computationally intensive and must be validated against physical experiments or extensive field data.

This highlights a core limitation of the tools mentioned above. The high computational demands of complex models can make fine-grained only detailed calculations costly. Furthermore, approximate assumptions—such as constant wind profiles or geometrically simplified building configurations—can result in significant deviations between actual and modeled performance (Zhang *et al.*, 2020). While CFD tools are valuable for revealing airflow mechanics, their accuracy depends heavily on correctly inputting influential parameters such as climatic conditions and material properties.

To increase reliability, CFD simulations must be validated through comparison with real-world field measurements. Combining computational techniques with observational data strengthens conclusions and enhances their relevance for architectural and engineering applications in sustainable building design. The integration of CFD results with real-time sensor feedback and post-occupancy evaluations represents a promising development, enabling dynamic calibration and long-term performance monitoring. Going forward, cross-validation with empirical field studies and sensitivity analyses across

different seasons and urban densities should be prioritized as essential directions for future research.

CFDs is especially powerful in modeling the external environment, including wind speed, direction, and thermal behavior across different architectural designs (Figure 3). A study by Cuce *et al.* (2019) demonstrated that CFD techniques could effectively evaluate courtyard designs for their natural ventilation performance. In regions like Inner Mongolia, where buildings must withstand extreme climatic conditions, CFD simulations offer a pathway to optimize conventional and typical Mongolian courtyard designs in line with contemporary standards of energy efficiency and thermal comfort. Benni *et al.* (2016) applied CFD to investigate airflow in courtyard-shaped houses under desert conditions. The study discovered that factors such as the height of enclosing walls and window placement significantly influenced natural air movement and indoor temperature. Such findings underscore the potential of CFD to predict architectural design solutions that maximize natural ventilation without straining energy consumption.

#### 2.4. Field studies and empirical research on ventilation performance

In addition to CFD simulations, field measurements and empirical surveys provide a wealth of information about the real-world effectiveness of natural ventilation systems. Field measurements allow researchers to determine how well passive ventilation strategies perform under current

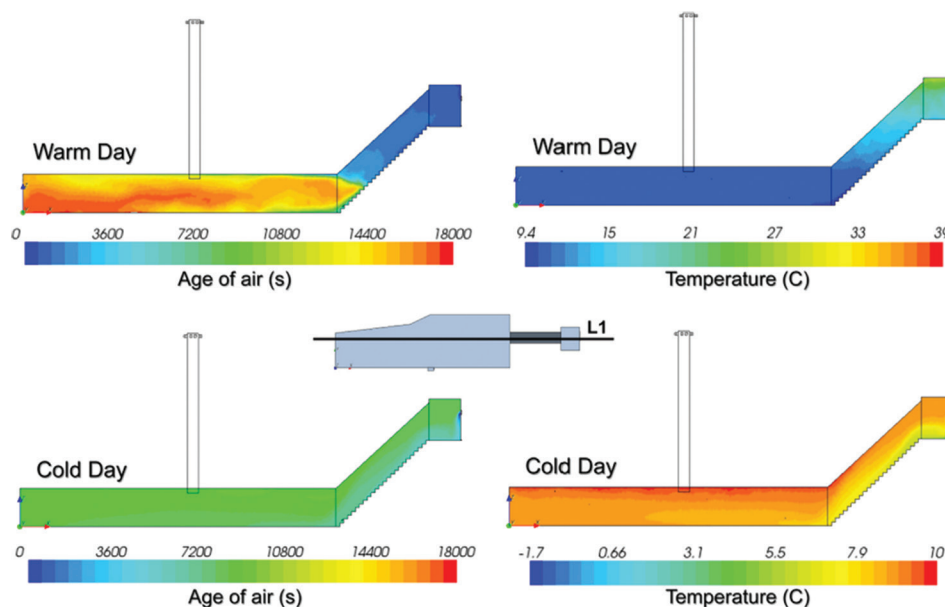


Figure 3. Result of computational fluid dynamics simulation under different weather conditions. Source: Porras-Amores *et al.*, 2019. Copyright © 2019 Tunnelling and Underground Space Technology Elsevier Ltd.

climatic conditions and in buildings occupied by residents. Several studies carried out in climatic regions comparable to Inner Mongolia—such as those by Etheridge (2015)—offer important lessons on optimizing natural ventilation in courtyard-style buildings.

Field investigations have confirmed that building layout, along with the size and placement of courtyards and other spatial elements, significantly influences natural ventilation. For instance, field research by Huang *et al.* (2015) revealed that buildings with centrally located courtyards exhibited superior airflow compared to those with courtyards located toward the periphery. The study also underscored that windows facing uphill slopes benefitted from enhanced wind exposure, promoting natural ventilation and eliminating the need for mechanical cooling during the summer.

In another study, Omrani *et al.* (2017) conducted field measurements on a courtyard house in Gansu province, China, to evaluate its thermal response and ventilation performance. The findings indicated that courtyard arrangement and size had a direct influence on the ventilation performance, with north-facing courtyards achieving optimal ventilation under fair summer weather conditions. These results are especially relevant for Inner Mongolia, where courtyard-style dwellings share similar spatial organizations and face comparable environmental conditions.

### 2.5. Design considerations for enhancing natural ventilation in Inner Mongolia

This article highlights that, due to Inner Mongolia's distinct climatic conditions, specific design approaches must be taken to facilitate effective natural ventilation in residential buildings. Characterized by hot summers and cold winters, the region demands bi-climatic design approaches that address both cooling and heating needs. Yu *et al.* (2016) observed that the residential structures in this region tend to be efficient and structurally rigid. Nevertheless, the flexible and complex layouts of courtyard houses offer promising opportunities to enhance natural ventilation—provided there is a thorough understanding of wind direction, daily and seasonal temperature variations, and humidity levels.

A prominent aspect that is often considered during architectural and engineering design is the orientation of the courtyards relative to prevailing wind patterns. Aligning buildings with the prominent wind direction can significantly enhance the ventilation in a room and hence increase the quality of air indoors (Wang & Malkawi, 2019). However, courtyard attributes—such as size and shape—also significantly influence natural ventilation efficiency.

Large, uncovered courtyards promote air circulation, whereas small, enclosed courtyards tend to trap heat and restrict airflow.

Table 1 presents the keywords identified in the reviewed studies, enabling a quick assessment of the focus areas explored in the literature.

Table 2 summarizes the main findings and methodologies of selected studies reviewed in this article.

This research began with a comprehensive review and classification of existing literature on courtyard-style houses and natural ventilation (Figure 4). Thematic analysis was then employed to extract key findings—such as the importance of orientation and thermal comfort strategies. Finally, conclusions were drawn, and practical suggestions were proposed to inform contemporary sustainable architectural practices.

### 2.6. Long-term performance and occupant feedback

Long-term monitoring and user-based evaluation are important for assessing the practical effectiveness of courtyard dwellings, complementing insights gained from CFD simulations and short-term field measurements. Previous studies conducted in northern Chinese regions such as Gansu and Sichuan have applied post-occupancy evaluation to assess thermal comfort, energy usage, and ventilation efficiency across different seasons (Chi *et al.*, 2020). These studies found that traditional courtyard-style homes consistently reduced the need for mechanical heating and cooling by 20 – 35% annually. Occupant surveys conducted over 12-month periods revealed a preference for natural ventilation strategies during transitional seasons (spring and autumn). However, users also reported discomfort due to cold draughts in winter and heat accumulation in sealed courtyards during peak summer months. These experiences highlighted the need for adaptive features such as operable skylights,

Table 1. Keywords in the study

| Study focus                              | Keywords  |
|--|---|
| Natural ventilation in courtyard housing | Natural ventilation, courtyard architecture, airflow optimization                             |
| Computational fluid dynamics (CFD)       | CFD simulation, airflow modeling, wind direction analysis, ventilation performance            |
| Empirical validation                     | Field measurement, case study analysis, vegetation impact, adjacent structure influence       |
| Sustainable design                       | Energy efficiency, thermal comfort, passive cooling, renewable architecture                   |
| Climate adaptation strategies            | Seasonal climate adaptation, stack effect, cross ventilation, regional climate considerations |

Table 2. Key findings from the literature review

| Author                | Year | Focus area                      | Methodology                                    | Key findings  |
|-----------------------|------|---------------------------------|--|---|
| Xu <i>et al.</i>      | 2018 | Courtyard ventilation           | Computational fluid dynamics (CFD) simulations | Orientation significantly affects cross-ventilation         |
| Tafti <i>et al.</i>   | 2018 | Modern ventilation issues       | Comparative analysis                           | Modern designs neglect ventilation, leading to inefficiency |
| Chandel <i>et al.</i> | 2016 | Traditional designs in Mongolia | Field studies                                  | Thick walls improve thermal comfort                         |
| Zhang <i>et al.</i>   | 2020 | Seasonal climate adaptation     | CFD+field measurements                         | Effective stack ventilation during summer and winter        |

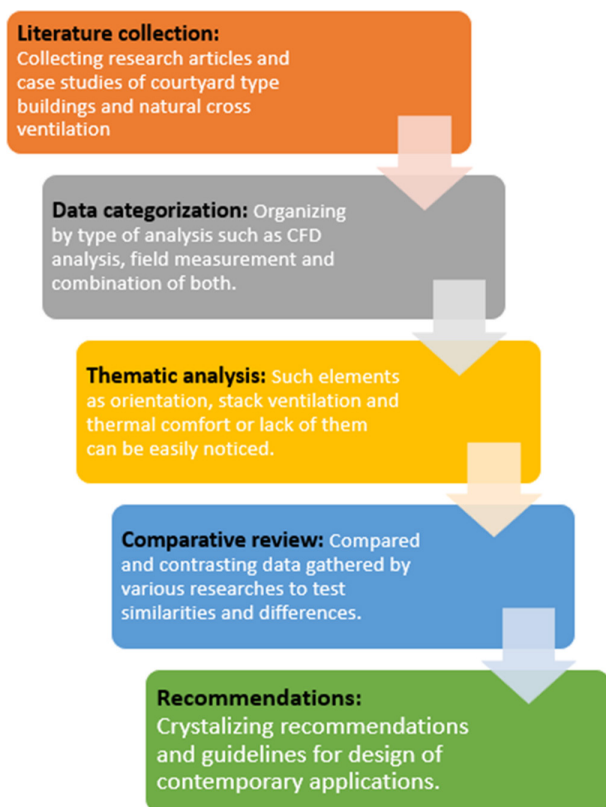


Figure 4. Technical roadmap of the study  
Abbreviation: CFD: Computational fluid dynamics.  
Source: Diagram by the authors.

retractable shading, and seasonal modifications to window configurations. To validate CFD predictions, enhance passive design strategies, and better understand the long-term socio-environmental dynamics of occupancy, such user feedback is indispensable. As such, both retrospective and forward-looking studies should adopt a user-centered approach, incorporating performance monitoring and data logging to bridge the gap between theoretical optimization and real-world performance.

### 3. Methodology

#### 3.1. Systematic review approach

A systematic review approach was used, as it was deemed most appropriate for integrating published studies across

various disciplines and study types, thereby ensuring methodical comprehensiveness in the review process. Afshin *et al.* (2016) define a systematic review as a formal process of identifying, selecting, and critically evaluating studies that address particular research questions. In this case, the principal research question focuses on the identification of strategies that can be used to enhance natural airflow in 4-story courtyard-based residential buildings in Inner Mongolia.

The advantages of the systematic review approach are as follows:

- Comprehensive coverage: This methodology helps reduce the risk of omitting studies critical to understanding the research topic
- Critical synthesis: A systematic review allows for the identification of thematic aspects, research gaps, and emerging trends across a broad body of literature
- Methodological rigor: By following a structured and coordinated review process, this approach minimizes bias and enhances the reliability of conclusions and recommendations.

In the context of this research, the systematic review includes CFD studies, field investigation, and empirical case studies on airflow characteristics in courtyard-style buildings, especially those located in climates similar to that of Inner Mongolia.

#### 3.2. Data collection process

The data sources for this systematic review were identified through a four-step process: (i) database search and retrieval, (ii) article selection, (iii) data extraction, and (iv) quality assessment. The types of literature reviewed include research articles, conference papers, technical reports, and case studies. Google Scholar was used as the primary source engine for sourcing relevant literature. To broaden the scope of the review, a series of keywords was employed during the search, including “natural ventilation,” “courtyard architecture,” “Inner Mongolia residential buildings,” “computational fluid dynamics (CFD),” and “airflow optimisation in courtyard buildings.”

### 3.3. Inclusion and exclusion criteria

Although the inclusion and exclusion criteria cannot eliminate all forms of bias, the following guidelines were adopted to ensure relevance and quality in the selection of studies. Five key criteria were used to include studies, with a focus on those addressing the hot-temperate climate of Inner Mongolia (Haig *et al.*, 2016). Only literature published within the past 20 years (2003 – 2023) was considered, and only peer-reviewed journals, conference proceedings, technical and research papers, and case studies were included. Studies incorporating field measurements or analytical methods such as CFD were prioritized to provide a comprehensive perspective on natural ventilation.

Conversely, studies focused on commercial or non-residential architectural structures were excluded, as the present study exclusively targets residential architecture. Articles presenting only CFD simulations or conceptual designs without assessing the architectural incorporation of HVAC systems were also excluded. Additionally, non-peer-reviewed sources and studies that did not address natural ventilation enhancement at the building level were omitted. These criteria ensured that the review remained focused on high-quality, relevant material that directly addressed the research questions.

### 3.4. Data extraction

After screening and selecting the relevant studies, essential information was extracted using a predefined data extraction form to ensure consistency and quality. The following data points were extracted from each study:

- Study title and authors
- Year of publication
- Study objective
- Methodology (e.g., CFD, field study, case study)
- Key findings on natural ventilation and courtyard design
- Climatic context
- Building configuration and spatial arrangement
- Ventilation performance metrics.

This structured data extraction process facilitated the organization and comparison of findings across different studies. All extracted data were recorded for further analysis and synthesis.

### 3.5. Analysis and synthesis

Following data extraction, the collected data were subjected to thematic analysis. Rabani *et al.* (2015) describe thematic analysis as the process of identifying patterns or themes within systematically analyzed data. In this study, thematic

analysis was used to categorize the findings into several key themes:

- (i) Impact of spatial arrangement on airflow: This theme focuses on analyzing the effect of courtyard location, building orientation, and window sizes on ventilation performance.
- (ii) Building geometry and ventilation efficiency: Studies focusing on the size, shape, and height of courtyard buildings were grouped under this theme, aiming to identify relevant configurations for enhancing fresh air intake.
- (iii) CFD simulations and empirical validation: This theme combines data from CFD models and case studies, evaluating both the findings of the models and the feasibility of computational techniques.
- (iv) Climate-specific design considerations: This theme explores courtyard building features in hot-temperate climates, such as Inner Mongolia, and identifies topological adjustments needed to enhance natural ventilation in such contexts.

Thematic analysis enabled the synthesis of similar results and the identification of methodological shortcomings across reviewed studies. For instance, while CFD analysis provides detailed insights into airflow patterns (Gopang *et al.*, 2017), it is often not supported by sufficient experimental validation, highlighting the need for complementary field investigations.

The systematic review approach adopted in the present study allowed for the consistent search, selection, assessment, and synthesis of the existing body of literature on natural ventilation in courtyard housing, with a specific focus on the climatic characteristics of Inner Mongolia. The review provides a conceptual model of how courtyard design can enhance natural ventilation, integrating findings from CFD simulations, field studies, and empirical studies. This thematic analysis is expected to be of significant relevance to architects and urban planners, supporting the development of efficient ventilation strategies that minimize energy use and improve thermal comfort in residential dwellings.

## 4. Results and analysis

### 4.1. Impact of spatial arrangement on airflow

Layout type—particularly open compounds surrounded by enclosed buildings—is a key determinant of natural ventilation. Multiple studies have demonstrated that the positioning and design of structures significantly affect ventilation patterns within courtyards and surrounding areas (Lee & Mak, 2021). Prior studies revealed that buildings with different orientations show varying levels of ventilation performance, with windward façade openings

achieving better airflow. This alignment allows for cross-ventilation, a critical feature, especially during hot summer months.

Previous studies noted that the configuration of courtyard doors and windows largely determines airflow capacity. For instance, courtyard layouts featuring multiple openings on opposite walls exhibited improved ventilation, as air could circulate more easily through the space (Lu *et al.*, 2018). In contrast, courtyards with only one or two small openings created air stagnation zones, characterized by low air change rates and elevated indoor temperatures (Figure 5). These findings underscore the necessity of designing courtyards with an appropriate number and placement of openings to ensure effective integration of prevailing winds.

#### 4.2. Building geometry and ventilation efficiency

Architectural features such as courtyard area, shape, and the geometry of surrounding buildings influence natural ventilation performance. Research examining the effects of courtyard size on airflow showed that larger courtyards facilitated better ventilation due to the greater availability of free space. Kheiri (2018) found that rectangular or

elongated courtyards generally outperformed square or circular ones in terms of ventilation efficiency. This is attributed to their ability to channel wind flow more effectively, reducing resistance and enhancing cross-ventilation throughout the building.

In addition to size and shape, building height also plays a significant role. Surrounding buildings contribute to the stack effect, in which hot air rises and exits through upper vents, while fresh, cooler air is drawn in at lower levels. Peng *et al.* (2019) documented this mechanism in Inner Mongolian courtyard houses, where taller courtyard walls facilitated sufficient vertical air movement to alleviate summer heat. A drawback of liver-shaped building design, as explored in the results, is that it can obstruct airflow at lower levels due to wind shadowing—particularly when the building height exceeds the courtyard size. Thus, achieving optimal natural ventilation requires a balanced relationship among three key elements: building height, courtyard size, and geometric configuration.

#### 4.3. CFDs simulations and empirical validation

Most of the reviewed studies used CFD simulations to predict airflow patterns in courtyard-style buildings. These simulations provided detailed insights into the effects of various aspects of design, including window position and size, building shape, and courtyard dimension, on ventilation performance (Schulze & Eicker, 2013). However, a common limitation across multiple studies was the inadequate representation of microclimatic factors, including terrain variability, vegetation morphology, and building envelope materials. For example, train simulations often assumed smooth wall surfaces and excluded transient wind fluctuations, both of which significantly contribute to the effectiveness of natural ventilation (Garcia *et al.*, 2017). Variants of CFD models demonstrated that improved airflow and reduced hot air stagnation could be achieved when courtyards had openings on more than one side. Jomehzadeh *et al.* (2020) investigated airflow characteristics in Inner Mongolia courtyard houses and discovered that those oriented northwest were optimally ventilated. This alignment supported effective cross-ventilation, enhanced indoor air quality, and reduced reliance on mechanical cooling systems. Simulations also revealed that buildings with wind-catching protruding windows experienced superior ventilation performance compared to those with flush-mounted windows.

One of the CFD simulations performed in this study focused on airflow within a typical Inner Mongolian courtyard under different seasonal wind conditions. Using ANSYS Fluent, the model analyzed and quantified summer and winter velocity fields, pressure distributions,

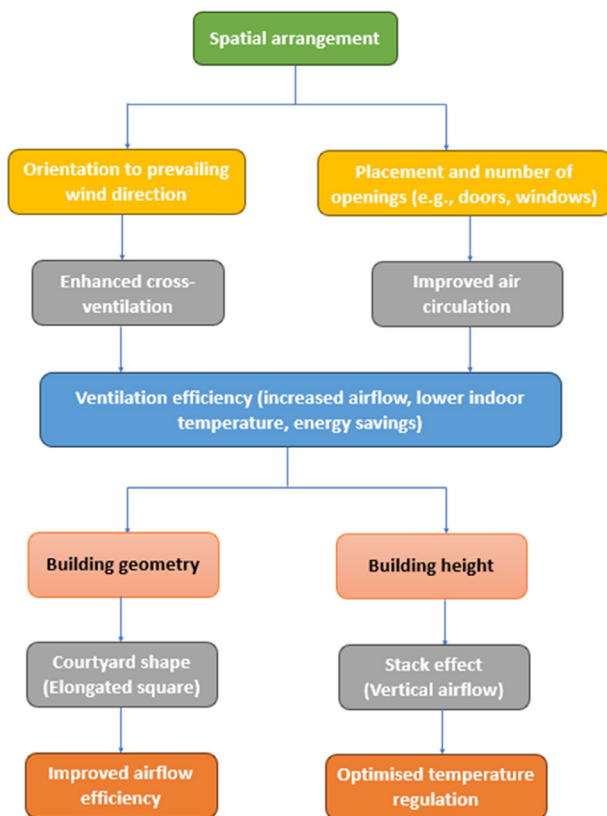


Figure 5. Relationship between spatial arrangement, building geometry, and ventilation efficiency in courtyard-style residential buildings. Source: Diagram by the authors.

and temperature profiles (Pathirana *et al.*, 2019). Results indicated that stack ventilation was efficient, with warm air expelled through upper vents and cool air drawn in through lower inlets. The presence of foliage within the courtyard also contributed noticeably to daytime cooling and improved thermal comfort (Figure 6).

To address the limitations of CFD-only approaches, some researchers have begun using hybrid methods that combine CFD simulations with scaled wind tunnel testing or real-time measurement data from occupied courtyard buildings. For instance, in the case of Gansu province, hourly airflow and temperature data collected from sensor arrays installed in an occupied residence were used to calibrate simulation parameters. The comparison with observed comfort conditions was improved through CFD calibration, thereby providing strong support for hybrid validation techniques.

In the CFD simulation study, efforts were directed toward assessing the effectiveness of three-dimensional steady-state RANS equations in modeling temperature stratification and indoor air quality in a displacement ventilation environment. Utilizing full-scale measurement data, the shear stress transport  $k-\omega$  turbulence model, along with other associated modeling results on thermal stratification and airflow distribution, showed the best agreement with empirical observations. The results demonstrated that the model effectively captured buoyancy-driven thermal plumes and recirculation zones, with an average difference of 4.2% compared to measured coefficients (Gilani *et al.*, 2016). Sensitivity analysis revealed that only grid resolution and the choice of discretization schemes significantly affected overall results, while the “age of air” predictions were largely insensitive to iterative convergence criteria. These insights contribute

to improving the accuracy of CFD simulations and to designing energy-efficient, thermally comfortable indoor spaces.

Furthermore, CFD simulations and short-term measurement studies on courtyard dwellings in Inner Mongolia and Gansu revealed important seasonal patterns in ventilation effectiveness. Air change rates and thermal comfort assessments showed that some occupied courtyard residences remained uncomfortable due to inadequate ventilation in corner rooms not directly exposed to courtyard inlets. Additionally, user adaptation behaviors (e.g., temporary window sealing, the use of internal curtain barriers, and vegetation screens) were found to significantly change airflow patterns compared to those predicted by simulation. These discrepancies, documented through thermal comfort logs and occupant diaries, highlight the importance of incorporating behavioral data into future design simulations.

#### 4.4. Climate-specific design considerations for Inner Mongolia

The results highlight specific design considerations related to the climatic features of Inner Mongolia, where hot summers and cold winters limit the consistent use of natural ventilation. While natural ventilation is primarily used for cooling during the summer, it must be carefully managed in winter to avoid excessive heat loss (Chen *et al.*, 2020). Some studies suggest that courtyard geometry should be adaptable to allow for seasonal alteration of stack ventilation strategies. For instance, in summer, courtyards should remain open to prevailing winds to enable effective cross-ventilation and cooling (Li & Chen, 2021). In contrast, during winter, courtyards should be partially open or buffered to prevent cold air infiltration and the

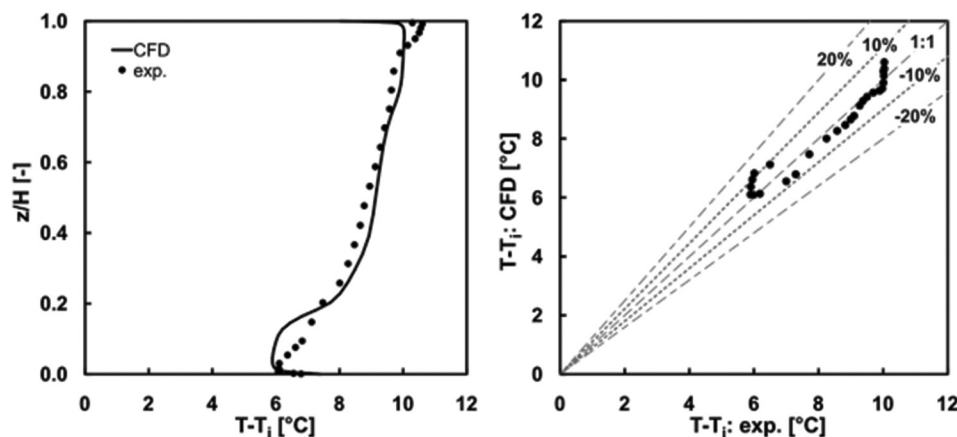


Figure 6. Comparison of temperature scale ( $T-T_i$ ) from computational fluid dynamics simulation and experimental results. Source: Gilani *et al.*, 2016. Copyright © 2016 Building and Environment.

“cold chimney effect” through interior living spaces. Such adaptive designs have demonstrated the potential to reduce dependence on mechanical heating and cooling throughout the year.

Additionally, incorporating natural features, such as plants within the courtyard’s intermediate space, further improves thermal comfort. Trees and shrubs provide protection from hot summer winds and offer shading that helps to cool and regulate the courtyard area. These elements also contribute to the formation of a more comfortable microclimate within the courtyard while simultaneously enhancing ventilation performance. The summary of results is provided in Table A1.

## 5. Discussion

Although many previous studies have explored courtyard ventilation principles, virtually none have examined their applicability to extreme seasonal climates such as that of Inner Mongolia. This analysis aims to clarify that while general ventilation principles remain valid, their effective application must be adapted to local conditions. Specifically, flexible courtyard openings, combined ventilation-insulation approaches, protective barriers, and adaptive spatial planning are essential for coping with large temperature variations and high winter wind speeds. Therefore, this refined approach ensures that the results from CFD models and case studies are not merely referenced in isolation but are directly translated into architectural guidelines tailored to the specific climatic conditions of Inner Mongolia.

### 5.1. Spatial arrangement and wind orientation

One of the key findings highlighted in the review is the contradictory relationship between spatial organization and natural ventilation performance. Ventilation performance was found to be significantly higher in structures where walls were oriented parallel to prevailing winds (Vermeulen *et al.*, 2018). This aligns with established principles of natural ventilation, which emphasize harnessing wind-driven airflow to regulate indoor temperatures and air quality. In the context of Inner Mongolia’s climate, this finding is particularly relevant for residential building layouts. Designers and planners in the region should prioritize windward-facing building orientations to ensure effective free air circulation through central courtyards and into adjacent rooms, especially during the hot summer months.

Furthermore, the review found that buildings with multiple openings on opposite walls were more favorable for cross-ventilation. This corresponds with earlier findings on courtyard ventilation and demonstrates

that the number and placement of openings are critical to achieving effective airflow. This insight has practical implications for architects aiming to reduce reliance on mechanical cooling systems. In this article, the concept of wind-oriented openings is emphasized as a means of leveraging natural ventilation to reduce energy use and enhance indoor thermal comfort.

### 5.2. Comparative analysis of Inner Mongolia’s climate

A comparison was made between the climate of Inner Mongolia and other regions, such as the Mediterranean and sub-Saharan Africa. The climate of the study area, Inner Mongolia, is hotter in summer and significantly colder in winter than the Mediterranean region’s more moderate weather (Chiang & Anh, 2012). These extremes suggest the need for unique airflow strategies, including the use of stack ventilation and the orientation of courtyards toward prevailing wind.

Sub-Saharan Africa experiences a consistently hot climate throughout the year, with minimal seasonal variations. As a result, architectural designs in that region focus on features such as large roof overhangs and maximized airflow. In contrast, the Mediterranean climate—characterized by warm winters and hot summers—supports communicative and open architectural planning, with an emphasis on courtyard-centered layouts (Mahmoud *et al.*, 2020). Inner Mongolia, with its extreme climate marked by severely cold winters and hot summers, requires design strategies that can effectively shield interior spaces from low winter temperatures while also facilitating smooth, continuous airflow during the summer months.

This discussion reinforces the idea that while foundational knowledge of cross-ventilation, stack effects, and courtyard configuration is universally applicable, the practical implementation of these strategies must be adapted to meet local climatic demands. The findings emphasize the importance of contextualizing international design concepts within local environmental conditions to develop sustainable and energy-efficient residential buildings.

### 5.3. Building geometry and height: Balancing ventilation efficiency

Another important consideration identified in this study is the influence of building geometry and height on ventilation performance in courtyard buildings. It was found that extended, slender courtyards promote better ventilation than square or circular ones, due to their ability to channel airflow more effectively (Zhu *et al.*, 2018). This finding aligns with broader architectural strategies that

emphasize form as a key determinant of airflow patterns. The findings presented in this study indicate that architects should prioritize elongated courtyard layouts oriented along cardinal directions to maximize natural ventilation (Figure 5).

Building height was also found to be a critical factor, as taller structures can enhance the stack effect, thus augmenting vertical airflow. However, the review highlighted a potential disadvantage: when building height exceeds the appropriate proportion relative to courtyard dimensions, upper structures may obstruct airflow at lower levels, reducing overall ventilation effectiveness. This underscores the importance of achieving a balance between building height and courtyard dimensions to ensure airflow. Architects must consider this balance carefully, integrating adequate provisions without compromising design creativity. The proportional relationship between building height and courtyard extent offers a valuable lesson—particularly for designers in areas such as Inner Mongolia, where natural cooling is critical to cope with rapid seasonal temperature changes.

### 5.3.1. Seasonal adaptation details

Temperature regulation in Inner Mongolian courtyard houses relies heavily on seasonal adaptations involving operable openings and insulated walls. In hot summers, courtyards are designed to intercept prevailing winds, thereby enhancing cross-ventilation (Li *et al.*, 2018). Strategically placed openings allow airflow to be directed into the interior, enabling climate control in structures without mechanical ventilation. Vegetation—such as trees and shrubs—within courtyards serve as a natural barrier against direct sunlight and wind, creating a cooler microclimate.

During winter, thermal insulation becomes an important design feature. Thick courtyard walls help retain interior heat by minimizing heat loss (Kakinuma *et al.*, 2019). Small courtyard designs are especially effective in preserving warmth, and window or door openings are minimized to reduce cold air infiltration. Stack ventilation continues to be used, with warm air rising and being expelled through upper vents, while cooler air enters at lower levels to maintain air circulation.

These strategies are often supported by a combination of traditional knowledge and contemporary design elements. Together, they provide sustainable architectural solutions tailored to extreme climatic conditions. Such designs reduce dependence on mechanical energy for ventilation, insulation, and thermal regulation, thereby improving occupant comfort. This approach not only promotes

environmental sustainability but also preserves cultural heritage embedded in traditional building practices.

### 5.4. CFDs and field studies: Complementary insights

The prediction of ventilation performance in courtyard buildings was conducted through this review using CFD simulations, which provided a detailed visualization of airflow patterns. CFD simulations have become a mainstream method in architectural research (Tu *et al.*, 2023), enabling designers to assess how various architectural features affect environmental performance. Analysis of CFD studies revealed that windward-facing courtyard orientation and proper positioning of openings positively impacted ventilation efficiency.

At the same time, the review underlined the necessity of verifying CFD findings through empirical field data. Several studies highlighted that CFD may not fully capture local effects, including vegetation, adjacent buildings, or microclimatic variability (Tominaga *et al.*, 2023). This highlights that while CFD offers valuable predictive insights, it should not be used in isolation. A combined approach—integrating computational modeling with field investigations—provides a more realistic assessment of ventilation performance. This is especially relevant in Inner Mongolia, where environmental factors such as wind direction, temperature, and terrain variability significantly influence airflow dynamics. Table 3 summarizes the key findings and comparisons between field studies and CFD simulations.

### 5.5. Climate-specific design adaptations

In exploring the climatic conditions most suitable for natural ventilation, particular attention must be given to regions with extreme temperature variations—such as Inner Mongolia, which experiences hot summers and extremely cold winters. The review established that courtyard structures should be able to accommodate these significant seasonal fluctuations. During the summer, design strategies should emphasize the promotion of free air exchange to maximize cooling. In contrast, during the winter, the focus should shift toward minimizing heat loss to the external environment (Azmi & Ibrahim, 2020). Literature recommendations on adaptive design principles propose practical approaches to this issue, including the partial enclosure of courtyards during the cold season and more extensive opening and ventilation during the hot season.

Furthermore, research has highlighted the common practice of incorporating vegetation within courtyards to improve thermal comfort by acting as a windbreak. This underscores the importance of well-designed landscaping strategies and the integration of physical layout features

**Table 3. Summary of field study and computational fluid dynamics (CFD) simulation comparison**

| Analysis criteria           | Field study result  | CFD findings   | Consistencies and discrepancies                                       |
|-----------------------------|---|--|---|
| Airflow patterns            | Cross-ventilation in large courtyards                     | Cross-ventilation patterns similarly observed in simulated airflow   | Consistent; minor discrepancies in localized airflow rates            |
| Seasonal performance        | Effective ventilation in summer; heat retention in winter | Simulated seasonal correlation in ventilation and thermal conditions | Consistent across seasonal variations                                 |
| Limitations and assumptions | Influenced by local climate, rock, and soil conditions    | Terrain and materials idealized; homogeneous conditions assumed      | Discrepant; local complexities not fully captured by CFD              |
| Thermal comfort             | Improved comfort noted in shaded areas                    | Internal temperatures reduced through light modification             | Consistent; shading effects closely matched                           |
| Vegetation impact           | Reduced wind speed; enhanced microclimate                 | Simulated effects of vegetation on airflow and cooling               | Consistent; simulations slightly underpredicted cooling effectiveness |

into environmental design to enhance occupant comfort. Many of these strategies offer valuable insights not only for Inner Mongolia but also for other regions with similarly harsh climates.

### 5.6. Comparative insights from courtyard-based residential designs across China

Although the present study focuses on Inner Mongolia, the examination of courtyard-based residential designs from other provinces of China provides valuable comparative insights. In Inner Mongolia, for instance, some courtyard dwellings incorporate sunken courtyards, surrounded by perimeter rooms with high thermal mass, which help moderate temperatures despite large external fluctuations (Chang *et al.*, 2017). In Henan, courtyard dwellings strike a balance between passive solar heating in winter and cross-ventilation in summer through the use of strategically placed vents and operable windows. In the humid subtropical climate of Sichuan, ventilation remains a year-round priority, resulting in the development of multi-courtyard layouts with elevated walkways that offer protected circulation paths while also helping dehumidify and cool incoming air.

These comparisons affirm that courtyard architecture is relevant for natural ventilation across diverse climates. However, they also highlight the need for additional adaptation to climate. CFD simulations and field studies conducted in Gansu and Sichuan have revealed varying stack flow behaviors due to differences in topography and humidity. The performance of traditional courtyard designs in these provinces not only validates their continued relevance but also suggests the need to integrate additional strategies into future sustainable architectural developments in Inner Mongolia.

### 5.7. Limitations and future improvements in CFDs application

While CFD simulation remains an effective tool for analyzing natural ventilation, understanding its limitations

is essential for ensuring its accurate application in real-world contexts. The reviewed literature often assumes idealized conditions—such as homogeneous wind profiles, smooth surfaces, and uniform material properties—which deviate significantly from actual environments. In practice, factors such as courtyard vegetation, dynamic occupancy patterns, surface roughness, and interference from adjacent structures markedly impact airflow behavior. Omitting these elements reduces the applicability of simulation results.

To enhance simulation reliability, future studies should consider the development of multi-scale modeling strategies, including:

- Incorporating high-resolution urban terrain data to more accurately reflect the topographic variation and overlapping built form.
- Employing LES or DES models to capture unsteady airflow in complex courtyard geometries.
- Constructing seasonal boundary condition profiles to simulate ventilation dynamics under varying climatic conditions.
- Conducting *in-situ* experiments or utilizing sensor-based real-time data acquisition in occupied courtyard dwellings.

Such approaches can complement CFD analysis by identifying perceived, rather than simulated, comfort mismatches that trigger user feedback in performance assessments. It is therefore recommended that future research on the ventilation performance of traditional and modern courtyard designs rely on the convergence of digital simulation, empirical validation, and occupant experience.

### 5.8. Practical performance and occupant experience

The effectiveness of natural ventilation strategies in courtyard houses relies on residents' interaction with the space, rather than on simulation-based models. Post-

occupancy surveys and longitudinal environmental monitoring, as conducted in several reviewed studies—including those in Henan and Inner Mongolia—revealed that courtyard dwellings with flexible spatial layouts and user-operable features (e.g., mobile interior partitions and pivoting shutters) achieved higher thermal comfort ratings, especially during shoulder seasons (Pilechiha *et al.*, 2022). Early summer and late spring were identified as the most comfortable periods for natural cooling, whereas thermal discomfort was reported in enclosed courtyards lacking adjustable openings during winter inversions. These findings imply that responsive design is required to accommodate varying user needs on both daily and seasonal timescales. In addition, long-term energy consumption records indicated that courtyard-type dwellings for passive ventilation consumed up to 30% less energy than modern apartments in the same regions, which rely heavily on HVAC systems (Abuhussain *et al.*, 2022). These real-world insights add support to the value of integrating adaptive, user-informed design principles with traditional architectural logic.

### 5.9. Cultural continuity and urban adaptation

Traditional courtyard dwellings are not merely physical structures; they are cultural constructs developed over centuries in response to environmental, social, and symbolic conditions. In Inner Mongolia, residential structures exemplify spatial models that foster familial closeness, hierarchical organization, and seasonal rituals—such as those associated with the Mid-Autumn Festival or traditional spring cleaning—conducted within the courtyard. These spaces supported a range of activities, including drying clothes, elder care, storytelling, and sheltering livestock, all of which contributed to both physical comfort and social cohesion.

In the context of contemporary urbanization, densification, standardized housing models, and policy-driven spatial planning, such cultural practices face increasing pressure. Nevertheless, research by Melioui *et al.* (2023) explores the reinterpretation of courtyard principles within the framework of modern eco-districts, housing estates, and urban infill projects. Emerging hybrid typologies aim to integrate the spatial centrality and communal ethos of traditional courtyards while addressing modern demands for privacy, infrastructure, and modular construction. This demonstrates that cultural heritage and innovation are not mutually exclusive, especially when aligned with goals of environmental and social sustainability. Thus, the courtyard should not be viewed as a historical relic, but rather as a regenerative spatial idea with potential for reshaping the future of residential living.

## 6. Conclusion

As discussed in this article, this systematic literature review aimed to provide an analytical overview of how natural ventilation has been optimized in the courtyard housing typology, with insights drawn from the traditional architecture of the Inner Mongolia region. The review integrated findings from CFD simulations, field surveys, and case studies to identify the key factors influencing natural ventilation in residential buildings located in hot temperate climate zones. These findings are relevant for architects, planners, and researchers engaged in sustainable residential design.

First, spatial arrangement emerged as a key component in enhancing natural ventilation. Courtyard houses featuring rooftop openings oriented toward the windward side, more than two opposing openings, and layouts aligned with prevailing wind directions exhibited superior natural ventilation and thermal comfort. These results underscore the importance of architectural design that leverages favorable local climatic conditions, especially in regions such as Inner Mongolia, where strong winds and season variations may cause discomfort in enclosed structures. This insight is particularly valuable for encouraging the adoption of natural ventilation strategies to reduce reliance on energy-intensive mechanical systems such as HVACs.

Second, building geometry—particularly height—was identified as a critical determinant of ventilation performance. This review found that courtyards with larger surface areas or elongated rectangular layouts offered better ventilation outcomes than small, square, or circular designs. Newer structures also improved vertical ventilation by utilizing the stack effect, wherein cool air is drawn in at the base while warm air is expelled at higher elevations. Nonetheless, excessive building height may impede airflow at ground level, effectively obstructing circulation. Therefore, designers must strike a careful balance between height and courtyard dimensions to achieve optimal ventilation through proportionate architectural relationships.

Third, CFD simulations offered valuable information regarding airflow characteristics within courtyard buildings, but their findings must be interpreted with caution and validated through field studies. While CFD provides predictive capabilities, field measurements capture the influence of real-world environmental variables, including adjacent structures and vegetation. Thus, combining computational and empirical approaches is essential to achieve the precision required in ventilation design.

Fourth, the study confirms that courtyard architecture in Inner Mongolia is not only environmentally responsive

but also culturally meaningful. The orientation, layout, and use of courtyards reflect values such as collectivism, seasonal rituals, and harmony with nature. These values remain applicable in modern sustainable housing design, where thermal efficiency and community well-being are equally important. Cultural grounding can inform modern design in reconceptualizing courtyards in urban housing, from high-density developments to mixed-use communal living spaces, thereby promoting human-centered architecture. Retaining the courtyard as a shared microclimate and passive ventilation hub fosters more holistic and resilient urban environments.

Finally, although this study focuses on Inner Mongolian architecture, its findings have broader applicability across China. Comparative analysis with other regions—such as Gansu, Henan, and Sichuan—demonstrates how courtyard design principles evolve in response to varying climatic conditions, from arid deserts to humid basins. The regional examples confirm the adaptability of courtyard ventilation strategies, validating design principles such as cross-ventilation, stack effects, and passive cooling. Such comparative insights help to shape a flexible design framework that can guide sustainable residential development not only in Inner Mongolia but throughout China and potentially in similar climatic contexts worldwide.

## Acknowledgments

None.

## Funding

This study was funded by the Sarawak Government through Jabatan Tanah dan Survei Sarawak. The funding includes Project No. PY/2024/00847 (vote No. R.J 130000.7352.1R062), titled “SWK 13.1: Study on Centrality Potential on Smart Infrastructure via Space Syntax Network Analysis of the Strategic Sustainable Growth Development for Petra Jaya,” and Project No. PY/2024/00864 (vote No. R.J130000.7352.1R061), titled “SWK 13.0: Space Syntax Approach in Achieving a Sustainable Quality of Life in Urban Growth Related to Urban Design, Housing, Architectural Development, and Natural Aspects of Heritage-Based Tourism Attraction: The Case of Petra Jaya, Kuching.”

## Conflict of interest

The authors declare that they have no competing interests.

## Author contributions

*Conceptualization:* Shangbing Ma

*Investigation:* Sharifah Salwa Syed Mahdzar

*Methodology:* Shangbing Ma, Sharifah Salwa Syed Mahdzar

*Visualization:* Shangbing Ma

*Writing – original draft:* Shangbing Ma, Sharifah Salwa Syed Mahdzar, Nor Izura Tukiman, Pau Chung Leng

*Writing – review & editing:* Sharifah Salwa Syed Mahdzar, Nor Izura Tukiman, Pau Chung Leng

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

## References

- Abass, F., Ismail, L. H., & Solla, M. (2016). A review of courtyard house: History evolution forms, and functions. *ARP Journal of Engineering and Applied Sciences*, 11(4), 2557-2563.
- Abuhussain, M. A., Al-Tamimi, N., Alotaibi, B. S., Singh, M. K., Kumar, S., & Elnaklah, R. (2022). Impact of courtyard concept on energy efficiency and home privacy in Saudi Arabia. *Energies*, 15(15), 5637.  
<https://doi.org/10.3390/en15155637>
- Afshin, M., Sohankar, A., Manshadi, M. D., & Esfeh, M. K. (2016). An experimental study on the evaluation of natural ventilation performance of a two-sided wind-catcher for various wind angles. *Renewable Energy*, 85, 1068-1078.  
<https://doi.org/10.1016/j.renene.2015.07.036>
- Azimi, Z., & Shafaat, A. (2024). Proposing design strategies for contemporary courtyards based on thermal comfort in cold and semi-arid climate zones. *Building and Environment*, 266, 112150.  
<https://doi.org/10.1016/j.buildenv.2024.112150>
- Azmi, N. A., & Ibrahim, S. H. (2020). A comprehensive review on thermal performance and envelope thermal design of mosque buildings. *Building and Environment*, 185, 107305.  
<https://doi.org/10.1016/j.buildenv.2020.107305>
- Benni, S., Tassinari, P., Bonora, F., Barbaresi, A., & Torreggiani, D. (2016). Efficacy of greenhouse natural ventilation: Environmental monitoring and CFD simulations of a study case. *Energy and Buildings*, 125, 276-286.  
<https://doi.org/10.1016/j.enbuild.2016.05.014>
- Borro, L., Mazzei, L., Raponi, M., Piscitelli, P., Miani, A., & Secinaro, A. (2021). The role of air conditioning in the diffusion of Sars-CoV-2 in indoor environments: A first

- computational fluid dynamic model, based on investigations performed at the Vatican State Children's hospital. *Environmental Research*, 193, 110343.  
<https://doi.org/10.1016/j.envres.2020.110343>
- Chandel, S. S., Sharma, V., & Marwah, B. M. (2016). Review of energy efficient features in vernacular architecture for improving indoor thermal comfort conditions. *Renewable and Sustainable Energy Reviews*, 65, 459-477.  
<https://doi.org/10.1016/j.rser.2016.07.038>
- Chang, C., Zhu, N., & Shang, J. (2017). The study of occupant behavior analysis of Inner Mongolia in regard to heating energy consumption. *Procedia Engineering*, 205, 915-922.  
<https://doi.org/10.1016/j.proeng.2017.10.122>
- Chen, T., Feng, Z., & Cao, S. J. (2020). The effect of vent inlet aspect ratio and its location on ventilation efficiency. *Indoor and Built Environment*, 29(2), 180-195.  
<https://doi.org/10.1177/1420326X19865930>
- Chi, F. A., Xu, L., & Peng, C. (2020). Integration of completely passive cooling and heating systems with daylighting function into courtyard building towards energy saving. *Applied Energy*, 266, 114865.  
<https://doi.org/10.1016/j.apenergy.2020.114865>
- Chiang, W. H., & Anh, N. D. (2012). Natural Ventilation Inside Courtyard-Apartment Building in Taiwan. In: *Fourth German-Austrian IBPSA Conference*, pp. 392-399.
- Cuce, E., Sher, F., Sadiq, H., Cuce, P. M., Guclu, T., & Besir, A. B. (2019). Sustainable ventilation strategies in buildings: CFD research. *Sustainable Energy Technologies and Assessments*, 36, 100540.  
<https://doi.org/10.1016/j.seta.2019.100540>
- Da Graça, G. C., & Linden, P. (2016). Ten questions about natural ventilation of non-domestic buildings. *Building and Environment*, 107, 263-273.  
<https://doi.org/10.1016/j.buildenv.2016.08.007>
- Elshafei, G., Negm, A., Bady, M., Suzuki, M., & Ibrahim, M. G. (2017). Numerical and experimental investigations of the impacts of window parameters on indoor natural ventilation in a residential building. *Energy and Buildings*, 141, 321-332.  
<https://doi.org/10.1016/j.enbuild.2017.02.055>
- Etheridge, D. (2015). A perspective on fifty years of natural ventilation research. *Building and Environment*, 91, 51-60.  
<https://doi.org/10.1016/j.buildenv.2015.02.033>
- Garcia, J., Muñoz-Paniagua, J., & Crespo, A. (2017). Numerical study of the aerodynamics of a full scale train under turbulent wind conditions, including surface roughness effects. *Journal of Fluids and Structures*, 74, 1-18.  
<https://doi.org/10.1016/j.jfluidstructs.2017.07.007>
- Gilani, S., Montazeri, H., & Blocken, B. (2016). CFD simulation of stratified indoor environment in displacement ventilation: Validation and sensitivity analysis. *Building and Environment*, 95, 299-313.  
<https://doi.org/10.1016/j.buildenv.2015.09.010>
- Gopang, M. A., Nebhwani, M., Khatri, A., & Marri, H. B. (2017). An assessment of occupational health and safety measures and performance of SMEs: An empirical investigation. *Safety Science*, 93, 127-133.  
<https://doi.org/10.1016/j.ssci.2016.11.024>
- Haig, C. W., Mackay, W. G., Walker, J. T., & Williams, C. (2016). Bioaerosol sampling: Sampling mechanisms, bioefficiency and field studies. *Journal of Hospital Infection*, 93(3), 242-255.  
<https://doi.org/10.1016/j.jhin.2016.03.017>
- Huang, Y., Wang, Y., Liu, L., Nielsen, P. V., Jensen, R. L., & Yan, F. (2015). Reduced-scale experimental investigation on ventilation performance of a local exhaust hood in an industrial plant. *Building and Environment*, 85, 94-103.  
<https://doi.org/10.1016/j.buildenv.2014.11.038>
- Jomehzadeh, F., Hussen, H. M., Calautit, J. K., Nejat, P., & Ferwati, M. S. (2020). Natural ventilation by windcatcher (Badgir): A review on the impacts of geometry, microclimate and macroclimate. *Energy and Buildings*, 226, 110396.  
<https://doi.org/10.1016/j.enbuild.2020.110396>
- Kakinuma, K., Yanagawa, A., Sasaki, T., Rao, M. P., & Kanae, S. (2019). Socio-ecological interactions in a changing climate: A review of the Mongolian pastoral system. *Sustainability*, 11(21), 5883.  
<https://doi.org/10.3390/su11215883>
- Kheiri, F. (2018). A review on optimization methods applied in energy-efficient building geometry and envelope design. *Renewable and Sustainable Energy Reviews*, 92, 897-920.  
<https://doi.org/10.1016/j.rser.2018.04.080>
- Lee, K. Y., & Mak, C. M. (2021). Effects of wind direction and building array arrangement on airflow and contaminant distributions in the central space of buildings. *Building and Environment*, 205, 108234.  
<https://doi.org/10.1016/j.buildenv.2021.108234>
- Li, C., Leal Filho, W., Wang, J., Yin, J., Fedoruk, M., Bao, G., et al. (2018). An assessment of the impacts of climate extremes on the vegetation in Mongolian Plateau: Using a scenarios-based analysis to support regional adaptation and mitigation options. *Ecological Indicators*, 95, 805-814.  
<https://doi.org/10.1016/j.ecolind.2018.08.031>
- Li, J., Wu, X., Chow, S. K., Zhuang, Q., & Habert, G. (2023). Thermal comfort comparison and cause analysis of low-temperature high-humidity indoor environments of rural houses in Gansu Province, China. *Sustainability*, 15(23), 16428.

- <https://doi.org/10.3390/su152316428>
- Li, W., & Chen, Q. (2021). Design-based natural ventilation cooling potential evaluation for buildings in China. *Journal of Building Engineering*, 41, 102345.  
<https://doi.org/10.1016/j.jobe.2021.102345>
- Lu, H., Zhang, Z., & Yang, L. (2018). A review on airflow distribution and management in data center. *Energy and Buildings*, 179, 264-277.  
<https://doi.org/10.1016/j.enbuild.2018.08.050>
- Maeng, H., & Hyun, K. H. (2020). Multi-objective pareto optimization of tensile membrane architecture for energy harvesting. *Applied Sciences*, 10(18), 6231.  
<https://doi.org/10.3390/app10186231>
- Maghrabie, H. M., Abdelkareem, M. A., Elsaid, K., Sayed, E. T., Radwan, A., Rezk, H., et al. (2022). A review of solar chimney for natural ventilation of residential and non-residential buildings. *Sustainable Energy Technologies and Assessments*, 52, 102082.  
<https://doi.org/10.1016/j.seta.2022.102082>
- Mahmoud, E. S., Badrawy, A. E., & Mousa, M. G. S. (2020). The role of atriums and courtyards in improving natural light and ventilation in hospitals. *MEJ-Mansoura Engineering Journal*, 44(4), 1-15.  
<https://doi.org/10.21608/bfemu.2020.95011>
- Meliouh, F., Sekhri, A., Aoul, K. A. T., & Hamel, K. (2023). Post-occupancy evaluation of the neo-vernacular "courtyard" in contemporary mass housing. Case study: 124 duplex dwellings by the El Miniawy brothers in Biskra (Algeria). *Technium Social Sciences Journal*, 40, 511.
- Omrani, S., Garcia-Hansen, V., Capra, B. R., & Drogemuller, R. (2017). Effect of natural ventilation mode on thermal comfort and ventilation performance: Full-scale measurement. *Energy and Buildings*, 156, 1-16.  
<https://doi.org/10.1016/j.enbuild.2017.09.061>
- Passe, U., & Battaglia, F. (2015). *Designing Spaces for Natural Ventilation: An Architect's Guide*. England: Routledge.
- Pathirana, S., Rodrigo, A., & Halwatura, R. (2019). Effect of building shape, orientation, window to wall ratios and zones on energy efficiency and thermal comfort of naturally ventilated houses in tropical climate. *International Journal of Energy and Environmental Engineering*, 10(1), 107-120.  
<https://doi.org/10.1007/s40095-018-0295-3>
- Peng, Y., Gao, Z., Buccolieri, R., & Ding, W. (2019). An investigation of the quantitative correlation between urban morphology parameters and outdoor ventilation efficiency indices. *Atmosphere*, 10(1), 33.  
<https://doi.org/10.3390/atmos10010033>
- Pilechiha, P., Norouziasas, A., Ghorbani Naeini, H., & Jolma, K. (2022). Evaluation of occupant's adaptive thermal comfort behaviour in naturally ventilated courtyard houses. *Smart and Sustainable Built Environment*, 11(4), 793-811.  
<https://doi.org/10.1108/SASBE-02-2021-0020>
- Porras-Amores, C., Mazarrón, F. R., Cañas, I., & Sáez, P. V. (2019). Natural ventilation analysis in an underground construction: CFD simulation and experimental validation. *Tunnelling and Underground Space Technology*, 90, 162-173.  
<https://doi.org/10.1016/j.tust.2019.04.023>
- Qureshi, R. A., Akhtar, M., & Shah, S. J. (2019). Deep beauty in architecture: Comparative analysis of the traditional-courtyard and the contemporary residences of lahore. *Pakistan Journal of Engineering and Applied Sciences*, 25, 64-79. Available from: [https://journal.uet.edu.pk/ojs\\_old/index.php/pjeas/article/view/1737](https://journal.uet.edu.pk/ojs_old/index.php/pjeas/article/view/1737) [Last accessed on 2025 Jun 30].
- Rabani, M., Kalantar, V., Dehghan, A. A., & Faghih, A. K. (2015). Empirical investigation of the cooling performance of a new designed Trombe wall in combination with solar chimney and water spraying system. *Energy and Buildings*, 102, 45-57.  
<https://doi.org/10.1016/j.enbuild.2015.05.010>
- Rakhmanov, R. S., Bogomolova, E. S., Narutdinov, D. A., Razgulin, S. A., Potekhina, N. N., & Nepryakhin, D. V. (2022). Assessment of bioclimatic indices in the territories of the subarctic and continental climatic zones of the Krasnoyarsk Territory. *Hygiene and Sanitation*, 101(3), 288-293.  
<https://doi.org/10.47470/0016-9900-2022-101-3-288-293>
- Ricci, A., Kalkman, I. M., Blocken, B., Burlando, M., Freda, A., & Repetto, M. P. (2016). Inflow Condition Sensitivity in the CFD Simulation of Wind Flow in the Urban Environment. In: *8<sup>th</sup> International Colloquium on Bluff Body Aerodynamics and Applications (BBAA VIII)*, June 7-11, 2016, Northeastern University, Boston, Massachusetts, USA, pp. 1-10. Available from: <https://www.northeastern.edu/bbaa8> [Last accessed on 2025 Jun 30].
- Schulze, T., & Eicker, U. (2013). Controlled natural ventilation for energy efficient buildings. *Energy and Buildings*, 56, 221-232.  
<https://doi.org/10.1016/j.enbuild.2012.07.044>
- Tafti, F. A., Rezaeian, M., & Razavi, S. E. (2018). Sunken courtyards as educational environments: Occupant's perception and environmental satisfaction. *Tunnelling and Underground Space Technology*, 78, 124-134.  
<https://doi.org/10.1016/j.tust.2018.04.023>
- Tominaga, Y., Wang, L. L., Zhai, Z. J., & Stathopoulos, T. (2023). Accuracy of CFD simulations in urban aerodynamics and microclimate: Progress and challenges. *Building and Environment*, 243, 110723.  
<https://doi.org/10.1016/j.buildenv.2023.110723>
- Tu, J., Yeoh, G. H., Liu, C., & Tao, Y. (2023). *Computational Fluid Dynamics: A Practical Approach*. Netherlands: Elsevier.

- Vermeulen, S. J., Dinesh, D., Howden, S. M., Cramer, L., & Thornton, P. K. (2018). Transformation in practice: A review of empirical cases of transformational adaptation in agriculture under climate change. *Frontiers in Sustainable Food Systems*, 2, 65.  
<https://doi.org/10.3389/fsufs.2018.00065>
- Wang, B., & Malkawi, A. (2019). Design-based natural ventilation evaluation in early stage for high performance buildings. *Sustainable Cities and Society*, 45, 25-37.  
<https://doi.org/10.1016/j.scs.2018.11.024>
- Wang, F., Yu, F., Zhu, X., Pan, X., Sun, R., & Cai, H. (2016). Disappearing gradually and unconsciously in rural China: Research on the sunken courtyard and the reasons for change in Shanxian County, Henan Province. *Journal of Rural Studies*, 47, 630-649.  
<https://doi.org/10.1016/j.jrurstud.2016.05.011>
- Xu, L., Chi, F. A., & Peng, C. (2020). Integration of completely passive cooling and heating systems with daylighting function into courtyard building towards energy saving. *Applied Energy*, 266, 114865.  
<https://doi.org/10.1016/j.apenergy.2020.114865>
- Xu, X., Luo, F., Wang, W., Hong, T., & Fu, X. (2018). Performance-based evaluation of courtyard design in China's cold-winter hot-summer climate regions. *Sustainability*, 10(11), 3950.  
<https://doi.org/10.3390/su10113950>
- Yu, X., Yan, D., Sun, K., Hong, T., & Zhu, D. (2016). Comparative study of the cooling energy performance of variable refrigerant flow systems and variable air volume systems in office buildings. *Applied Energy*, 183, 725-736.  
<https://doi.org/10.1016/j.apenergy.2016.09.033>
- Zamani, Z., Heidari, S., & Hanachi, P. (2018). Reviewing the thermal and microclimatic function of courtyards. *Renewable and Sustainable Energy Reviews*, 93, 580-595.  
<https://doi.org/10.1016/j.rser.2018.05.055>
- Zhang, D. (2015). Classical courtyard houses of Beijing: Architecture as cultural artifact. *Space and Communication*, 1(1), 47-68.  
<https://doi.org/10.15340/2148172511881>
- Zhang, X., Weerasuriya, A. U., & Tse, K. T. (2020). CFD simulation of natural ventilation of a generic building in various incident wind directions: Comparison of turbulence modelling, evaluation methods, and ventilation mechanisms. *Energy and Buildings*, 229, 110516.  
<https://doi.org/10.1016/j.enbuild.2020.110516>
- Zhu, Y., Fan, X., Wang, C., & Sang, G. (2018). Analysis of heat transfer and thermal environment in a rural residential building for addressing energy poverty. *Applied Sciences*, 8(11), 2077.  
<https://doi.org/10.3390/app8112077>

Appendix

Table A1. Summary of results

| Aspect   | Findings   |
|--|--|
| Spatial arrangement                                    | <ul style="list-style-type: none"> <li>- Houses that have windward facades with opposite openings had improved cross ventilation.</li> <li>- These measures, particularly orientation to prevailing winds, enhance airflow in the barn to a great extent.</li> </ul>   |
| Courtyard layout                                       | <ul style="list-style-type: none"> <li>- The nature of the form: larger elongated planets increase the airflow compared to square or round-shaped courtyards.</li> <li>- Several openings provide good ventilation and alleviate heat effects on the courtyard and the contiguous areas.</li> </ul>  |
| Building geometry                                      | <ul style="list-style-type: none"> <li>- Closer spaced structures create fissures that allow vertical air circulation, an advantage of the “stack effect,” ideal for natural ventilation.</li> <li>- When the building height is much larger in terms of height to the courtyard area, there will be some unfavorable “wind shadows” that will discourage flow at lower levels.</li> </ul> |
| Computational fluid dynamics (CFD) simulation insights | <ul style="list-style-type: none"> <li>- CFD models, in turn, show that the windward orientation of the courtyard and appropriate positioning of openings enhances the natural ventilation.</li> <li>- Courtyard layouts are designed to correspond to the wind pattern anticipated by CFD thus enhancing ventilation effectiveness.</li> </ul>  |
| Empirical validation                                   | <ul style="list-style-type: none"> <li>- Field observation confirmed CFD prediction with differences attributed to site-specific characteristics such as vegetation and adjacent structures.</li> <li>- Ventilation calculations must be validated empirically to construct configurations that function as designed in real-world environments.</li> </ul>                                |
| Climate-specific adaptation                            | <ul style="list-style-type: none"> <li>- Some courtyard designs can be made to allow for a summer breeze and restricted winter heat loss.</li> <li>- Planted orders within the courtyards function as windbreakers which enable control of microclimates.</li> </ul>   |

## ORIGINAL ARTICLE

## Top-down rural heritage revitalization and economic development: A case study of Tangwei village, Dongguan, Guangdong, China

Lok-yin Law<sup>1\*</sup>, Huiwei Chen<sup>2</sup>, Shuwen Liu<sup>3</sup>, and Ming-hin Cheung<sup>4</sup><sup>1</sup>Department of Chinese Language Studies, Faculty of Humanities, The Education University of Hong Kong, Hong Kong SAR, China<sup>2</sup>Department of Urban and Rural Planning, School of Architecture and Urban Planning, Guangdong University of Technology, Guangzhou, Guangdong, China<sup>3</sup>Department of Social Sciences and Policy Studies, Faculty of Liberal Arts and Social Sciences, The Education University of Hong Kong, Hong Kong SAR, China<sup>4</sup>Independent Researcher, London, United Kingdom(This article belongs to *Special Issue: Regenerating Views, Values, and Visions in Countryside Conservation in Chinese Societies*)**\*Corresponding author:**Lok-yin Law  
(llylaw@eduhk.hk)**Citation:** Law, L., Chen, H., Liu, S. & Cheung, M. (2025). Top-down rural heritage revitalization and economic development: A case study of Tangwei village, Dongguan, Guangdong, China. *Journal of Chinese Architecture and Urbanism*, 7(3): 5029.  
<https://doi.org/10.36922/jcau.5029>**Received:** October 3, 2024**1st revised:** November 6, 2024**2nd revised:** December 1, 2024**3rd revised:** December 14, 2024**Accepted:** December 30, 2024**Published online:** February 4, 2025**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.**Abstract**

Tangwei village, located in Dongguan's rapidly urbanizing Pearl River Delta region, Guangdong, illustrates the challenges and opportunities of balancing heritage preservation with rural revitalization in contemporary China. Designated as a major cultural heritage site in 2006, the village's preservation strategies reflect the interplay between provincial policies, local government planning, and a broader national emphasis on tourism-driven economic development. This research examines how government-led rural heritage revitalization initiatives shape cultural preservation in Tangwei village. By analyzing this historic village – designated as a Major Cultural Heritage Site under National-level Protection in 2006 – the study reveals how local authorities strategically leverage cultural symbols and heritage practices to promote tourism development, often in ways disconnected from authentic community traditions. The findings demonstrate that while heritage tourism initiatives aim to enhance the village's visibility and economic group, their top-down implementation primarily serves government economic objectives rather than addressing community preservation needs. Drawing on fieldwork, visual documentation, oral histories, and textual analysis, the study illuminates the complex dynamics between local governance, tourism development imperatives, and rural heritage preservation in contemporary China. It underscores how traditional cultural practices are increasingly commodified and detached from local communities through standardized festivals and artistic interventions. This research contributes to a deeper understanding of how state-driven rural revitalization policies reshape heritage landscapes and alter community relationships with traditional spaces in rapidly urbanizing regions.

**Keywords:** Rural heritage revitalization; Top-down economic development; Tangwei village, Dongguan; Cultural tourism and heritage-making; Government-led rural revitalization strategies

## 1. Introduction

Dongguan, a significant industrial center within the Pearl River Delta economic zone of Guangdong, China, has experienced rapid urbanization and a gradual transformation of its rural villages since the establishment of the Shenzhen Special Economic Zone. In 2006, Tangwei village (塘尾村), along with the adjacent Nanshe village (南社村), was designated as a Major Cultural Heritage Site under National-level Protection (全国重点文物保护单位) by the State Council of the People's Republic of China (PRC) in 2006 (Jiang & Cheng, 2014) (Figure 1). The preservation strategies in Tangwei village have been shaped by a combination of provincial government policies and local planning efforts. For example, the Shipai town (石排镇) government released the Shipai Town Tangwei Ancient Town Area Detailed Control Plan (石排镇塘尾古城片区控制性详细规划) (Li, 2010) in 2010.

Following China's reform and opening up, the concept of “*nongjiale*” (农家乐; farmhouse tourism) began gaining traction among Chinese scholars. However, the term “rural tourism” did not become prevalent in Chinese academic discourse until the 1990s. Rural tourism in China initially emerged in the 1980s with a clear focus on poverty alleviation through tourism rather than serving alternative functions (Yang *et al.*, 2021). Economic policies enacted post-reform period expanded possibilities for rural livelihoods and the introduction of a 5-day workweek in the mid-1990s popularized weekend tourism. In 2001, the PRC government underscored the significance of tourism in the new century, establishing it as a pivotal element in economic development and rural revitalization under national policy promotion (Gao *et al.*, 2009).

In 2018, the State Council unveiled a strategic plan for rural revitalization, recognizing the protection and utilization of traditional rural culture as a means to promote the excellent traditional Chinese culture (Xue *et al.*, 2021). This plan emphasized the preservation of original architectural styles and villages, uncovering historical charm, fostering humanistic spirit, and integrating intangible cultural heritage and ethnic activities to ultimately develop cultural industries. In 2022, the Guangdong Provincial Government initiated the High-Quality Development Project for 100 Counties, 1000 Towns, and 10,000 Villages to promote rural revitalization, address urban–rural disparities, and render rural areas suitable for habitation and work. Commonly referred to as the Hundred-Thousand-Ten Thousand Project, this initiative provides a framework for revitalization strategies in Tangwei village. Concurrently, Chinese President Xi Jinping's discourses on the preservation of historical villages and towns have been prominently featured in



Figure 1. Main gate of Tangwei village, Dongguan, Guangdong, China. Source: Photo by the authors (2024)

official media over the past decade (Xi, 2024), serving as a top-down impetus for rural tourism and revitalization efforts in recent years. External factors, such as travel restrictions related to COVID-19 (Tang *et al.*, 2022) and enhancements to the high-speed rail network (Yao *et al.*, 2022), have further invigorated domestic rural heritage tourism in China.

Previous studies have found that promoting heritage tourism and rural tourism can help increase the visibility of villages and boost villagers' income (Su *et al.*, 2016). Such measures can also enhance villagers' sense of belonging, serving as a driving force for preserving traditional village appearances (Qin & Leung, 2021). However, in South China, it remains unclear whether the preservation models of these villages reflect the collective will of the villagers or a top-down approach driven by economic goals. Tangwei village, a historical village with minimal commercial and economic elements, offers a unique opportunity for reflection.

Current research in Chinese academia has yielded significant findings on the revitalization and architectural conservation of Tangwei village. For instance, Luo *et al.* (2019) conducted on-site investigations to assess the effectiveness of implemented measures in Tangwei village. Their study highlighted issues arising from the idealization of revitalization policies, particularly noting that the overall planning paid insufficient attention to residents' daily lives. Similar observations were made in Chen *et al.* (2023) study on the theory of “darning” and the restoration of Tangwei village's landscape spaces.

In addition, Tian *et al.* (2024) employed social network analysis and spatial structure perspectives to explore transformation patterns in traditional clan-based living settlements. This approach sought to identify new methods for sustaining and revitalizing local traditional settlements.

While these studies primarily treat Tangwei village as a case study for practical architectural and village

revitalization strategies, they overlook its potential as a lens for analyzing the mindset of national or local governments regarding rural revitalization measures. To address this gap, this article aims to re-examine the factors contributing to Tangwei village's revitalization approach from a different perspective.

As Wen (2020) posits, heritage-making is a process that reorganizes everyday traditions and practices to align with local economic strategies. Wen examines the interplay between cultural heritage and economic development in Dongkeng of Dongguan, Guangdong, during China's transition from the reform era to the "new era." Confronted with the need for industrial restructuring in the early 2000s, Dongkeng's local government strategically reconstructed the folk singing tradition of *muyuge* (木魚歌) as an intangible cultural heritage. By establishing *muyuge* as a local cultural brand and integrating it into economic and cultural development initiatives, Dongkeng demonstrates how local governments in China repurpose traditions and cultural resources to reshape socioeconomic development. This process emphasizes traditional culture and consolidates a nationalistic cultural identity. This heritage-making process in Dongkeng provides valuable insights into the complex dynamics between cultural preservation, local governance, and economic imperatives in contemporary China.

This article builds on Wen's concept of the relationship between heritage-making and economic development, utilizing the revitalization and preservation of Tangwei village in Dongguan, Guangdong, China, as a case study. The research adopts a qualitative methodology, drawing on multiple data sources collected during field investigations conducted in Tangwei village in 2024.

Data collection methods include:

- (i). Visual documentation: Photographs and videos were captured to document the village's physical environment, architectural features, and cultural activities
- (ii). Oral histories: Semi-structured interviews were conducted with villagers, artists, and local officials to gather their perspectives on the revitalization process, traditional practices, and the impact of government initiatives. A total of five interviews, each lasting between 30 and 60 min, were completed
- (iii). Textual analysis: Official documents, village records, media reports, and academic literature related to Tangwei village and rural revitalization policies were reviewed. This analysis provided context and triangulated findings from the visual and oral data.

The research focuses on how local government and village representatives strategically utilize artistic symbols

and intangible cultural heritage projects to showcase the village's historical and cultural significance. In addition, it examines how the reorganization of the village's daily functions reflects the impact of China's economy-driven rural tourism activities on the preservation of historical villages. Through this multimethod approach and in-depth analysis, the research aims to provide a nuanced understanding of the complex dynamics between local governance and rural space preservation in China, as exemplified by the heritage revitalization efforts in Tangwei village.

## 2. Tangwei village: Historical context and current conditions

According to records from the State Council, Tangwei village currently preserves 268 houses, 21 ancestral halls, 19 study rooms (in the context of this article, "study room" refers to a house traditionally used for scholarly activities), three *jiadian* (家塾; family shrines), and four village gates from the Ming (1368 – 1644) and Qing (1644 – 1911) dynasties. These features make it one of the most well-preserved historical villages in Lingnan (岭南; a geographical and cultural region in southern China traditionally encompassing Guangdong, Guangxi, Hainan, and parts of southern Fujian, and northern Vietnam, bounded by the Nanling Mountains in the north and the South China Sea to the south) (Jiang & Cheng, 2014). The history of Tangwei village can be traced back to the Southern Song dynasty (1127 – 1279). Li Kui (李魁, 1265 – unknown death date), also known as Li'an Gong, was a descendant of the Neo-Confucian scholar Li Yong (李用, 1198 – 1279), who is noted for spreading Confucianism to Japan (Luo, 2003). At the end of the Southern Song Dynasty, Li Kui moved from Baima Village (白馬村) in Dongguan to settle in Tangwei village, where he established a school. Li Yong's son, Li Chunsou (李春叟, 1219 – 1298), was a *juren* (舉人; an individual who passed the provincial-level imperial civil service examination) during the Southern Song dynasty. Li Kui's son-in-law, Xiong Fei (熊飛, unknown birth date–1276), led troops in response to Wen Tianxiang's (文天祥, 1127 – 1279) call to resist the Yuan dynasty (1271 – 1368) but ultimately died in the battle. Before Li Kui's relocation, no written records of Tangwei village existed, but it is believed to have been a mixed-surname settlement. During the Ming dynasty, the Li clan began compiling genealogies. In the Kangxi era (1661 – 1722) of the Qing dynasty, they built new ancestral halls, study rooms, and village walls, reflecting improvements in the village's economic and cultural conditions. From the late 19<sup>th</sup> century to the early 20<sup>th</sup> century, members of the Li clan expanded their economic activities to Shilong, Hong Kong, and other places. Village records indicate that during this time, the

population of Tangwei villagers living in Guangzhou and Hong Kong was comparable to the number living in the village. In recent years, the village's temporary resident population from other provinces has exceeded 3,000, whereas the local population is just over 300 – a disparity of more than tenfold, indicating significant demographic changes (Tangwei Village Editorial Committee *et al.*, 2019).

In the 1970s, Tangwei villagers began building new houses outside the village walls, forming Dongcun (东村, Eastern Village), and Xicun (西村, Western Village). In 1987, Xianyantou village (香元头村) was planned, facilitating further relocation of villagers outside the historical village walls (Guangdong Provincial Cultural Center – Intangible Cultural Heritage Center, 2018). In an interview with students from Guangdong University of Technology in August 2024, the village committee pointed out that the 1980s marked a turning point, with most villagers born after this period growing up outside the village. In 2002, the Ming and Qing architectural complex of Tangwei village was designated as part of the fourth batch of cultural relic protection units in Guangdong province (Jiang & Cheng, 2014). Consequently, the construction of new houses and other buildings within the village was strictly prohibited. This policy has gradually estranged the villagers from their ancestral village, as many now reside in newer settlements outside its historical boundaries.

After being designated as a provincial-level cultural relic protection unit in 2003, the Shipai town government commissioned the South China University of Technology to formulate a protection plan. This initiative marked the beginning of architectural restoration design and the collection of various local historical and cultural records in the village. In 2006, Tangwei village achieved further recognition when it was selected as a major cultural heritage site under national-level protection – the highest level of protection for immovable cultural relics in China, encompassing more than 5,000 units nationwide. As part of this recognition, the Nanshe Village and Tangwei Village Historical Architectural Complex in Dongguan City was included as a historical architectural relic in the sixth batch of listings announced by the State Council. The completeness of the layout and the well-preserved ancestral halls and historical houses in both villages were key factors in their inclusion on the list. In 2007, Tangwei village was officially recognized as a Chinese Historical and Cultural Village, and in 2016, it became a 4A-level tourist attraction. These impressive achievements have connected Tangwei village with emerging concepts such as cultural tourism and rural revitalization, forming the foundation of its current revitalization efforts. Consequently, in 2018, the Shipai town government began restoration work on the

historical Tangwei village and initiated plans to revitalize and utilize the historical architectural complex after the restoration. Inspired by the idiom “building a nest to attract phoenixes,” government representatives invited artists to reside in the village. Since July 2020, a total of 16 artists have taken up residence in Tangwei village, with their artistic fields spanning crafts, dance, music, and drama. This artistic presence has become a symbol of the village's uniqueness, celebrated in media and public discourse.

However, the revitalization and protection of historical villages in China often reflect government planning and interests rather than the genuine needs of the villages themselves. During the investigation, the research team inquired about the relationship between Nanshe village and Tangwei village, which are only 2 – 3 km apart and jointly listed as major cultural heritage sites under national-level protection. Local officials and village representatives pointed out that Nanshe village belongs to Chashan town, but not Shipai town. Apart from the convenience of jointly submitting applications to enhance the likelihood of successful recognition, there is no cooperation or shared planning between the two villages. Tangwei village and Nanshe village operate entirely independently in their respective cultural heritage projects.

Tangwei village emphasizes its tradition of “respecting literature and valuing martial arts,” particularly the importance of family instructions in nurturing future generations. Aligning with the Chinese government's current emphasis on anti-corruption education, one of the ancestral halls in Tangwei village – Qinle Gongci (琴乐公祠; Qinle Ancestral Hall) – has been designated by the town government as the Family Values and Integrity Training Center (家训与廉政教育基地; *jiaxun yu lianzheng jiaoyu jidi*) (Figure 2). This ancestral hall is the only historical building open to visitors free of charge on a long-term basis. Inside, in addition to anti-corruption educational materials, display boards feature prominent villagers, such as industrialists Wong Chung-ming and Wong Kam Fai from Hong Kong. Interestingly, these individuals hail from another village in Shipai town and have no direct connection with Tangwei village. This situation underscores that the revitalization of Tangwei village is not driven by the village itself but by the town government. The initiatives reflect a top-down imposition of ideological symbols aligned with broader governmental and economic priorities, rather than a focus on preserving the village's authentic traditions and historical legacy.

At present, apart from the Mei'an Gongci (梅菴公祠; Mei'an Ancestral Hall), which is dedicated to worshipping Kangwang (康王), a military general of the Northern Song dynasty (960 – 1279) who was later

deified for his role in resisting the Liao dynasty (916 – 1125), and the Family Values and Integrity Training Center, most of the historical buildings in Tangwei village, such as the Li Clan Ancestral Hall and other structures visited by the research team, can only be accessed with the assistance or unlocking by village tour guides. Even when accessible from a cultural and heritage tourism perspective, the historical village lacks narratives, displays, or demonstrations that allow the public to understand its beliefs, customs, and lifestyle traditions. The Li Clan Ancestral Hall is an exception, as it exhibits various village artifacts, such as farming tools, revitalization reports, old clothing, and festive items.

Although it may be difficult for tourists to fully understand the daily lives of villagers during the Ming and Qing dynasties, the imagery of antiquity and cultural depth throughout the village is unmistakable. Compared to other villages in southern China, such as the Liu clan in Fanling and the Tang clan in Ping Shan, Hong Kong SAR, China, Tangwei village does not boast an impressive number of individuals who achieved scholarly honors. However, village records or display boards prominently highlight its literary prosperity, listing the achievements of two *juren*, two *gongsheng* (贡生), and 42 *xiucai* (秀才) – titles conferred on individuals who passed different

levels of the imperial examinations (Jiang & Cheng, 2014). Lanterns inscribed with the character “*li xue*” (理学; literally Neo-Confucianism) hang outside the Li Clan Ancestral Hall, symbolizing the Confucian tradition inherited by the Li family from the Neo-Confucian scholar Li Yong. This practice underscores the village’s cultural significance, especially within Dongguan, a city often regarded as lacking a strong traditional cultural identity (Figure 3).

The above description of Tangwei village’s cultural heritage and revitalization efforts provides a preliminary understanding of the relationship between its cultural assets and the government’s top-down rural revitalization strategy, under the influence of economic development goals (Looney, 2015).

Reflecting on the methodological approach adopted in this study strengthens its credibility and transferability. The research methods employed include field observations, interviews, and the analysis of visual and textual materials. It is important to acknowledge the limitations and potential biases inherent in these methods and to detail the strategies used to ensure the trustworthiness of the findings. By providing a transparent account of the research process, the study demonstrates methodological rigor and lays the groundwork for future research in this area.



Figure 2. The Tangwei village’s Family Values and Integrity Training Center. Source: Photo by the authors (2024)



Figure 3. A lantern with the characters “*li xue*.” Source: Photo by the authors (2024)

### 3. Standardizing the Kangwang Festival from a top-down approach

The research team's visit to Tangwei village coincided with the annual Kangwang Festival (康王华诞; literally "the festival for celebrating the birth of Kangwang"). This festival is the largest-scale folk activity in Tangwei village and is recognized as a provincial-level intangible cultural heritage (Guangdong Provincial Cultural Center – Intangible Cultural Heritage Center, 2018). It is also an important cultural activity promoted by Tangwei village to external audiences.

The 2018 *Tangwei Village Records*, published under the guidance of the town government, provides the following standardized narrative about the origin of the Kangwang legend: A member of the seventh branch of the Li family in Tangwei village, who engaged in the trade of second-hand goods, discovered a statue of Kangwang in a dilapidated temple. Identifying it as Kangwang, he brought the statue home for enshrinement. As the clan member's economic conditions improved, other members of the seventh branch expressed a desire to jointly worship the deity, which led to relocating the statue to the Seventh Branch Hall. Subsequently, the fourth and sixth branches also expressed their desire to participate in the worship, prompting a unanimous decision to move the statue to the Mei'an Gongci. This relocation symbolized unity and prosperity for the entire clan, fostering safety and development for all its members.

The Mei'an Gongci, originally the ancestral hall of one branch of the Li clan, now houses the Kangwang statue. Unlike typical village temples, the Mei'an Gongci retains its ancestral hall layout. The altar for Kangwang is situated on the left side of the shrine, whereas the center holds the ancestral tablets of the Li clan, shielded by a screen. However, during the investigation period, which coincided with the Kangwang festival, the statue of Kangwang was temporarily moved to the center of the shrine, where villagers worshipped it in front of the screen.

The identity of Kangwang varies significantly between Macau and Dongguan. In Macau, Kangwang (or Kanggong) is regarded as a Daoist deity associated with fire prevention, with his birthday celebrated on the 7<sup>th</sup> day of the 7<sup>th</sup> lunar month. Huang Wenhui, a researcher of Macau's history and culture, noted in his book that Kangwang's identity and origin differ across regions (Huang, 2021). In Macau, Kanggong is often referred to as Li Lie, a Daoist master from the Han dynasty (206 BCE – 220 CE), or as a bandit who later attained enlightenment by performing good deeds, such as robbing the rich to help the poor. However, based on the couplets found in a temple, Huang Wenhui

personally believes that this Kanggong is actually Kang Yuanshuai, one of the Ten Marshals of the Eastern Peak in Daoist legend. In contrast, the Kanggong Temple in Nanhai, Foshan, Guangdong, regards Kangwang as Kang Baoyi, a general who fought against the Liao dynasty during the Northern Song dynasty. According to legend, Kang Baoyi's descendants migrated south to the Pearl River region and were granted permission to build a temple in his honor after reporting their military accomplishments. Zhu Guangwen has observed that the earliest records of Kangwang appear in the *Lingnan Miscellany*, which mentions the deity in the Gaozhou area (Zhu, n.d.). Tangwei village in Dongguan aligns its version of Kangwang's story with Nanhai, Foshan account. This alignment integrates the legend into Tangwei village's founding story, allowing the village to express its cultural traditions and symbolism to the outside world (Figure 4).

Why is Kangwang identified as Kang Baoyi in Tangwei village, while in Macau he is not? *Tangwei Village Records* provides no explicit explanation, and villagers have not offered any clarification. On the contrary, the records begin with the assertion: "Kangwang, originally named Kang Baoyi, was a native of Luoyang, Henan, and a famous general who fought against the Liao dynasty during the Northern Song dynasty" (Tangwei Village Editorial Committee *et al.*, 2019, p. 115). For the villagers, the true origin of the tradition is less important than its symbolic significance. What they value is a folk legend that underscores the village's orthodoxy and loyalty. This is further reinforced by the stories of Li Chunsou, the son of Li Yong – who is considered the common ancestor of the villagers, and Xiong Fei, Li Yong's son-in-law. Both are described as loyal ministers during the final years of the Song dynasty, which indirectly reinforces the village's collective identity.

By associating Kangwang with Kang Baoyi, the villagers highlight his image of loyalty to the emperor, shaping perceptions of the village as orthodox, ancient, and state-recognized. This alignment ensured that, when the Kangwang Festival was revived in 1994, it not only avoided official restrictions but also received strong government support.

Regarding the ceremonial customs, no other comprehensive oral or local documentary sources exist, leaving the villagers to rely on standardized village records for their understanding of the festival's history. According to these records, in the past, the festival was organized and coordinated by five spontaneous villager associations. Since its resumption in 1994, however, the Xincheng Society has taken over all organizational responsibilities (Guangdong Provincial Cultural Center – Intangible Cultural Heritage



Figure 4. Statue of Kangwang. Source: Photo by the authors (2024)

Center, 2018). Almost all villagers are now members of the society, indicating a centralization of local power and a shift away from the festival's traditional role as a community platform for local power dynamics. The contemporary iteration of the festival has been transformed into a celebratory deity parade, retaining its primary forms but omitting many details (Figure 5). The village records focus primarily on the Kangwang Festival during the Qing dynasty and the Republic of China era (1912 – 1949), offering little elaboration on its current evolution.

Today, the Kangwang Festival has been reimagined by village and town representatives as a tool for promoting rural tourism. It has become a symbol of the village's historical continuity and cultural richness. While the festival retains its “authentic” folk activities – such as Kangwang's Parade, Festival Blessing, and the Thousand People Banquet – new cultural elements with limited ties to the festival's folklore have been introduced. These elements include *guzheng* (古筝; Chinese plucked zither) performances, *tai chi* demonstrations, calligraphy, and photography exhibitions. In addition, a food festival outside the village showcases agricultural products, local delicacies, and handicrafts. Evidently, the motivation for holding the Kangwang Festival extends beyond preserving folk traditions to attracting villagers and tourists, achieving rural revitalization through tourism.



Figure 5. Wooden plaque used for worshipping Kangwang. Source: Photo by the authors (2024)

Deity parades and temple festivals in southern China reflect the evolution of community boundaries. For example, on Cheung Chau Island in Hong Kong SAR, China, the parade route was shaped by interactions among the colonial government, local clans, and religious groups (Ma, 2022). Similarly, the Kangwang Festival parade route in Tangwei village has expanded beyond the historical village walls to include the residential areas of Dongcun and Xicun and a nearby commercial street. According to an artist involved in the parade, the inclusion of the commercial street serves as a deliberate attempt to align with a developer's goal of leveraging folk activities to increase foot traffic to this key commercial project.

Although many villagers actively participate in the festival's sacrificial duties, the vast majority of them no longer reside within the village. Instead, they live in newer residential areas outside the historic core, whereas some older houses with lower architectural value have been rented out to new residents. During the Kangwang Festival parade, these “new villagers” are included in the festival, effectively “legitimizing” and “standardizing” their roles within the village community. The interviewed artist even noted that he was allowed to carry the statue of Kangwang in the parade, despite not being a native villager. Therefore, the Kangwang Festival's role as a representation of the village's traditions and regional boundaries has become increasingly ambiguous.

In 2022, the Guangdong Provincial Government launched the Hundred Counties, Thousand Towns, Ten Thousand Villages High-quality Development Project, commonly referred to as the Hundred-Thousand-Ten Thousand Project, to promote rural revitalization. To align with the project's economic and tourism-related goals, localities across the province have been actively exploring suitable development strategies for towns and villages.

In Tangwei village, all the calligraphy couplets adorning its historical buildings were created by Huang Tong, a

calligrapher and a member of the Artists Alliance. In the summer of 2024, Huang Tong hosted a calligraphy exhibition in Tangwei village, subtitled *Cultural Empowerment of the Hundred-Thousand-Ten Thousand Project*. This subtitle reflected the strategic use of calligraphy art to position Tangwei village in alignment with the Hundred-Thousand-Ten Thousand Project (Figure 6). Notably, the calligraphy exhibition was incorporated into the Kangwang Festival as part of its parade activities. The integration of the exhibition into the festival underscores how the Kangwang Festival has been adopted as a tool for cultural tourism promotion by the town government.

While the top-down planning of Kangwang Festival has limited the agency of local villagers, both elite and common residents – whether long-term villagers or recent arrivals – have found ways to adapt the officially sanctioned festival. They have utilized the event to construct a renewed sense of cultural confidence and to promote Tangwei village’s visibility and reputation, both online and within broader societal contexts.

#### 4. “Building nests to attract phoenixes”: Art and historical village conservation

The Kangwang Festival illustrates tensions between traditional practices and modern promotional strategies, whereas another dimension of Tangwei village’s heritage conservation is revealed through the introduction of resident artists. This “building nests to attract phoenixes” (筑巢引凤, *zhuchao yinfeng*) approach represents a distinct yet interconnected strategy by the local government to infuse new cultural elements into the village, further complicating the dynamics between preservation, utilization, and economic development.

“Building nests to attract phoenixes” is a metaphorical concept in Chinese strategic thinking, encapsulating the idea of creating an environment or infrastructure conducive to attracting high-quality resources, talents,

or opportunities. In contemporary academic discourse, it is often understood as a proactive approach to fostering development and innovation.

Most of the historical buildings in Tangwei village remain vacant or are awaiting development. Only a dozen or so ancestral halls and study rooms have been converted into art studios by the town government. These spaces, which belong to the village or clans rather than private owners, have been repurposed to host artists from across China. Table 1 presents a list of the locations and orientations of the artists’ studios, compiled during the on-site investigation.

The first artist took up residence in 2020, and by 2024, there were 16 artists, forming the Tangwei Artists Alliance under the town government’s arrangement (Wei *et al.*, 2024). These artists set up studios and reside in ancestral halls, study rooms, or ancestral houses within the historical village. However, none of them are originally from Tangwei village. Only two are from Shipai town, Dongguan, whereas the rest hail from various locations across and outside Guangdong province. The artists’ residency program is outwardly presented as an effort to revitalize the historical village by moving away from overly commercialized development models. As part of this initiative, the artists launched the “Tangwei Impression” cultural and creative project, aimed at enhancing the village’s cultural identity, attracting visitors, and promoting rural revitalization. Notably, two artists affiliated with the township government’s development initiatives are employees of a major toy company based in Shipai town (Figure 7). This arrangement suggests that the residency program is not entirely aligned with the village’s intrinsic needs but is instead part of the township’s strategic planning.

During the investigation period, the research team inquired about the alliance’s composition and the regulations governing studio setups in the village. Village representatives initially claimed that the artists’ residences required a selection and verification process, with



Figure 6. The calligraphy exhibition by Huang Tong during the Kangwang Festival. Source: Photo by the authors (2024)



Figure 7. Introduction of the Tangwei Artists Alliance. Source: Photo by the authors (2024)

Table 1. List of the locations of artists' studios

| Name; Chinese name                    | Origin/Identity  | Studio location; Chinese name      | Art form  |
|---------------------------------------|--|------------------------------------|---|
| Wang Huanlai; 王欢来                     | Tianjin  | Jingru Ancestral Hall; 敬如公祠        | Calligraphy   |
| Huang Zhentong (Huang Tong); 黄镇铜 (黄同) | Shipai, Dongguan   | Li Clan Sixth Ancestor House; 六世祖屋 | Calligraphy   |
| Yang Xiuzhu (Farmer); 杨秀筑(农夫)         | Guiyang, Guizhou   | Ye Yi Ancestral Hall; 叶一公祠         | Poetry  |
| Li Yiyu (Heitian); 李一字 (黑天)           | Changde, Hunan   | Zhuoqing Family Shrine; 卓卿家塾       | Poetry  |
| Zhou Zurong; 周祖嵘                      | Zibo, Shandong   | Li Fengchi Residence; 李凤池民居        | Intangible heritage craft (raindrop glaze)                  |
| Sun Ruoxi (Zhou's Wife); 孙若溪          | Not mentioned  | Li Fengchi Residence; 李凤池民居        | Thangka painting  |
| Wang Zhirong; 王志荣                     | Shipai, Dongguan   | Liangde Study Room; 亮德书房           | Photography   |
| Miao Weiji; 苗炜基                       | Not mentioned  | Zicong Study Room; 子聪书房            | Film and video production                                   |
| Li Kangrong; 李康荣                      | Graduated from Guangdong University of Finance and Economics | Chaoyun Ancestral Hall; 巢云公祠       | Trendy toy design (employee of Li'ao Toy Company, Dongguan) |
| Zheng Zhuyao; 郑祝耀                     | Worked in Shanghai for a long time                           | Chaoyun Ancestral Hall             | Performance art (employee of Li'ao Toy Company, Dongguan)   |
| Yang Guang; 杨光                        | Graduated from Central Academy of Fine Arts                  | Lanyuan Ancestral Hall; 兰苑公祠       | Film planner/director                                       |
| Jiang Xinyan; 蒋欣妍                     | Not mentioned  | Lanyuan Ancestral Hall             | Stage performing arts                                       |
| Nie Hongfei; 聶宏飞                      | Zhaoqing, Guangdong  | Zicong Study Room                  | Film Producer   |
| Wang Chao; 王潮                         | Graduated from Shanghai Theatre Academy                      | Zicong Study Room                  | Actor   |
| Wu Xiaohao; 吴晓超                       | Shanwei, Guangdong   | Siwo Ancestral Hall; 思我公祠          | Konghou (ancient Chinese harp)                              |
| Mo Yinru (Mo Mo); 莫茵茹 (莫莫)            | Yangjiang, Guangdong   | Li Clan Sixth Ancestor House       | Hanfu model   |

candidates expected to contribute to the village or actively participate in its activities. However, interviews with an artist provided more nuanced insights. He disclosed that some artists had prior connections in Shenzhen and friendly relationships with Tangwei village officials, which led to their invitations to take up residence. Once settled, the artists live rent-free but are expected to organize educational workshops and host cultural performances and exhibitions periodically.

For example, a provincial-level intangible cultural heritage inheritor of raindrop glaze (雨点釉) from Shandong province, who was among the early artists to settle in Dongguan, initially operated studios in Shenzhen (Qin, 2020). After being invited to Tangwei village, he began experimenting with local materials. In an interview, he revealed that the residency contracts are signed for 2-year terms, allowing rent-free accommodation in exchange for conducting workshops and cultural events to help the village committee build a local cultural brand. During the research team's visit, the artists were also observed engaging with a student team from the Guangdong University of Technology, participating in an informal meeting – a further obligation of their residency in the historical village.

Concrete examples illustrate the integration of artists into Tangwei village's architectural revitalization efforts. For instance, a calligrapher collected porcelain and transformed a collapsed house into a small garden, preserving much of its original appearance (Figure 8). Similarly, a ceramic artist repurposed a dilapidated house into a ceramic studio (Wei *et al.*, 2024). These artistic endeavors have contributed to Tangwei Village's cultural landscape, turning the integration of art and architecture into a tourism highlight.

This research underscores significant policy implications. The case of Tangwei village offers valuable lessons for rural revitalization and heritage conservation in China. Policymakers, local governments, and community stakeholders can draw lessons from this research to develop more balanced, community-centered approaches that respect authentic cultural heritage and address rural communities' needs while pursuing sustainable economic growth.

## 5. Conclusion: The top-down “revitalization and utilization” strategy

As the research team prepared to depart, food stalls around the historical village began to open, supporting the “stall

economy” associated with the Kangwang Festival (Figure 9). This activity represents a direct means for villagers to engage and benefit from the revitalization efforts, aligning with the overarching goal of the Hundred-Thousand-Ten Thousand Project, which aims to enhance living and employment conditions in rural areas (Figure 10). At this juncture, while the artists’ studios have been positively



**Figure 8.** A corner of the Porcelain Garden. Source: Photo by the authors (2024)



**Figure 9.** Food stalls outside Tangwei village. Source: Photo by the authors (2024)



**Figure 10.** Banner promoting the Hundred-Thousand-Ten Thousand Project in Shipai. Source: Photo by the authors (2024)

received as a component of Dongguan’s Tangwei village revitalization strategy, the Shipai Town Government has introduced a new top-down revitalization and utilization plan. This initiative involves partnering with a tourism company from Beijing to transform the village’s historical buildings into boutique inn courtyards. The goal is to boost the village’s income and generate economic benefits for the entire community. The announcement highlights plans to develop “national trendy boutique inns” and “a comprehensive cultural tourism industry that integrates trendy industrial culture with the nearby trendy toy center.”

Throughout the investigation, villagers and artists consistently emphasized how converting ancestral halls into studios has fostered a vibrant cultural atmosphere. Many expressed satisfaction in being able to experience the joy of continuing an almost original village life within Tangwei village. However, during a banquet hosted by town government officials for the research team and a group of students conducting field investigations, a late-arriving official shared news about the provincial government’s pending approval of a plan to establish inns in the village.

This revelation underscores a critical dynamics: while the introduction of art and cultural symbols fosters cultural revitalization, the top-down “revitalization and utilization” approach remains anchored in the pursuit of business opportunities and economic maximization (Looney, 2015).

This article examines the heritage preservation and conservation strategies employed in Tangwei village, Dongguan, Guangdong, China, focusing on the complex dynamics between top-down government initiatives and the local community’s authentic cultural heritage. The findings reveal that local government and village representatives strategically utilize cultural symbols and intangible heritage practices, such as the Kangwang Festival and the artist residency program, to showcase the village’s historical and cultural significance. However, these initiatives are often disconnected from the local community’s authentic traditions and are primarily driven by economic and tourism development goals.

The case of Tangwei village demonstrates how the reorganization of daily village functions through top-down revitalization initiatives can potentially overshadow the preservation of authentic cultural heritage. While the introduction of artists’ studios and the promotion of cultural tourism have brought attention to the village’s heritage, the ultimate pursuit of business opportunities and economic maximization by higher-level government actors risks eroding the community’s genuine connection to its past.

These findings carry significant implications for rural revitalization and heritage conservation policies in China. Policymakers and local authorities must carefully balance the dual objectives of fostering economic development and preserving the authentic cultural heritage of rural communities. A community-centered approach that prioritizes the needs, traditions, and voices of local residents is essential for ensuring both the sustainability and integrity of heritage preservation efforts.

This research acknowledges several limitations that open avenues for future study:

- (i). While the case study of Tangwei village offers valuable insights into government-led heritage revitalization, its findings may not fully apply to other rural communities in China. Comparative studies across different regions and administrative contexts could provide a broader understanding of how local conditions influence heritage preservation outcomes
- (ii). Primary data collection was conducted during a specific timeframe in 2024, coinciding with the Kangwang Festival. This temporal limitation may not capture the full spectrum of community dynamics and stakeholder interactions throughout the year. Longitudinal studies could more effectively examine how top-down initiatives evolve over time and their long-term impacts on community cohesion and cultural authenticity
- (iii). Efforts were made to include diverse perspectives through interviews with villagers, artists, and officials. However, access to certain stakeholders and decision-making processes may have been limited. More extensive ethnographic research could uncover deeper insights into informal power dynamics and negotiations among the various actors involved in heritage revitalization.

These limitations underscore valuable opportunities for future research in rural heritage preservation and community development. Studies incorporating longer observation periods, multiple case comparisons (particularly within the same city), and more diverse methodological approaches could enhance a deeper understanding of the complex interplay between state power, economic development, and cultural heritage preservation in urbanizing rural China.

## Acknowledgments

The authors would like to thank Deng Zhaomian, Liu Manyu, Zhong Jiayi, Fu Yiming, Wu Limin, Huang Ruiyi, Chen Jiaying, Luo Jingying, Liang Jining, and Yang Ruohan, who are students from the School of Architecture and Urban Planning at the Guangdong University of

Technology, for their contributions to interviews and fieldwork.

## Funding

The fieldworks are supported by the project “Research on Industrial Heritage Conservation and Ecotourism Design Based on Cultural Mapping” under the “Ten Thousand People’s Scheme” of the Ministry of Education, the People’s Republic of China (grant no. 402240029).

## Conflict of interest

Authors declared no (potential) conflicts or competing interests with any institutes, organizations, or agencies that might influence the integrity of results or objective interpretation of their submitted works.

## Author contributions

*Conceptualization:* Lok-yin Law, Ming-hin Cheung

*Formal analysis:* Lok-yin Law

*Investigation:* Lok-yin Law, Huiwei Chen

*Methodology:* Lok-yin Law, Huiwei Chen, Shuwen Liu

*Writing – original draft:* Lok-yin Law

*Writing – review & editing:* Huiwei Chen, Shuwen Liu, Ming-hin Cheung

## Ethics approval and consent to participate

The project was approved by the Research Ethics Committee at Hong Kong Metropolitan University. Verbal consents were obtained from each of the subjects to participate in the study.

## Consent for publication

Verbal consents were obtained from each of the subjects to publish their data.

## Availability of data

Data will be made available from the corresponding author on reasonable request.

## References

- Chen, B., Chen, D., & Chen, Z. (2023). Research on the “Three restorations” of traditional village public spaces under “green fabric patching” - A case study of Tangwei ancient village in Dongguan City. [“绿布织补”下的传统村落公共空间“三修”之道研究——以东莞市塘尾古村为例]. *Village Committee Director* [村委主任], 2023(8):118-122.
- Gao, S., Huang, S., & Huang, Y. (2009). Rural tourism development in China. *International Journal of Tourism Research*, 11(5):439-450. <https://doi.org/10.1002/jtr.712>
- Guangdong Provincial Cultural Center - Intangible Cultural Heritage Center. (2018). *King Kang’s Birthday*

- Celebration* [康王宝诞]. Guangdong Provincial Cultural Center - Intangible Cultural Heritage Center [广东省文化馆-非遗中心]. Available from: <https://www.gdsqyg.com/agdfyzg/mingluinfo?mlproud=2018011270941319> [Last accessed on 2024 Dec 30].
- Huang, W. (2021). *The Kangzhenjun Temple in Macau* [澳门康真君庙]. Hong Kong: Joint Publishing.
- Jiang, L., & Cheng, J. (2014). Study on the historical culture of Ming and Qing ancient village of Tangwei, Dongguan [东莞塘尾明清古村历史文化考]. *Lantai World* [蘭台世界], 2014(13):113-114.
- Li, J. (2010). *The "Regulatory Detailed Plan for the Tangwei Ancient City Area of Shipai Town" Released: Tangwei Ancient City Area Focuses on Tourism and Leisure* [《石排镇塘尾古城片区控制性详细规划》出炉: 塘尾古城片主打旅游休闲牌]. *Dongguan Daily* [东莞日报], p. D02.
- Looney, K. E. (2015). China's campaign to build a new socialist countryside: Village modernization, peasant councils, and the Ganzhou model of rural development. *The China Quarterly*, 224:909-932.  
<https://doi.org/10.1017/S0305741015001204>
- Luo, H. (2003). Brief history of Dongguan scholar Li Yong's eastward journey to Japan to spread neo-confucianism at the end of the song dynasty [宋末东莞学者李用东渡日本传播理学事略]. *Lingnan Culture and History* [岭南文史], 2023(3):75-79.
- Luo, Y., Qi, L., & Huang, X. (2019). Research on the assessment of implementation results of the protection planning of traditional village of Tangwei, Dongguan [东莞塘尾传统村落保护规划实施结果评价研究]. *Journal of Dongguan University of Technology* [东莞理工学院学报], 26(3):73-80.
- Ma, M. (2022). *Traditional Festivals Under Colonial Rule: The Transformation of the Cheung Chau Bun Festival* [殖民管治下的传统节日: 长洲太平清醮的流变]. Hong Kong: Intangible Cultural Heritage Office.
- Qin, R. J., & Leung, H. H. (2021). Becoming a traditional village: Heritage protection and livelihood transformation of a Chinese village. *Sustainability*, 13(4):2331.  
<https://doi.org/10.3390/su13042331>
- Qin, X. (2020). *Dongguan Explores New Paths for Revitalizing Ancient Villages: Attracting Artists to Gather Popularity and Add Vitality* [东莞探索古村落活化利用新路径 引进艺术家聚人气添活力]. Yangcheng Evening News Online [羊城晚报网]. Available from: [https://wap.ycwb.com/2020-12/10/content\\_1337067.htm](https://wap.ycwb.com/2020-12/10/content_1337067.htm) [Last accessed on 2024 Dec 30].
- Su, M., Wall, G., & Xu, K. (2016). Heritage tourism and livelihood sustainability of a resettled rural community: Mount Sanqingshan world heritage site, China. *Journal of Sustainable Tourism*, 24(5):735-757.  
<https://doi.org/10.1080/09669582.2015.1085868>
- Tang, C., Zhang, H., Zhao, L., & Zhang, X. (2022). Discussion on the impact of COVID-19 on China's tourism industry and its responses [新冠肺炎疫情对中国旅游业的影响及其应对探讨]. *Journal of Chinese Ecotourism* [中国生态旅游], 12(1):169-183.
- Tangwei Village Editorial Committee, Shipai Town, Dongguan City, Guangdong Province. (2019). *Gazette of Tangwei Village* [塘尾村志]. Beijing: Fangzhi Publishing House.
- Tian, H., Li, M., Wei, C., & Sheng, Q. (2024). *Study of the Sociospatial Relevance of Traditional Family-Type Settlements: A Case Study based on Tangwei Village in Dongguan* [传统家族型聚落社会空间关联性研究——以东莞塘尾村为例]. Greece: South Architecture [南方建筑], p. 3.
- Wei, C., Liu, F., Yang, C., Cheng, Y., & Shen, J. (2024). Challenges and trends in the protection and utilization of traditional villages in rapid urbanization areas: A case study of the Pearl River Delta [快速城镇化地区传统村落保护利用的挑战与趋势——以珠江三角洲为例]. *Journal of Natural Resources* [自然资源学报], 38(8):1867-1886.
- Wen, C. (2020). At the juncture of reform: Heritage making of an industrial town in Pearl River Delta region. *Cultural Studies*, 34(2):277-294.  
<https://doi.org/10.1080/09502386.2019.1709094>
- Xi, J. (2024). *Strengthen the Protection and Inheritance of Cultural Heritage, Carry Forward the Excellent Traditional Chinese Culture* [加强文化遗产保护传承 弘扬中华优秀传统文化]. The State Council of the People's Republic of China [中国政府网]. Available from: [https://www.gov.cn/yaowen/liebiao/202404/content\\_6945341.htm](https://www.gov.cn/yaowen/liebiao/202404/content_6945341.htm) [Last accessed on 2024 Dec 30].
- Xue, E., Li, J., & Li, X. (2021). Sustainable development of education in rural areas for rural revitalization in China: A comprehensive policy circle analysis. *Sustainability*, 13(23):13323.  
<https://doi.org/10.3390/su132313101>
- Yang, J., Yang, R., Chen, M.H., Su, C.H., Zhi, Y., & Xi, J. (2021). Effects of rural revitalization on rural tourism. *Journal of Hospitality and Tourism Management*, 47:35-45.  
<https://doi.org/10.1016/j.jhtm.2021.02.008>
- Yao, S., Yan, X., Lei, C. K., & Wang, F. (2022). High-speed railway and tourism development in China. *Tourism Economics*, 28(6):1520-1544.  
<https://doi.org/10.1177/1354816621998520>
- Zhu, G. (n.d.) *A Preliminary Study on the Ritual Worship of Lord Kangwang in the Pearl River Delta* [珠江三角洲康公祭祀初探]. China Review Academic Publishers Limited [中国评论学术出版社]. Available from: <https://hk.crntt.com/crn-webapp/cbspub/secdetail.jsp?bookid=16867&secid=16883> [Last accessed: 2024 Dec 31].

## ORIGINAL ARTICLE

Dynamics and discrepancies in rural–urban  
village regeneration: A case study of a coastal  
community in Hong Kong SAR, ChinaJimmy T. W. Ho\* and Thomas W. L. Chung

School of Architecture, Faculty of Social Science, The Chinese University of Hong Kong, Hong Kong SAR, China

(This article belongs to the *Special Issue: Regenerating Views, Values, and Visions in Countryside Conservation in Chinese Societies*)

## Abstract

Village revitalization has garnered significant attention in urbanized regions such as Hong Kong, where researchers and practitioners are actively responding to the rural revitalization movement inspired by China's policies to enhance agricultural activities, preserve cultural heritage, and stimulate economic development. This article examines the historical, cultural, and ecological significance of Shui Hau village, a coastal farming, and rural–urban community, alongside the implementation of novel village regeneration initiatives proposed by the authors. The primary aim is to illustrate the mechanisms behind these initiatives, explore the dynamics between stakeholders and researchers, and analyze the dual role of researchers as both trusted outsiders and effective collaborators. These insights are intended to inform future practices and recommend context-specific policy changes. Adopting a case study approach, this article contributes to the growing body of qualitative rural studies in the wider Asian context. Challenges relevant to village regeneration, including land boundaries, the Small House Policy, and planning and conservation regulations under the existing legal framework, are documented. As part of a broader action research initiative, three government-funded projects were proposed and implemented to revitalize cultural values: (i) Rediscovering traditions and rituals through tactical interventions, (ii) restoring the grain store as a farming cooperative, and (iii) transforming the stone house into a living culture cooperative. This retrospective review reveals key dynamics and discrepancies, including intricate land ownership issues, unspecific regulations, loose governance, and mismatches between expectations and actual outcomes. From a practitioner's perspective, systemic changes at multiple levels are recommended to better engage stakeholders and facilitate more effective countryside regeneration.

**Keywords:** Countryside regeneration; Architectural restoration; Rural–urban village; Community engagement; Bottom-up initiatives; Village dynamics

**\*Corresponding author:**Jimmy T. W. Ho  
(jimmyho@cuhk.edu.hk)

**Citation:** Ho, J.T.W. & Chung, T.W.L. (2025). Dynamics and discrepancies in rural–urban village regeneration: A case study of a coastal community in Hong Kong SAR, China. *Journal of Chinese Architecture and Urbanism*, 7(3): 4992.  
<https://doi.org/10.36922/jcau.4992>

**Received:** September 29, 2024**1st revised:** December 18, 2024**2nd revised:** December 21, 2024**Accepted:** December 31, 2024**Published online:** February 17, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

Village revitalization in architecture is not a novel idea for rural areas (Knapp, 1986; Koolhaas, 2020). However, it has substantially gained everyone's attention in cities such

as Hong Kong, where 75% of its land remains countryside. Local researchers and practitioners in architecture and community design are reacting to the thrust of rural revitalization (Chang, 2023), which is arguably driven by policies in China aimed at boosting agricultural activities for food production, characterizing and thematizing villages through tradition and culture, stimulating cultural tourism, and eventually improving the local economy as part of a broader grand narrative. In the recent 5 years, a wave of countryside movements has emerged across southern China, largely through government-funded initiatives aimed at restoring, repurposing, and regenerating underutilized village structures (Knapp, 2024), including those in Hong Kong.

Funded by the Lantau Conservation Fund under the Sustainable Lantau Office, the authors have implemented a series of regenerative initiatives in Shui Hau village – a coastal, modernized, or hybridized suburban area on the Lantau island, which is easily accessible from the nearest satellite town through public transport.

This article adopts a case study approach and is structured as follows: First, it discusses the existing theoretical background on rural–urban village regeneration. Second, it documents the historical, cultural, and ecological significance of Shui Hau village. Third, it examines the challenges posed by the existing underdeveloped legal framework for regeneration. Fourth, it details three bottom-up initiatives proposed and implemented by the authors to revitalize the village, focusing on retelling its history, reinterpreting cultural activities, strengthening community bonds, and educating the public. These initiatives include: (i) Rediscovering traditions and rituals through tactical interventions, (ii) restoring the historic stone house into a living culture cooperative, and (iii) reinterpreting the ruined grain store as a farming cooperative. Finally, a retrospective review is presented, uncovering key findings related to land ownership, building regulations, governance, and discrepancies during implementation. These findings aim to stimulate further discussion on the policy implications across multiple levels.

## 2. Theoretical background on rural–urban village regeneration

Recent studies on village regeneration have investigated rurality and urbanicity as distinct concepts (Dong, 2018; Yan *et al.*, 2018) while emerging research has started to explore the rural–urban continuum, integration, and symbiosis (Hoffmann *et al.*, 2023; Liu *et al.*, 2019). While population and settlement patterns vary drastically across contexts, the idea of counter-urbanism has emerged in certain

circumstances, characterized by migration or second-home tourism returning to rural environments (McManus, 2022; Wu *et al.*, 2024). In China, rural revitalization is strongly encouraged by government policies aiming to transition mid- to large-scale villages from agricultural productivism to post-productivism. This shift generates multiple outcomes, including cultural, leisure, and nature tourism (Wu *et al.*, 2024). Recent research suggests that counter-urbanization in China can foster the formation of a rural middle class while avoiding rural gentrification, largely due to the collective land ownership system. This model aspires to achieve an idyllic lifestyle and shared prosperity across urban and rural areas (Yu *et al.*, 2024). Nonetheless, for small-scale, post-productivist urban–rural villages with limited migration, such as Shui Hau village, the discourse on village regeneration remains underdeveloped.

Existing literature has addressed various challenges related to land policies and political frameworks in rural regeneration. Many villages face common human-land problems (Du & Shi, 2019), such as population decline due to early-year outmigration, the erosion of culture and traditions, difficulty attracting younger generations, and insufficient social infrastructure. In Hong Kong, village development is significantly constrained by the unsustainable Small House Policy (SHP), which highly diminishes place identity as ethnographic characteristics evolve under shifting political, social, and economic circumstances (Ho, 2024; Ma, 2016). Under these political circumstances, involved stakeholders often resist collaboration with conservationist researchers or fail to contribute creatively (Ma, 2016).

A recent study highlights that community-based, action-oriented research scholars are often fluidly positioned by villagers as “trusted outsiders” or “affective collaborators” in rural settings, where verbal communication can be sensitive, stereotypical, and judgemental (Magnus & Rai, 2024). However, the impact of rural policies on these dynamics remains underexplored. In China, universities are increasingly engaging in community co-creation models for knowledge co-production and social empowerment. Researchers emphasize the need for flexible rural planning and construction policies to accommodate the diverse nature of rural locales (Lang *et al.*, 2024).

Overall, there is a lack of discussion on how post-productivist village regeneration initiatives can move beyond development-oriented models, such as SHP, at the macroscale and how these initiatives influence social dynamics – such as psychological land ownership (Bullock & Lamoureux, 2025) – at the microscale. This article aims to address these gaps by illustrating the mechanisms of novel initiatives for rural–urban village regeneration, revealing

the dynamics between stakeholders and researchers, and exploring the dual roles of researchers as trusted outsiders and effective collaborators. These insights seek to inform future practices and recommend context-specific policy changes. Adopting a case study approach, this article also aims to contribute to the growing body of practice-led architectural research (Rust, Mottram and Till, 2007) and qualitative rural studies in the wider Asian context (Strijker *et al.*, 2020).

### 3. Shui Hau village: A coastal rural–urban village

As its name suggests, Shui Hau village, located in Hong Kong SAR, China, is a coastal settlement situated at the river mouth between Tong Fuk village and Shek Pik reservoir (formerly Shek Pik village, which is submerged beneath the reservoir). Over the years, it has maintained a stable population of around 200 residents, three-fourths of whom are indigenous villagers. The community is composed of three major Punti (local) clans with the surnames Chan (陈), Chi (池), and Feng (冯). The Chi clan established the earliest settlement in 1625 after relocating from Shek Pik village, followed by the Fung and Chan clans. Some members of the Chi clan identify as Hakka, likely due to cultural influences from inter-village marriages with Hakka spouses. Shui Hau village has undergone expansion and integration with different ethnic groups, resulting in territories demarcated by clan settlements. This segregation – both physical and social – remains evident in modern times, with minimal interpersonal interactions between clans and occasion intergroup conflicts (Chau & Lau, 1982).

Before the construction of the South Lantau road in 1973, the village was closely connected to its surrounding farmlands and the sea, fostering a unique lifestyle that combined farming and fishing. Agricultural production primarily focused on rice cultivation, with villagers trading their high-quality crops in Cheung Chau. Two rice harvests were achieved annually. In addition to rice, villagers grew vegetables such as sweet potatoes, taro, and spring onions for personal consumption. To store their harvests, resourceful villagers built simple storage huts, commonly referred to as “grain stores.”

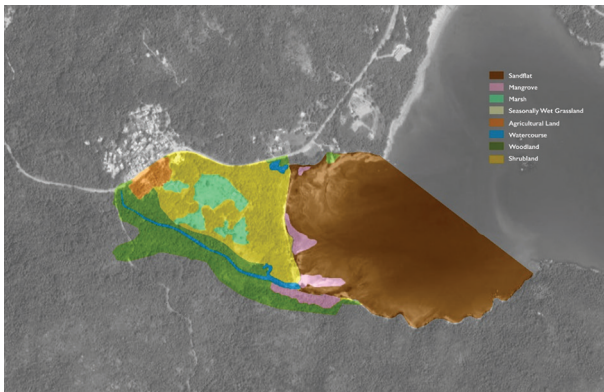
Fishing complemented farming as an essential livelihood. Male villagers typically engaged in fishing, whereas females were mainly involved in clam digging. Some women continue to take pride in their clam-digging skills, using the *chikoulian* (刺口镰), a slightly bent metal hook traditionally used to stab and hook clams. This tool, with its slim metal tube and pointed head, minimizes the environmental impact on sandflats compared to shovels, providing a traditional yet sustainable method of clam harvesting.

The village’s hybrid lifestyle is also reflected in its culinary traditions, particularly the preparation of *leihuobian* (爵镬边). This traditional dish, common in local coastal communities, integrates resources from both farmlands and the sea. Freshly caught seafood such as clams are cooked to create a seafood soup, whereas rice paste is skilfully poured along the edge of a heated iron wok. Once dried, the rice paste forms noodles, which are then pushed into the soup and mixed before serving. The ingredients and preparation methods reflect the village’s unique landscape and cultural practices, rooted in both farming and fishing traditions.

#### 3.1. Urbanization and the decline of agriculture

With the significant demand for labor to construct the South Lantau road and Shek Pik reservoir in the late 1950s, many villagers started seeking work as builders outside Shui Hau village. In the 1960s, the water supply to villages in South Lantau was reduced due to the construction of new aqueducts that diverted water to the reservoir and increased usage by the neighboring Tong Fuk prison. The reduced availability of stream water for irrigation severely impacted agricultural activities. To mitigate this issue, the water pipe supplying Tong Fuk village was split to provide water to Shui Hau village, leading to inter-village conflicts over competing water resources in 1962. In 1964, the water shortage caused widespread crop failures, and the government’s compensation for the losses was deemed unsatisfactory by villagers. The issue was exacerbated by unusually dry weather in the following years, intensifying the water scarcity. The problem became so severe that the government arranged for daily water trucks to supply Shui Hau from Mui Wo, located about 20 min away by road. With the advent of more convenient transportation, better salaries in urban areas, and the availability of public housing in newly developed towns, many villagers moved to urban areas. As a result, traditional farming activities in Shui Hau started to decline. In the 1990s, almost no farming activities were reported.

Since then, the morphology of Shui Hau village has transformed into an eco-cultural landscape, featuring a broad spectrum of landscape characteristics and historical remnants. Spanning from the shoreline to the mountains, the area includes sandflats, mangroves, marshes, seasonally wet grasslands, shrublands, woodlands, farmlands, the new and old village structures, and fengshui woods, with the Shui Hau stream flowing from the mountains to the river mouth (Figure 1). The intertidal area has been recognized for its high conservation value due to its ecological significance of biodiversity. In 2023, the government further designated some coastal protection areas near the shoreline as “conservation areas” to reflect the urgency of conserving natural habitats.



**Figure 1.** Landscape characteristics of Shui Hau village  
Source: Map redrawn by the authors, adapted from (WWFHK, 2021).

### 3.2. From an agrarian community to a recreational destination

Shui Hau has undergone a significant transformation from an agrarian community into a coastal tourist destination. The emergence of tourism can be traced back to the 1970s, when the New Lantau Bus was established, carrying up to 40,000 passengers on holidays to Shui Hau. The village served as a transitional spot between Mui Wo (where the public pier is) and Ngong Ping (where the famous Po Lin Temple is). The completion of the South Lantau Road in 1978 and the development of the new airport and Tung Chung town in the 1990s further increased the influx of tourists and foreign residents to this small village.

At present, the coastal area of Shui Hau Bay is the focal point of recreational tourism. The sandflat, often referred to as the “Mirror of the Sky,” is renowned for its water surface blending seamlessly with the blue sky at high tide. Visitors flock to the sandflat for clam digging and kitesurfing, with most outsiders bypassing the inner village entirely. This has narrowed the perception of Shui Hau village to its coastal area, creating a physical, social, and cultural separation from the inner village fabric. The village’s identity, once rooted in its “rural landscape at the local level” (Dragan *et al.*, 2024, p. 4369), has been markedly diminished. Unlike the counter-urbanism movement in mainland China, tourists to Shui Hau village show less interest in these aspects (Yu *et al.*, 2024). This is evidenced by the adverse impact on the sandflat landscape caused by inappropriate visitor etiquette and the misuse of tools.

### 3.3. Inaccessible communal facilities

Despite its reputation as a recreation destination, Shui Hau village lacks the infrastructural support needed to maintain a strong sense of community. The existing community spaces are limited to formal facilities, such as the football court, Chan’s ancestral hall (the former Shui

Hau School), and the Shui Hau village office. However, access to the ancestral hall and the village office is often restricted to a few privileged parties, discouraging broader community participation. Although some grocery stores (commonly transliterated and referred to in Hong Kong as 士多 [pinyin: *shiduo*] in Cantonese) serve as informal community spaces, intense competition among them has created unfriendly social dynamics, limiting interaction among the stores. As a result, residents have become increasingly individualistic and apathetic toward both insiders and outsiders.

## 4. Underdeveloped legal framework for village regeneration

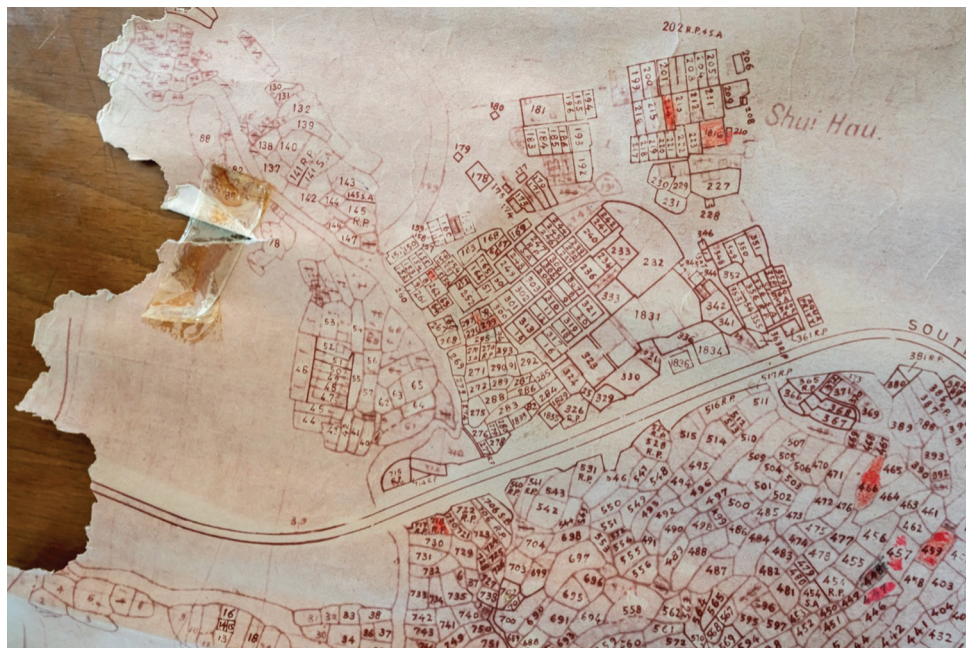
Village development in Hong Kong, including conservation and regeneration efforts, remains a controversial issue. Land-related issues such as intergroup conflicts between original inhabitants and newcomers, competing priorities and unequal rights, lack of informational transparency, ineffective bureaucracy, and issues with land surveys and resumptions have been widely discussed since the British colonial period (1841 – 1941 and 1945 – 1997) (Chau & Lau, 1982).

### 4.1. Demarcation districts and land boundaries

After the Convention for the Extension of Hong Kong Territory was signed between the United Kingdom of Great Britain and China in 1898, the New Territories (N.T.) was leased to Great Britain for 99 years. To determine private land ownership and raise revenue through government rent, the British colonial government hired “trained staff” from the Indian government to conduct large-scale survey work in the N.T., aimed at registering and (re)allocating 41,000 acres of private land comprising approximately 350,000 holdings (Nissim, 2021).

By 1903, the land survey was completed rapidly but with significant inaccuracies, which have caused ongoing issues (a similar problem also occurred in Victoria City on the island side of Hong Kong). For example, claimants to land lots were issued *zhizai* (紙仔; pronounced *chi tsai* in Cantonese) – small slips of paper with the lot number written on the front and the owner’s name and land description on the back. These slips were easily lost or transferred (Nissim, 2021).

A Block Government Lease governed privately owned land lots across the N.T., dividing the region into 477 Demarcation Districts (Figure 2). These lots are now regarded as Old Schedule Lots. Following the Sino-British Joint Declaration in 1984, these leases were extended to 2047. Nonetheless, inaccuracies in the original land surveys have left unresolved issues, such as incompatible



**Figure 2.** Partial land boundary map for Demarcation District (D.D.) 326 in Shui Hau village  
Source: Government map by the villagers.

land boundaries and mistaken registration of squatter structures.

#### 4.2. SHP for indigenous villagers

Before the implementation of the aforementioned leasehold and taxation system, the N.T. functioned as a series of self-sufficient agrarian economies, and there were vigorous conflicts between the Punti clans and the colonial government, including the Six-Day War of 1899 (Hase, 2008, p. 43). The N.T. served as a buffer zone between the British colony and China until the 1950s, when a post-war population boom, driven by an influx of immigrants from China, necessitated large-scale industrial and residential development.

To facilitate this development, the government proposed the construction of new towns in the N.T. and started resuming large amounts of land from indigenous villagers, offering compensation. In the later years, however, many villagers found it difficult to afford government lands for building village houses. With assistance from Heung Yee Kuk, the statutory advisory body for indigenous villagers, a policy for building small houses in rural areas was swiftly drafted and introduced in 1972. This policy, later known as the SHP, was initially regarded as a political strategy to facilitate colonial administration (Tang *et al.*, 2005) and as a reward for the Heung Yee Kuk's in maintaining order during the 1967 riots (Ma, 2016). However, it has arguably resulted in fundamentally biased priorities favoring indigenous villagers.

Under the Cap. 121 Buildings Ordinance (Application to the New Territories) Ordinance, male indigenous villagers aged 18 or older are eligible to apply for a “Ding” (丁; male offspring) right to construct a small house with specific controlled dimensions (i.e., a maximum roofed-over area of 700 sqft, a height of 27 ft, and no more than 3 stories). This type of small house is classified as a New Territories Exempted House (NTEH), meaning its construction is exempted from specific provisions and regulations under the Buildings Ordinance, such as the requirement to obtain approval and consent from the authority (i.e., Buildings Department) before the commencement of works. Indigenous villagers may also apply for a private treaty grant to build houses on government lands within village environs if private land is unavailable. Overall, the SHP is a development-oriented and gender-discriminatory policy that has resulted in the inefficient utilization of land resources among privileged indigenous villagers (Ma, 2016).

#### 4.3. Development-oriented planning

To indigenous villagers, *Ding* rights are considered inherited wealth from their ancestors. The demand for building small houses has consistently grown. In 2016, the Heung Yek Kuk estimated there were 240,000 potential applications, though whether this figure reflected actual housing needs remains questionable. Earlier research revealed that 47% of successful applications from 1997 to 2002 involved requests to remove restrictions on house (re)sales, indicating systemic abuse of the SHP for profit-making purposes (Ma, 2016ibid). Precedents show that

abuses, including selling small houses and *Ding* rights, have led to criminal offenses, such as false declarations. While the SHP is widely regarded as inequitable by modern standards, the indigenous *Ding* right, viewed as a traditional custom, remains politically difficult to challenge. Even the government has acknowledged the problem, noting in a 2016 Legislative Council report that “the remaining issues were complex and required further deliberation within the Administration” to review the SHP (LegCo, 2016).

The prioritization of small house development has intensified rural sprawl. The colonial government faced criticism for its pro-development approach, which often came at the expense of environmental protection (Tang *et al.*, 2005). After establishing new towns, greenbelts were introduced to mediate urban sprawl and provide passive recreational spaces. Despite the general presumption against development in greenbelt zones, researchers pointed out that these areas served to selectively support urbanization (Tang *et al.*, 2005), with structures such as village houses, low-density residences, schools, and temples permitted. Nonetheless, there is a notable lack of programmatic diversity in practice. Research indicates that up to 33 percent of development in greenbelt zones comprises small houses (Tang *et al.*, 2007).

#### 4.4. Inflexible land use and building regulations

The existing village area is confined to the “village-type development” zone, which permits a limited list of developments. However, there is a noticeable reluctance to establish flexible, rural-specific regulations that address local needs and balance optimal development with cultural conservation. For instance, the semi-outdoor shading structure of Phoenix Store (a local grocery store) was demolished after being audited as Unauthorized Building Work – despite its presence for decades (Figure 3). Without the canopy, the grocery store lost its communal function as a vital informal social hub in Shui Hau village. Due to the time-consuming and costly formal application process for rebuilding the structure, the owner was forced to abandon the semi-outdoor social space. In addition, building usage is



**Figure 3.** Phoenix Store in the 1970s (left panel) and the canopy structure before demolition (right panel)  
Source: Left: Photo by the villagers (1980); Right: Photo by the authors (2020).

subject to stringent restrictions. Houses built after 1961 are classified as NTEH, allowing ground-floor spaces to be used as schools or restaurants. In contrast, houses built before 1961 are not recognized as NTEH, and their use is restricted solely to residential purposes. Furthermore, several village houses on old scheduled lots are also considered unauthorized building work.

### 5. Government-funded regenerative initiatives: Tactical intervention, architectural restoration, and reinterpretation

To rejuvenate Shui Hau village and enhance its eco-cultural identity and sense of community as part of a rural–urban symbiosis (Bell, 1992; Chang, 2022), three regenerative initiatives were proposed: tactical interventions, architectural restoration, and reinterpretation.

#### 5.1. Tactical interventions: Mobile kiosks

Given the inaccessibility of formal community spaces, the research team explored alternative semi-public spaces within the village fabric for communal use. Two mobile kiosks – a design-thinking kiosk and a gastronomy kiosk – were created to test whether underutilized semi-public spaces could be activated for temporary community events using these tactical interventions.

One example of such underutilized spaces is primary schools and their ancillary sports courts. Typically, these spaces are not accessible to the community outside of regular weekday operations. With appropriate programming, it is argued that school grounds, as a valuable land resource, can be transformed to accommodate medium-scale communal events. To test this idea, a full-day design-thinking workshop for 30 participants was organized at the basketball court of Bui O Primary School, utilizing a mobile design-thinking kiosk. The kiosk is designed to be transformable. It could be folded into a compact transport trolley (Figure 4) and expanded into four panels for conducting various engagement activities. Key features include magnetic whiteboards for instant graphical pin-ups



**Figure 4.** The mobile design-thinking kiosk for conducting workshops  
Source: Photo by the authors (2020).

and drawing exercises, pegboards for displaying objects, a multimedia display at the back for video playbacks, and two sets of moveable desks and stools. In addition, mobile audio systems and power banks can be stored within the kiosk, eliminating the need for an external power supply. Although no school exists in Shui Hau village, this model of spatial transformation can be readily applied to the village's football court, replicating similar scenarios.

Traditional rituals and cuisine are essential to the cultural identity of the indigenous villagers in this coastal village. Within the village fabric, several underutilized spaces serve as informal communal areas where these rituals are conducted. On *weima* (尾禡; pronounced *meinga* in Cantonese) – the 16<sup>th</sup> of the last Lunar month and the 2<sup>nd</sup> of the Lunar New Year – villagers worship at multiple spots, beginning at the ancestral hall and proceeding to the Tai Wong Yeh temple (大王爷庙; *Dawangye Miao*), the pair of boundary stones, the Earth God shrine, and finally returning to the ancestral hall. The rituals involve burning incense and firecrackers, beating drums and gongs, and offering pork. Afterward, the pork is shared among village families.

In addition to rituals, food preparation is another cornerstone of cultural expression. Beyond the everyday dish “Lai Wok Pin” (in Cantonese) discussed earlier, villagers prepare various types of steamed glutinous rice cakes for special occasions. For example, *chaguo* (茶果; pronounced *chaguo* in Cantonese) is made for the Qingming festival on the 15<sup>th</sup> day after the Spring Equinox, whereas *zaci* (杂糍; pronounced *zaapchi* in Cantonese) for *Tianji* (天忌; pronounced *Tingei* in Cantonese) on the 19<sup>th</sup> of the first Lunar month. Steaming these rice cakes requires a large stove in a well-ventilated area to manage smoke. While many traditional outdoor stoves have disappeared over time, one Chan family still operates such a stove in their backyard.

To support the reinterpretation of these cultural culinary practices, a gastronomy kiosk was designed and introduced during a trial event, cultural cuisine day. This mobile kiosk can be stationed at different spots to activate semi-public spaces for various functions. For instance, it can be placed in the Tai Wong Yeh temple for pork sharing, in the front yards of village houses for snack-making, in the backyard for cooking *leihuobian*, or in the outdoor area of the village office for meal sharing (Figure 5). The kiosk is equipped with magnetic bars for displaying information panels, hooks for hanging culinary utensils, expandable table panels for food preparation, a wok holder, and shelves for portable fuel tanks and cooking sets. Using the kiosk, participants can engage with the existing spatial configurations (e.g., parapet seating), transforming them



**Figure 5.** Activating the outdoor area of the village office using the gastronomy kiosk  
Source: Screen capture from a video by the authors (2020).

into temporary communal spaces. Furthermore, this reinterpretation of cultural cuisine strengthens cultural identity by evoking social memories and fostering connections with senior villagers.

## 5.2. Architectural restoration of House No. 49

To provide additional communal spaces and facilitate communication between insiders and outsiders, the research team proposed restoring House No. 49 and repurposing it as the Shui Hau Living Cooperative. The young female house owner (daughter of the Phoenix Store proprietor) will host a series of cultural workshops in this space, including indigo dyeing, soap-making, and cultural cuisine tasting for interested residents and visitors.

Listed as a Grade 3 Historic building by the Antiquities and Monuments Office (AMO), House No. 49 was built in the 1920s and appears to follow a Qing vernacular design. It features a one-hall-one-courtyard layout, a single-bay width, and a single-story structure. At present, it is a hybridized structure: the front part consists of stone walls covered by a flat concrete roof accessible through the central skylight well, while the rear part features brick walls, timber purlins, and battens supporting a pitched roof with Canton tiles (Chinese pan and roll tiles) topped by a flat ridge.

House No. 49 shares its façade with the adjacent house, including granite stones, concrete parapet walls, and greenish urn balustrades. A timber door separates the entrance hall from the main hall, and a small mezzanine floor, supported by timber beams, is constructed along the rear wall (Figure 6). While House No.19 is currently used as a warehouse with storage racks on both sides, the house owner maintains the ancestral altar in the center with respect and care.

The restoration proposal emphasizes preserving the authentic architectural esthetics of House No. 49 while adopting a schematic design with minimal intervention.



**Figure 6.** Exterior and interior of House No. 49  
Source: Photo by the authors (2020).

Key restoration steps include:

- Replacing the stainless-steel entrance door with a pair of Chinese fir timber doors
- Cleaning existing stone and brick walls using high-pressure water jetting
- Replacing damaged timber components, including purlins, battens, beams, and lintels
- Salvaging intact tiles for reroofing and replacing broken ones
- Installing a stainless-steel hatch over the central skylight well to prevent water leakage from the flat roof
- Retaining and cleaning the existing cement-sand flooring
- Refurbishing metal window frames and glass panels to restore their original appearance.

To accommodate workshop activities throughout the year, simple downlights, power sockets, movable furniture, split-type air-conditioning units, and a sink with a potable water supply will be installed.

### 5.3. Architectural reinterpretation of the grain store

To reinforce the cultural identity of Shui Hau village as a former agrarian community, the research team proposed restoring the ruined grain store and repurposing it into a farming cooperative for experimental farming. The house owner, a senior female villager who previously worked as a horticultural therapist in the city, is enthusiastic about returning to Shui Hau village to revive small-scale farming practices. She aims to transform the original grain store into a community hub for exchanging farming-related knowledge and products.

Originally designed for storing harvests, the grain store was a single-story structure with a pitched tile roof supported by timber purlins and battens (Figure 7). Over time, much of the plaster layer has deteriorated, exposing the rough construction of the walls made of mud and stones. The structure is set back from the adjacent pedestrian footpaths, with another ruined structure standing between the grain store and a nearby village house.



**Figure 7.** The existing condition of the grain store (left panel) and the restoration proposal (right panel)  
Source: Left: Photo by the authors (2020); Right: Rendering image by the authors.

To restore the grain store while meeting modern needs, the design proposes reinterpreting its form and spatiality with the addition of a lightweight steel roof structure to protect the restored stone walls from rainfall. The surrounding landscape will be cleared, including the removal of the unrecognizable ruined structure. An outdoor hard-paved floor will be constructed to host horticultural workshops, accessible through folding doors on the side elevation. Similar to House No. 49, the restoration plan includes basic amenities such as power sockets, lighting, furniture, a sink, and a water supply.

Even before the restoration work commenced, the house owner demonstrated her proactive commitment to the project by collecting traditional farming tools for display and demonstration. Her efforts exemplify the enthusiasm and participation of partnering villagers in preserving and revitalizing their cultural heritage.

## 6. A Retrospective review of village dynamics: Land ownership, regulations, governance, and discrepancies

The regenerative initiatives were codeveloped with a group of passionate villagers who actively engage in discussions about village affairs, are willing to lend their premises for restoration, and are capable of delivering thematic workshops in the long term. The research team identified several key findings, including intricate land ownership issues, unspecific regulations for rural conservation, loose governance over village development (Table 1), and mismatches between actual and expected outcomes during implementation (Table 2).

### 6.1. Intricate land ownership

It is argued that in-between spaces can foster everyday interactions within the neighborhood more effectively than formal public spaces. For instance, during one of the tactical interventions in the form of culinary practice, *leihuobian* was prepared in the backyard of a village house using a self-built brick stove. While the event successfully attracted participants to witness the

**Table 1. Village dynamics on land ownership, regulations, and governance**

| Intricate land ownership  | Unspecific regulations   | Loose governance  |
|---|--|---|
| Perceived trespassing of adjacent private land property being in the same in-between backyard space | Inaccurate survey of a permanent private structure as temporary informal squatter structures   | No governance over the integrity of the landscape, replacing the village's esthetics with standard forms of a "Spanish villa" |
| Overlapping of building footprints and land boundaries due to inaccurate land survey                | Statutory assessment of restoration works using the development-oriented framework of SHP  | Uncoordinated development turning historic structures with shared components into eclectic and eccentric hybrids              |
| Unaware of trespassing issues due to the inaccessibility of land records                            | Architectural work is highly limited to restoring the old as the old, albeit the change of building volumes due to inaccurate land surveys<br><br>The inflexible land policy that forbids small-scale activities at restored village houses, resulting in the lengthy statutory submission for the change of land use from "House" to "Shop and services" and the additional fire services installations under the urban standards |   |

Abbreviation: SHP: Small House Policy.

**Table 2. Discrepancies between actual and expected realities**

| Aspects                             | Expected outcome   | Actual reality  |
|-------------------------------------|--|---|
| Role of villagers                   | As partners for collaborations   | As employees under the University                                   |
| Remuneration                        | A reasonable rate mutually agreed upon between the research team and villagers | A standard pay scale assessed by academic experience                |
| Hierarchical power relation         | Villagers and researchers as collaborators                                     | Villagers as landowner clients;<br>Researchers as service providers |
| Incentives                          | Historical and cultural values   | Monetary compensation as one of the primary motivations             |
| Perception toward the research team | An effective collaborator  | Not-so-trusted outsider   |

performative cooking process, it inadvertently caused tension among nearby residents. Interestingly, the complaint was not due to noise or smoke but rather the perceived trespassing of a privately owned planting area fenced off by a yellow metal wire mesh (Figure 8). The complainant, who is a relative of the partner villager chef, expressed her dissatisfaction by warning participants about encroaching on her land.

This incident highlights a critical challenge: in-between spaces are not entirely public, as they are often remnants of private lands. Such land ownership issues extend beyond these shared spaces. Due to the inaccuracies in past land surveys, it is common for existing building footprints to fall outside their recorded land boundaries in government documents. The demarcation district map, commonly used to locate private land lots under Block Government Lease, is treated as a reference rather than an accurate record. Landowners must consult professional land surveyors to resolve discrepancies between as-built structures and official records.

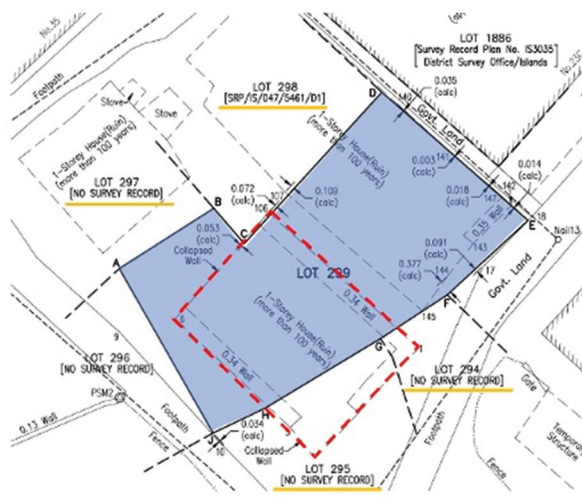
For example, regarding the grain store, the house owner was informed by neighbors that the footprint of the ruined structure encroached on the adjacent land lots. As a result, they were asked to acknowledge the trespassing situation



**Figure 8.** Privately owned planting area fenced off by a yellow metal wire mesh

Source: Photo by the authors (2020).

in writing a condition for authorizing restoration work. Upon retrieving land records, the research team discovered a remarkable finding: the structure was built over four different partial land lots (Figure 9). Similarly, for House No. 49, a complaint was made that the structure on Lot 222 overlapped with an adjacent private land (Lot 223). However, official records revealed the overlap to be physically insignificant. Further investigation uncovered that the complaint stemmed from a complex, intergenerational dispute between the two families involved.



**Figure 9.** The footprint of the grain store overlaps with adjacent land lots  
Source: Drawing by the authors.

To resolve these conflicts, a professional land surveyor was appointed to rectify the land boundaries based on the government coordinate system and the as-built structures. The fact that landowners were unaware of these trespassing issues highlights the inaccessibility of government land records. Villagers often rely on the fragile, outdated hard copies of maps and lease documents, which frequently contain outdated or inaccurate information. For the grain store, the landowner and the research team co-decided to restore only the portion of the structure that lay within the land boundary (Lot 299) to avoid further disputes.

## 6.2. Unspecific regulations for rural conservation

The historical inaccuracy of surveys has led to numerous intergroup conflicts and represents merely one of the many systematic flaws. A notable example of this is the classification of surveyed squatter structures (SSS) – informal dwellings temporarily tolerated until they are naturally phased out. These structures are often constructed on government lands and typically exhibit poor spatial and hygienic conditions. In one instance, land officers erroneously registered the grain store as an SSS, recording its dimensions in imperial units on the existing stone wall. This registration was legally infeasible, as SSS cannot exist on privately owned lands. After several rounds of clarification, the land officers agreed to remove the grain store from the SSS registry.

Fundamentally, building regulations for rural areas require significant development. No rural-specific policies exist for architectural restoration, leaving practitioners to rely on statutory requirements under the SHP for restoration works. The only viable pathway involves applying for a Certificate of Exemption (CoE), a standard

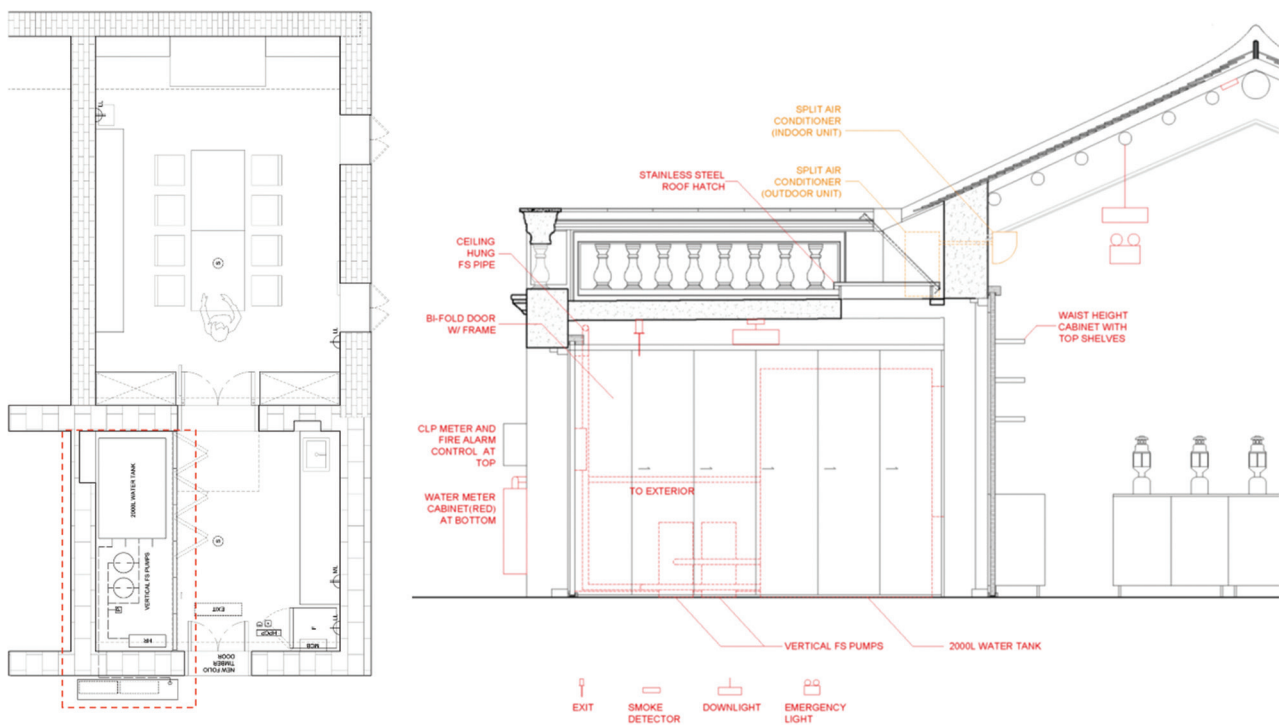
statutory submission for building small houses. The review and approval process by the lands department typically takes 4 months. Based on our practical experience, the CoE review criteria are limited to three aspects: (i) The confined dimensions, (ii) the roofed-over area, and (iii) adherence to the original form and materials for restoration.

This framework, however, reveals critical misconceptions. Restoration is treated as a form of residential development, ignoring the fact that architectural conservation in villages often involves non-residential structures (e.g., the grain store, which was originally a farming hut for crop storage). Furthermore, restoration is constrained by the principle of “restoring the old as the old” (修旧如旧; *xiujiurujiu*). For instance, although the grain store is being restored to its original function as a farming hut, no alterations to its volume are permitted – even if the total floor area remains unchanged. While the trimmed building bulk will be retained based on original forms and materials, the overall mass differs, meaning the appearance can no longer be considered original.

Buildings constructed before the effective date of the Buildings Ordinance (Application to the New Territories) in 1961 are not classified as unauthorized building work. However, there is no effective mechanism to address these policy flaws or assess alternative restoration proposals.

For House No. 49, the statutory procedures were even more complicated. The research team planned to organize a series of cultural workshops at the restored house, but this was regarded as a violation of the existing land use designation as a residence, despite the minimal extent of the activities. Accordingly, the government requested the research team to submit a planning application to change the land use from “residence” to “shop and services” due to the potential business activities, such as selling souvenirs. This process was time-consuming, taking one and a half years to obtain approval.

The approval came with two additional requirements: (i) Preparing and implementing a conservation management plan and (ii) providing additional fire services installations (FSIs) for the new use as “shop and services.” These requirements are not typically prerequisites for listed buildings but are enforced when a planning application is submitted. Drafting, submitting, and obtaining approval from the AMO took an additional 6 months. Meanwhile, the FSIs significantly impacted the interior space (Figure 10). The required installations – a 2,000-L water tank, two sets of water pumps, fire safety panels, and extensive ductwork – occupied half of the entrance hall. Given that workshops were being conducted in other households with relatively low risk, these requirements highlighted the inflexibility of current land



**Figure 10.** Extra fire safety installations at the entrance hall for “shop and services.”  
Source: Drawing by the authors.

policies. The lengthy process frustrated the partnering villagers and significantly undermined their confidence in implementing regenerative initiatives.

### 6.3. Loose governance over village development

The uncontrolled development of small houses represents an unsustainable policy (Hopkinson & Lei, 2003) that has caused irreversible changes in many rural villages. Since the relationship between new houses and their surroundings is not considered, this has led to the erosion of landscape features and the disappearance of vernacular architecture, such as the Hakka houses, resulting in eccentric village esthetics. This has arguably fostered a hidden agenda among villagers, whereby small houses can be constructed easily. As long as the building size adheres to prescribed dimensions, development rarely faces strong opposition. Over time, the esthetics of villages have been replaced by the standardized forms of “Spanish villas,” characterized by full-height glazing units, large balconies, and façades covered with modern ceramic tiles. There is no governance to ensure the integrity of the landscape.

The uncoordinated development has also had adverse effects on historic buildings, including House No. 49. The shared façade of the house originally reflected single-family ownership, but this was split into two units as the family grew. Over time, the two units lost communication and were used

primarily as general storage. Without proper management or maintenance, the roofs and walls deteriorated. When the regenerative initiative was announced, the owner of the adjacent land lot immediately demolished the old structure and rebuilt the house. Although the rebuilt structure maintained the same roofed-over area, it featured an increased floor height to access an outdoor roof terrace, resulting in a pitched roof with an awkward, incongruous shape. The retained shared façade could not compensate for the irreversible visual impact on the historic structures. Although the reconstruction may not technically qualify as unauthorized building works, it transformed the historic structures into an eclectic and eccentric hybrid. In this sense, the governance of rural development concerning existing fabric is loose and ineffective.

### 6.4. Discrepancies between expected and actual realities

In retrospect, several discrepancies between the expected and actual realities of the project have emerged – particularly regarding project beneficiaries, management, and outcomes. These challenges can largely be attributed to existing administrative constraints. From the perspective of both the government and the university, all project personnel must be engaged through a central vetting system.

As part of the initiatives, villagers were invited to collaborate as project partners and organize cultural workshops, with reasonable remuneration offered in return. However, the system for compensation presented significant challenges. Technically, no form of payment other than salary is permitted, and this is governed by formal employment contracts. As a result, all villager-partners were classified as university staff, with their salaries calculated according to the university pay scale, which is determined by academic experience. This arrangement led to highly inequitable and uncompetitive compensation rates when compared to the job market.

Monetary compensation emerged as a significant motivating factor for the conservation initiatives. Villagers repeatedly expressed that, without proper compensation, there was little incentive for families to preserve historic structures rather than redevelop the properties for profits. This dynamic fostered mistrust and strained relationships, with villagers often becoming dismissive of the research team's efforts and critical of decisions. This mistrust resulted in a hierarchical power dynamic, where the villagers, as landowner clients, viewed the researchers as "service providers" tasked with fulfilling their demands to complete the project.

Subsequent requests for modifications to spatial provisions and equipment led to increased time and cost implications. As other researchers have noted, rural regeneration partnerships that lack sufficient human capital are heavily dependent on "strong, local voluntary and community sector infrastructure" (Osborne *et al.*, 2004, p. 156). Consequently, the project's outcomes – including architectural esthetics and program implementation – became increasingly difficult to manage.

## 7. Implications for new policies, incentives, and community design

Systemic changes in new policies, incentives, and community design are essential to bridge the gap between expected and actual realities in countryside regeneration. At a high level, land policies and development-based planning regulations should be re-examined to address pressing issues such as land fragmentation, inactive lands, inconsistent land boundaries and footprints, and land misuse. Specific guidelines tailored to countryside areas – including village zones, greenbelts, conservation areas, and coastal zones – should be formulated to govern rural developments while allowing flexibility for innovative initiatives. The current policy, which categorizes land uses to regulate development, mistakenly includes restoration works under these controls. To address this, the government should distinguish between

commercial activities and regenerative initiatives, actively encouraging non-profit cultural projects that can revitalize underutilized land resources, such as informal spaces, unofficial historic buildings (those not officially listed), landscapes, and farming areas.

In Hong Kong, town planning is highly dependent on zoning, with the Town Planning Board periodically updating land uses through new statutory outline zoning plans. For example, agrarian villages such as Shui Hau are reassessed based on current ecological conditions and are often designated new planning zones, such as coastal protection or conservation areas. When farmlands are abandoned, nature processes often take over, transforming these lands into wetlands. This transformation, fueled by nutrient-rich soils, can recreate habitats and nurture biodiversity. Nonetheless, such ecological changes may inadvertently hinder the regeneration of cultural values, as the temporal aspect of these morphological changes is frequently overlooked. To address this, planning policies should be reviewed to balance and leverage cultural significance alongside ecological benefits.

At the middle level, policy focus should shift from restrictive development controls to proactive incentives for conservation and regeneration. Current funding mechanisms often emphasize the sustainable use of restored buildings beyond the funding period, which imposes unrealistic expectations on villagers. These expectations are misaligned with the priorities of stakeholders such as practitioners, researchers, and grant providers. Given the long-standing lack of private investment interest among villagers, the government should consider assuming greater responsibility for implementing regenerative proposals – particularly when cultural heritage, both tangible and intangible, is integral to the city's identity. For historic buildings that are unoccupied or unmanaged, the government could purchase, restore, and reactivate these structures. In addition, small-scale funds could empower proactive villagers to propose and implement their regenerative schemes. Villagers should also be engaged outside the existing university framework, which often misrepresents them as employees rather than equal partners.

At the community level, the place identity of Shui Hau village, rooted in its eco-cultural landscape, should be reinforced. Village culture and traditions can be leveraged through social design methods to foster sustainable innovation. Key stakeholders who are proactive, passionate, and willing to contribute should be identified and supported. Traditions such as farming and clam harvesting can be reinterpreted and showcased as part of an educational tourism experience.

Entrepreneurial programs can further enhance the value of cultural products and promote economic sustainability. As the village's population becomes increasingly diverse, stakeholders should recognize and embrace the formation of a new, hybrid community, fostering collaboration to regenerate the village's culture.

## 8. Conclusion

This study emphasized the significance of Shui Hau village as a case study for investigating the challenges and opportunities involved in regenerating its cultural values as a coastal farming community. The findings highlight that the current legal framework is unspecific and inadequate, failing to effectively support such regeneration. To address this, the authors presented three novel initiatives: a tactical intervention using mobile kiosks, the architectural restoration of a 100-year-old House No. 49, and the architectural reinterpretation of the grain store. These initiatives aimed to strengthen the village's eco-cultural identity and foster a sense of community.

The main findings revealed challenges encountered during the implementation process. First, intricate land ownership patterns, a legacy of colonial governance, have significantly restricted villagers' use of semi-public, in-between spaces. This has triggered interpersonal conflicts due to arbitrary and inaccurate land boundaries, ultimately weakening social bonds among neighbors. These findings align with studies on psychological ownership in rural land use at the microscale, which demonstrate that communal activities or construction projects on private plots can provoke adjacent landowners due to perceived "external factors" and potential infringements on private land (Bullock & Lamoureux, 2025). Second, the absence of specific regulations for rural regeneration initiatives in Hong Kong has led municipal authorities to assess restoration works using existing urban regulations and legal frameworks. This misalignment has resulted in inefficient use of space, such as the allocation of significant floor and wall areas for additional fire safety installations. To address these challenges, novel policies should be developed (Lang *et al.*, 2024) to support site-specific, multifunctional programs that facilitate the transformation of vernacular structures (e.g., houses) to maximize public benefit in the post-productivist era.

Third, loose governance over village development has caused irreversible damage to the visual esthetics of the village landscape. To mitigate this, additional clauses should be incorporated into the SHP to promote sustainable development, protect adjacent historic structures, and preserve the authenticity of the landscape (Ma, 2016). Finally, discrepancies between expected and

actual outcomes have affected villagers' perceptions of the research team. Initially regarded as collaborative partners, the team's role was later viewed with mistrust due to the flawed administrative mechanisms (Magnus & Rai, 2024).

There are several limitations in this study. First, the selection of sites for architectural restoration and reinterpretation was heavily constrained by the availability of premises and the enthusiasm of villagers. Consequently, no alternative options within the same village were considered. This limitation may introduce bias, as implemented ideas might favor specific villagers. Second, the study assumed that villagers maintained positive relationships with their neighborhoods and that the interventions would enhance their sense of belonging to the village. However, as the village population becomes increasingly hybridized with migrants from urban areas, further investigation into the understanding of village culture among both new and long-term residents would be beneficial. Third, this article focused only on the early stage of a larger community-based action research project. Follow-up actions are needed to monitor the ongoing impacts on stakeholders and their evolving perceptions of the research team in the near future.

To improve future practices, the authors recommend systemic changes at multiple levels. Future studies could explore ways to better address the real needs of stakeholders by resolving fragmented land ownership issues, developing flexible policies to support innovative initiatives that go beyond prescribed land uses and development, establishing incentives for self-initiated proposals, and reinforcing place identity among new community members, extending beyond ecology-oriented conservation.

## Acknowledgments

None.

## Funding

This research was made possible under the Lantau Conservation Fund (MA-2020-02) administered by the Sustainable Lantau Office of the Hong Kong SAR Government.

## Conflict of interest

Thomas W.L. Chung is the Guest Editor of this special issue but was not in any way involved in the editorial and peer-review process conducted for this paper, directly or indirectly. Separately, other authors declared that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

## Author contributions

*Conceptualization:* Jimmy T.W. Ho  
*Formal analysis:* Jimmy T.W. Ho  
*Funding acquisition:* All authors  
*Investigation:* Jimmy T.W. Ho  
*Methodology:* Jimmy T.W. Ho  
*Project administration:* All authors  
*Supervision:* Thomas W.L. Chung  
*Visualization:* Jimmy T.W. Ho  
*Writing – original draft:* Jimmy T.W. Ho  
*Writing – review & editing:* Jimmy T.W. Ho

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

The data supporting this study's findings are available from the corresponding author upon reasonable request.

## References

- Bell, M. M. (1992). The fruit of difference: The rural-urban continuum as a system of identity. *Rural Sociology*, 57(1):65-82.  
<https://doi.org/10.1111/j.1549-0831.1992.tb00457.x>
- Bullock, R., & Lamoureux, B. (2025). Understanding “public” framings of private places and psychological ownership in a rural land use conflict. *Journal of Rural Studies*, 114:103477.  
<https://doi.org/10.1016/j.jrurstud.2024.103477>
- Chang, K. K. (2022). *Community Practices in Lai Chi Wo: Limitations and Futures of Rural-urban Symbiosis*. Hong Kong: Hong Kong Baptist University.
- Chang, W. P. H. (2023). *Rediscovery of Cultural Landscapes in Southern China: Sustainable Heritage and Planning in Rural Settlements*. London: Routledge.  
<https://doi.org/10.4324/9781003030225>
- Chau, L. Y., & Lau, S. K. (1982). Development, colonial rule, and intergroup conflict in a Chinese Village in Hong Kong. *Human Organization*, 41(2):139-146.
- Dong, J. (2018). Language and identity construction of China's rural-urban migrant children: An ethnographic study in an Urban public school. *Journal of Language, Identity and Education*, 17(5):336-349.  
<https://doi.org/10.1080/15348458.2018.1470517>
- Dragan, A., Crețan, R., Jucu, I. S., & Oancea, O. A. (2024). Rural landscapes as cultural heritage and identity along a Romanian river. *Heritage*, 7(8):4354-4373.  
<https://doi.org/10.3390/heritage7080205>
- Du, X., & Shi, D. (2019). Rural heritage: Value, conservation and revitalisation-from the perspective of the human-land relationship. *Built Heritage*, 3(2):1-6.  
<https://doi.org/10.1186/BF03545723>
- Hase, P. H. (2008). *The Six-Day War of 1899: Hong Kong in the Age of Imperialism*. Hong Kong University Press. Available from: <https://www.jstor.org/stable/j.ctt1xwbjg> [Last accessed on 2025 Feb 11].
- Ho, J. T. (2024). Emergent place-identity: Place activation through the architectural restoration of a small Hakka household in the Hong Kong countryside. *Built Heritage*, 8(1):7.  
<https://doi.org/10.1186/s43238-024-00117-4>
- Hoffmann, E. M., Schareika, N., Dittrich, C., Schlecht, E., Sauer, D., & Buerkert, A. (2023). Rurbanity: A concept for the interdisciplinary study of rural-urban transformation. *Sustainability Science*, 18:1739-1753.  
<https://doi.org/10.1007/s11625-023-01331-2>
- Hopkinson, L., & Lei, M. L. M. (2003). *Rethinking the Small House Policy*. Civic Exchange. Available from: [https://civic-exchange.org/dev/wp-content/uploads/2003/09/47-200309land\\_rethinksmallhouse\\_en.pdf](https://civic-exchange.org/dev/wp-content/uploads/2003/09/47-200309land_rethinksmallhouse_en.pdf) [Last accessed on 2025 Feb 11].
- Knapp, R. G. (1986). *China's Traditional Rural Architecture: A Cultural Geography of the Common House*. United States: University of Hawaii Press.
- Knapp, R. G. (2024). China's vernacular architectural heritage and historic preservation. *Built Heritage*, 8(1):44.  
<https://doi.org/10.1186/s43238-024-00153-0>
- Koolhaas, R. (2020). *Countryside: A Report*. Cologne, Germany: Taschen America LLC.
- Lang, W., Gkartzios, M., Yan, J., Chen, T., & Tan, S. (2024). Community Co-creation through knowledge (Co)Production: The engagement of universities in promoting rural revitalization in China. *Journal of Rural Studies*, 112:103455.  
<https://doi.org/10.1016/j.jrurstud.2024.103455>
- Legislative Council of the Hong Kong Special Administrative Region. (2016). *Small House Policy*. The Legislative Council. Available from: <https://www.legco.gov.hk/research-publications/english/essentials-1516ise10-small-house-policy.htm> [Last accessed on 2025 Feb 11].
- Liu, C., Valentine, G., Vanderbeck, R. M., Diprose, K., & McQuaid, K. (2019). Rural-urban inequality and the practice of promoting sustainability in contemporary China. *GeoJournal*, 84(5):1187-1198.  
<https://doi.org/10.1007/s10708-018-9915-y>
- Ma, K. W. (2016). Sustainable development and social policy: A case of indigenous villages in Hong Kong. *Asian Education and Development Studies*, 5(3):305-317.

<https://doi.org/10.1108/AEDS-09-2015-0051>

Magnus, A. M., & Rai, K. (2024). Doing rural community-based action research (CBAR): Community perceptions and methodological impacts. *Qualitative Research*, 24(4):851-871.

<https://doi.org/10.1177/14687941231188884>

McManus, P. (2022). Counterurbanisation, demographic change and discourses of rural revival in Australia during COVID-19. *Australian Geographer*, 53(4):363-378.

<https://doi.org/10.1080/00049182.2022.2042037>

Nissim, R. (2021). *Land Administration and Practice in Hong Kong*. 5<sup>th</sup> ed. Hong Kong: Hong Kong University Press.

Osborne, S., Williamson, A., & Beattie, R. (2004). Community involvement in rural regeneration partnerships: Exploring the rural dimension. *Local Government Studies*, 30(2):156-181.

<https://doi.org/10.1080/0300393042000267218>

Rust, C., Mottram, J., & Till, J. (2007). *AHRC Research Review Practice-Led Research in Art, Design and Architecture*. United Kingdom: Arts and Humanities Research Council.

Strijker, D., Bosworth, G., & Bouter, G. (2020). Research methods in rural studies: Qualitative, quantitative and mixed methods. *Journal of Rural Studies*, 78:262-270.

<https://doi.org/10.1016/j.jrurstud.2020.06.007>

Tang, B., Wong, S., & Lee, A. K. W. (2005). Green belt, countryside conservation and local politics: A Hong Kong case study. *Review*

*of Urban & Regional Development Studies*, 17(3):230-247.

<https://doi.org/10.1111/j.1467-940X.2005.00103.x>

Tang, B., Wong, S., & Lee, A. K. W. (2007). Green belt in a compact city: A zone for conservation or transition? *Landscape and Urban Planning*, 79(3):358-373.

<https://doi.org/10.1016/j.landurbplan.2006.04.006>

Wu, M., Zhang, Q. F., & Donaldson, J. (2024). Post-productivism and rural revitalization in China: Drivers and outcomes. *Journal of Rural Studies*, 110:103382.

<https://doi.org/10.1016/j.jrurstud.2024.103382>

WWF Hong Kong. (2021). *Preserving the Natural Wealth of Southern Lantau Island of Hong Kong: A Coastal Watershed Analysis to Identify Priority Lowland Habitats for Protection and Restoration*. WWF Hong Kong. Available from: [https://wwf.hk.awsassets.panda.org/downloads/wwf\\_south\\_lantau\\_watershed\\_analysis\\_27sept2021.pdf](https://wwf.hk.awsassets.panda.org/downloads/wwf_south_lantau_watershed_analysis_27sept2021.pdf) [Last accessed on 2025 Feb 11].

Yan, J., Chen, H., & Xia, F. (2018). Toward improved land elements for urban-rural integration: A cell concept of an urban-rural mixed community. *Habitat International*, 77:110-120.

<https://doi.org/10.1016/j.habitatint.2018.01.007>

Yu, L., Wang, Y., & Li, M. (2024). The emergence of counter-urbanisation in China: Can it be a pathway for rural revitalisation? *Habitat International*, 144:102998.

<https://doi.org/10.1016/j.habitatint.2023.102998>

## ORIGINAL ARTICLE

“Creative” uses of heritage in the age of  
experiential tourism: The case of Tianjin’s former  
international concessionsMaria Gravari-Barbas<sup>1\*</sup> , Sandra Guinand<sup>2,3</sup> , and Yue Lu<sup>3</sup> <sup>1</sup>IREST, EIREST, Paris 1- Panthéon Sorbonne University, Paris, France<sup>2</sup>Institute for Urban and Regional Research, Austrian Academy of Sciences, Vienna, Austrian<sup>3</sup>EIREST, Doctoral School of Geography, Paris 1- Panthéon Sorbonne University, Paris, France(This article belongs to the *Special Issue: Glocalization: Urban Planning and Its Legacy in Modern Chinese Port Cities*)**Abstract**

Since the late 1990s, heritage reuse for cultural purposes has become a widespread phenomenon in major Chinese cities. Heritage-led projects aim to foster the development of new urban functions, transforming historical spaces into magnets for leisure and tourism. These government-led projects often attract local entrepreneurs, who capitalize on heritage settings as a breeding ground for new activities, such as design galleries, art and craft stores, cafés, gourmet restaurants, and microbreweries. Tianjin, a city 120 km south of Beijing, has embraced this trend by implementing ambitious projects to preserve and enhance its former Western concessions (19<sup>th</sup> – 20<sup>th</sup> centuries). While the “creative” use of heritage is a common feature of both Western and Chinese cities, Tianjin presents a particularly compelling case due to the dissonant nature of its former concession heritage. This article analyzes the relationship between creative (re)uses of heritage and cultural tourism in Tianjin’s former Western concessions. Specifically, it questions the influence of the re-functionalization of historical buildings in the former concessions, mainly for leisure and tourism purposes, on their recognition as heritage. To address this, the study draws on four case studies in Tianjin’s former Western concessions, employing qualitative data collected through participatory and non-participatory observations, thematic analysis of institutional documents, and semi-structured interviews with officials and local stakeholders. The findings highlight how creative uses of heritage could enhance tourism experiences and contribute to economic and cultural revitalization. These practices might foster a deeper engagement with the past while supporting sustainable tourism development.

**Keywords:** Creative use; Dissonant heritage; Experiential tourism; Concession; Tianjin; China**\*Corresponding author:**Maria Gravari-Barbas  
(maria.gravari-barbas@wanadoo.fr)**Citation:** Gravari-Barbas, M., Guinand, S., & Lu, Y. (2025). “Creative” uses of heritage in the age of experiential tourism: The case of Tianjin’s former international concessions. *Journal of Chinese Architecture and Urbanism*, 7(3): 3703.  
<https://doi.org/10.36922/jcau.3703>**Received:** May 20, 2024**1st revised:** October 13, 2024**2nd revised:** December 10, 2024**3rd revised:** December 24, 2024**Accepted:** January 20, 2025**Published online:** February 17, 2025**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.**Publisher’s Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.**1. Introduction**

The reuse of heritage has gradually become a common tool for local development and a means for city promotion (D’Ovidio & Cossu, 2017). Following China’s dramatic urban transformation since the late 1990s, the adaptive reuse of heritage for cultural purposes has become a widespread phenomenon in major Chinese cities (Bouteloup, 2011; Chen et al., 2016; Fresnais, 2001). In recent years, Tianjin has launched ambitious projects to preserve

and enhance its former Western concessions, which date from the 19<sup>th</sup> to the 20<sup>th</sup> century. While these concessions symbolize China's humiliating defeat in the Second Opium War (1856 – 1860)<sup>1</sup>, they also represent a unique architectural legacy, with many Western-style buildings now protected as local or national monuments (Marinelli, 2018).

Since the 2000s, the local government has launched several heritage enhancement projects with the aim of encouraging the development of new uses in the concessions, transforming them into cultural and creative hubs that attract leisure activities and tourism (Leng & Chen, 2017). These government-led projects have proven particularly appealing to local entrepreneurs, who leverage the heritage setting as a breeding ground for new activities such as design galleries, art and craft stores, cafés, gourmet restaurants, and microbreweries.

While the “creative” use of heritage is common in both Western (Landry, 1994) and Chinese cities (Wang, 2010), Tianjin's case is particularly noteworthy due to the historical specificity of its former concessions and the implementation of projects that link the creative use of heritage with tourism strategies. Moreover, the local government of Tianjin has recently set the goal of establishing the city as a “creative” destination and obtaining the UNESCO “Creative City” label (Rosi, 2014)<sup>2</sup>.

This article specifically examines the relationship between creative (re)uses of heritage and cultural tourism in former Western concessions. It presents and analyzes how the paradigm of creativity has been mobilized by local decision-makers in Tianjin to shape a destination with a specific and distinctive identity within the former international concessions.

In what way do heritage restoration, renovation, or reinvention projects – primarily designed for leisure and tourism – contribute to the reappropriation of the dissonant heritage of the former concessions? Do tourism redevelopment projects facilitate the (positive) redefinition of concessionary heritage, which is historically linked to China's “century of humiliation”<sup>3</sup> at the hands of Western powers?

<sup>1</sup> The Second Opium War, also known as the Second Anglo-Chinese War, was fought between the United Kingdom and France against the Qing dynasty (1644–1912) between 1856 and 1860. It was the second major conflict in the Opium Wars, which were waged over the right to import opium into China. The war resulted in a Qing defeat and the forced legalization of the opium trade.

<sup>2</sup> Interview with Li Yunfei, founder and director of Tianjin Flight Decoration Design Engineering Co., Ltd., Tianjin, 2018.

<sup>3</sup> The “century of humiliation” began with the First Opium War (1839–1842) and ended in 1945, when the Republic of China emerged from the Second World War as one of the Big Four powers (or alternately, in 1949 with the founding of the People's Republic of China).

The article draws on four case studies of heritage redevelopment located within former Western concessions in Tianjin. Their specific contexts and characteristics underline the diverse approaches to heritage conservation and reconversion, positioning Tianjin's former concessions as an emerging laboratory for creative heritage redevelopment in relation to tourism practices. By analyzing these varied approaches, this article demonstrates that creativity in China encompasses both creative approaches of restoring, reinterpreting, or rebuilding heritage and the new (creative) functions assigned to recently restored buildings.

The article first outlines the methodological approaches, followed by a discussion of the conceptual framing of heritage, experiential tourism, and creative economies, exploring how these concepts are interconnected. It then delves into the case studies before discussing the findings and concluding with final reflections.

## 2. Literature review

### 2.1. Heritage, experiential turn, and creative tourism

#### 2.1.1. Cultural heritage in the age of experience

Since Pine and Gilmore (1999) introduced the concept of the “experience economy,” several authors have analyzed the relationship between heritage development and practices linked to the quest for emotions and meaning (Boswijk et al., 2007; Sundbo & Sørensen, 2013). According to Pine and Gilmore (1998, p. 98), “Experience is as real an offering as any service, good, or commodity.” Thus, within the experience economy, experiences become the primary commodity to be purchased and consumed. In this context, “heritage products,” such as museum visits and tourist sites, are repackaged as experiences; the visitor is regarded as a “guest” (rather than a user or customer), and heritage is offered as an “experiential stage.” Historic sites are redesigned as heritage “products” to meet the evolving expectations, aspirations, and imaginations of their guests, offering them enriching and memorable experiences. This shift does not necessarily mean that heritage sites become purely places of entertainment; rather, new methods of heritage mediation are introduced in engaging and meaningful ways, reflecting a renewed approach to contemporary business models (Kearns & Philo, 1993). Heritage is not only socially constructed but also socially mediated.

Heritage is increasingly leveraged by local stakeholders to stimulate economic development, “put a city on the map,” build a new urban image, or promote cultural tourism (Gravari-Barbas et al., 2023, p. 248). Historic urban spaces function as experiential terrains, offering a sought-after urban atmosphere and new forms of storytelling (Guinand, 2015), where heritage becomes the medium for “authentic”

experiences (Cohen, 1988; Wang, 1999), offering consumers a “link with the past” (Chronis & Hampton, 2008).

These experiences set through the transformation and refurbishment of the urban landscape is not meaningless. The aim is to attract the mobile middle class, students, and other demographic groups, reinforcing connections to the tourism economy and consumption (Guinand, 2015). Economists Edward Glaeser, Jed Kolko, and Albert Saiz have, for instance, shown that cities with high levels of consumption tend to experience greater economic success than those centered primarily on production (Glaeser et al., 2001). They therefore emphasize the crucial role of amenities in urban planning.

In the case of Tianjing’s former concessions, an analysis of the imaginaries and practices of both local and national visitors suggests that their creative redevelopment fosters novel urban experiences. The former concessions, characterized by their “exotic” architecture, increasingly serve as stages for emerging urban practices (Lu et al., 2016), including leisure shopping, immersive heritage visits, and the consumption of Western food and drinks in fancy cafés and restaurants, or “*wanghong*” (网红; internet-famous) destinations (Zhang et al., 2022).

### 2.1.2. Creative uses of heritage as a stage for tourism

In his seminal book *The Rise of the Creative Class and How It is Transforming Work, Leisure, Community, and Everyday Life*, Florida (2004; 2005) showed how cities that perform best are those that attract and effectively “nurture” their creative class<sup>4</sup>. Florida’s work has had a significant influence on urban public policies and has contributed to the concept of mobile urbanism (McCann & Ward, 2011). Every Western city has been eager to boost its creative industries, thereby celebrating its culture, arts, and diversity. As Richards (2011, p. 1227) notices: “The creative turn has affected tourism in a number of ways. As well as increased creative content being integrated into tourism products, tourism has itself become a creative arena for the development of skills and performance.” While creative tourism has been the subject of different approaches and has evolved over the years (Carvalho et al., 2019), we follow Richards’ (2011, p.1237) view that creative tourism represents an escape from mass cultural tourism, offering more flexible and “authentic” experiences that can be co-created between host and tourist. Creative tourism also stresses the critical importance of place, presenting “creative” dimensions that offer potential

<sup>4</sup> According to Richard Florida, the creative class represents human capital, which is itself creative capital. This highly heterogeneous ‘class’ includes artists (writers, musicians, directors, etc.), scientists and senior business executives. The city needs to work on its attributes in order to attract these populations and enhance this creative capital.

for unique experiences and differentiation. In this regard, we follow Smith (2016, as quoted in Carvalho et al., 2019, p12), who emphasizes this spatial aspect. Accordingly, historic landscapes with acknowledged and identifiable heritage dimensions offer plenty of opportunities to establish the framework and policies for creative tourism while simultaneously becoming objects of commodification (Zukin, 1996).

Different registers of heritage adaptation to the creativity paradigm approaches can be identified. Some projects located in former industrial areas exemplify the transformation of urban sites into creative industry hubs. For instance, Fossa and Milan (2014) examines the case of Porta Genova in Milan, Italy, where the fashion industry has repurposed former industrial buildings – such as the Armani house in a former Nestlé factory – generating a new dynamic in the neighborhood.

Creativity also manifests in the capacity to transform historic landscapes into spaces to be experienced, visited, and enjoyed. A typical example of these projects is the redevelopment of former United States port areas into themed leisure waterfronts (Boyer, 1994; Gravari-Barbas, 1998; Guinand, 2022), where former factories, warehouses, and port infrastructure have been converted into “festival marketplaces” – spaces entirely dedicated to leisure tourism. Frequently, these new leisure functions are housed in entirely newly built buildings that freely imitate historic architecture. These pastiche buildings create eclectic and thematic environments catering to the new postmodern and post-industrial economy. These restored, refurbished, rebuilt, or reinvented historic spaces present an idealized, nostalgic past.

According to Thompson and Tambyah (1999, p.236, as quoted in Canavan and MacCamley, 2021, p.103185), “postmodernity is a cultural epoch that celebrates the pleasures and freedoms offered by simulacra, hyperrealism, aesthetic pastiches, and bricolage identities, against modernist ideals of originality and purity of form.” This postmodernist approach also gives rise to another type of creative projects – one characterized by “creative destruction” (Harvey, 2007), which is typical of neoliberal economic contexts and strategies. In this case, architectural heritage, or parts of it, is dismantled, transformed, or demolished to pave the way for a new type of object or project presented as innovative.

### 2.1.3. Conserve, restore, rebuild, reinvent heritage: Heritage interventions in the age of experience

One might imagine that established doctrines of heritage restoration and conservation, such as the Venice

Charter (1964)<sup>5</sup> in particular, would provide a generally and internationally adopted framework for heritage interventions. Obviously, this is not the case. Not only do interventions vary from one country to another, but sometimes, even in the same political and geographical context, they can differ significantly. In this sense, restoring a building is, implicitly or explicitly, an act of architecture.

Architect-restorers can adopt a range of approaches, from striving to restore a building “exactly as it was” (a term that is in itself disputed, since, in reality, it is impossible to reproduce an identical structure using the same materials and techniques) to utilizing heritage as a “substrate” for the creation of new architectural forms or styles.

Several factors may determine the choice of a restoration or conservation project adopted, ranging from absolute respect for the “original” state of the building to its total reinvention. Two of these factors are of particular interest in the context of this article: the motivations of those commissioning the restoration and the intended functions of the building post-restoration.

The first factor relates to the political intentions of the commissioners: What message do they seek to convey? What is the aim of the conservation or restoration project?

The second factor pertains to the liberties that private players, in particular, can take depending on the project for which they are developing the restored buildings: not only must these buildings be adapted to accommodate new functions (which implies creating new spaces, new access points, or compliance with public accessibility regulations), but they must also be adapted to accommodate the new function. Buildings restored by the private sector for tourism-related purposes can sometimes become the subject of fantasy-driven or playful interventions, or even the creation of architectural simulacra (Graburn et al., 2021; Gravari-Barbas et al., 2020).

Some restoration projects, particularly those aimed at accommodating tourism functions – or even integrating restored heritage as a central element of a destination’s tourism policy – do not hesitate to take liberties with heritage, using it as a creative medium.

Several cases of restoration in China, in particular, demonstrate that heritage restoration is not always carried out in accordance with the principles of authenticity and integrity promoted by the Venice Charter. Instead, there is often a margin of freedom and interpretation (Hevia, 2001;

Nyíri, 2006; Ryckmans, 2008). In China, the materiality of heritage is treated less fastidiously than in European countries, where traditions of restoration and conservation have been established since the 19<sup>th</sup> century. Approaches to the restoration and redevelopment of heritage in relation to new functions (e.g., tourism, leisure) are particularly interesting to study (Gravari-Barbas, 2018), a fortiori in the case of dissonant heritage.

#### **2.1.4. Creative developments in China: Paradigm circulation and local interpretations**

The overall success of the creative paradigm should not conceal its conceptual ambiguity, prescriptive nature, and normative dimensions (Peck, 2005), as seen in the work of Richard Florida (Florida, 2004). According to Kong (2009, p. 2), the “policy scenario” of creativity considers that to compete in the new creative economy, “cities should seek to implement specific initiatives such as fostering creative industry clusters, incubating learning and knowledge economies, optimizing networks with other successful places and companies, valuing and rewarding innovation, and aggressively campaigning to attract the creative class.”<sup>6</sup> This “policy scenario” of the Western creative city has recently been adopted by municipal leaders in China (Tan et al., 2013). However, the normative approach to the creative class tends to overlook the cultural values and practices inherent to a place. As Wang (2004) reminds us, the success of the creative industries sector depends heavily on the socioeconomic opportunities available to small businesses, allowing them to develop organically and in a bottom-up manner. These small companies are characterized by horizontal hierarchies and the clustering of independent, daring, and forward-thinking producers. The relevance of the creative industries concept to mainland China needs to be relativized since it implies the existence of a free-market economy that takes competition, intellectual property rights, and the existence of a commercial cultural industries sector for granted.

Yet, despite this apparent paradox, which places the creative industries paradigm within a specific context, the concept of creativity has enjoyed notable success in China. China and its public authorities have rapidly adopted discourses on cultural and creative industries and related policies (O’Connor & Xin, 2006), moving from “made in China” to “created in China” (Keane, 2007). As Qiang and Kovacs (2021b) have shown in their study of creative tourism in China, looking at 14 UNESCO-designated creative cities, while creative tourism is often depicted as tourists actively taking part in creative activities, passive activities, and experiences are equally important. For instance, sightseeing is one of the most direct and general

<sup>5</sup> The Venice Charter. The International Council on Monuments and Sites (ICOMOS). International Charter for the Conservation and Restoration of Monuments and Sites (Venice Charter, 1964). Available at: <https://www.icomos.org/en/participer/179-articles-en-francais/ressources/charters-and-standards/157-thevenice-charter>

<sup>6</sup> Kong, 2009, p.2, translated by the authors.

ways by which creative tourists acquire new knowledge about local cultures and engage with destinations. Moreover, the two scholars note that visitors show significant interest in the purchase of local products and consuming regional cuisine. Thus, handicrafts, homemade food, and original creations play an important role in creative tourism within the Chinese context (Qiang & Kovacs, 2021a), as observed in our study of Tianjin. In this sense, the creative tourism approach relates to the one observed by Tan et al. (2013) in Taiwan, in which creative tourism is seen as part of the cultural and creative industries focusing on everyday activities and aiming to attract tourists rather than seeing creativity in purely artistic terms.

Moreover, local authorities in China play a key role in these creative developments. Several projects in different Chinese cities show that local authorities serve as key decision-makers (Zielke & Waibel, 2014). They possess the authority to promulgate regulations for heritage site preservation, establish legislative frameworks, modify land-use rights, and act as investors and developers. In this way, they regulate and promote creative spaces. The strong involvement of the local state in almost all aspects leads to the conclusion that creative spaces in China could be appropriately labeled as spaces of “controlled creativity.” Notably, “the national government recognized the value of creative industries and spaces only after successful experiments at the local level.”<sup>7</sup>

## 2.2. Built heritage of the Tianjin concessions: Approaches to conservation and restoration

### 2.2.1. Heritage protection policies in Tianjin

Since the early 1990s, economic development in China has been decentralized, shifting responsibilities to provincial, municipal, and local governments. Cities have taken charge of their own economic development (Henriot, 2015), and local governments have taken the lead in real estate and tourism projects. This means that local instances are present as both co-owners and regulators (Nyíri, 2009; Oakes, 1998). Since the 1980s, China’s central government has recognized the important role of heritage in nation-building and economic development (Nyíri, 2006), reviewing and adjusting policies stemming from the Cultural Revolution (1966 – 1976).

Chinese cities are thus making an effort to choose and promote the unique image of the city. Often, especially in cities marked by a strong historical background and unique cultural identity (e.g., historic cities, minority cities, and formerly colonized cities), the rehabilitation of old centers consists of superimposing heritage pastiches onto existing elements linked to local culture. With the development

<sup>7</sup> Zielke et Waibel, 2014, p.106, translated by the authors.

of Chinese urban cultural tourism, urban heritage is now protected and exploited as a tourist resource. Since the 1990s, the protection and requalification of historic centers to be valorized as tourist areas have tended to become the most important renovation strategy in Chinese cities (Liu & Liu, 2010).

For Chinese cities with an abundance of Western heritage, the redevelopment incentive of former colonized territories into recreational centers can be traced to the Xintiandi district in Shanghai. In this case, the original Shikumen<sup>8</sup> community within the former French Concession was extensively transformed into a comprehensive commercial, catering, entertainment, and tourism area. The remarkable success of Xintiandi district (Figure 1) led to its replication in numerous other major cities across China (Tsai, 2008).

In this context, and after several decades of relative oblivion, the former concessions have attracted the attention of local governments in several Chinese cities. This heritage rediscovery marks a notable change against the dominant narratives depicting a “century of humiliation” (Chauffert-Yvart et al., 2020). The former concessions “joined the mainstream of local urban history” (Bickers, 2013, p. 194)<sup>9</sup> and became important sites in the heritage economy, aiming to capitalize on the country’s growing tourism market, as the discourse excerpt from one of our interviews underlines:

Our understanding of Western heritage has gradually evolved. Before, it was a sign of humiliation. Now,

<sup>8</sup> Shikumen is a traditional Shanghainese architectural style that blends Western and Chinese elements and first appeared in the 1860s.

<sup>9</sup> Translated by the authors.



Figure 1. The heritage buildings of the former concession district of Xintiandi, Shanghai, China, repurposed for leisure and tourism functions  
Source: Photo by Gravari-Barbas (2024).

our country is more powerful than before, and we are more confident in ourselves, so even if it evokes a painful image, we have realized that it is a treasure for China. We pay more attention. We have already talked about this 6 or 7 years ago; the heritage of the early 20<sup>th</sup> century in Tianjin signifies a transition of Chinese society from feudalism to modernity, with cultural collision and mixture, and the introduction of Western civilization, which have formed a very special culture of Tianjin. In fact, it is the same type as Macao, which has been listed as a world heritage. However, since Tianjin is closer to the interior of the country, these exchanges can be deeper and broader. The work of inscription on the World Heritage List concerns various aspects; we are still in the preparation phase. (Interview excerpt 1, Vice-director of Land Resource and Housing Management Bureau of Tianjin Municipality, 2016)

In 2004, for the celebration of the city's 600<sup>th</sup> anniversary, a new narrative emphasizing an "open city" emerged, grounded in the historical legacy of the Westernization Movement. This reinterpretation marked a shift in how the history of the former concessions was framed (Gravari-Barbas et al., 2020). For instance, the Tianjin Museum of Modern History, located in the Wudadao area of the former British concession, highlights the narrative change around the cosmopolitan city: "Synthesizing the essence of both Western and East cultures, Tianjin had become the epitome of multiculturalism" (Gravari-Barbas et al., 2020, p. 71). Interestingly, the highest concentration of historical buildings in Tianjin is located in the former concessions (Lu & Li, 2005), as much of the old city was demolished before 2005. Among the 14 designated historic and cultural districts of the city, 11 are located within

the former concessions (Figure 2). Today, the concessions represent an important resource for the municipality, which is actively looking for innovative development strategies.

### 2.2.2. In search of a tourist identity

Tianjin's tourism image has long remained ambiguous. Although its proximity to Beijing allows visitors easy access, competition between the two cities has made it difficult for Tianjin to establish itself as a major tourist destination. However, in the early 2000s, Tianjin accelerated its tourism development efforts. The festivities associated with the 600<sup>th</sup> anniversary of the city's founding considerably heightened government officials' awareness of the city's opportunities as a unique tourist destination, primarily based on the heritage of its former concessions.

A major exhibition, "A Hundred Years of China through Tianjin" (中华百年看天津; *Zhonghua bainian kan Tianjin*), was designed to position Tianjin as the quintessence of modern Chinese society and a showcase of diverse architectural styles (Marinelli, 2010b). The branding of the city focused on this unique feature. Referred to as the "International Exposition of Architecture" (万国建筑博览会; *Wanguo jianzhu bolanhui*), the city's communication insisted on the exemplary character of its Sino-Western urban architecture. The former colonial phase of Tianjin was actively reinterpreted as the starting point of the construction of modern China, as illustrated in the following interview excerpt:

I would like to share our thoughts on heritage and culture. We have always paid great attention to the exploitation of cultural resources, especially for the city of Tianjin, because the natural resources are limited, and the cultural resource is our basis for tourism development. Hence, we are always working on culture and heritage. Even though the city of Tianjin has only a little over 600 years of history, it is a city of character, and the modern history of Tianjin is unique in China, including architecture, stories, and intangible heritage. How to link this cultural wealth to tourism? It is often said that tourism without culture is tourism without spirit. We have also given advice to the Tianjin culture departments on this subject, the Ancient Culture Street, the Wudadao district, the Grand Canal, etc. However, development should not surpass protection. (Interview excerpt 2, Director of Tianjin Municipal Tourism Bureau of Tourism, 2018)

Since the 2000s, Tianjin authorities have financed a remarkable number of redevelopment projects (Figure 2), most of which involve the renovation and enhancement of the architecture and historic districts located in the former concessions. Through urban planning and redevelopment strategy, these areas have transformed into weekend

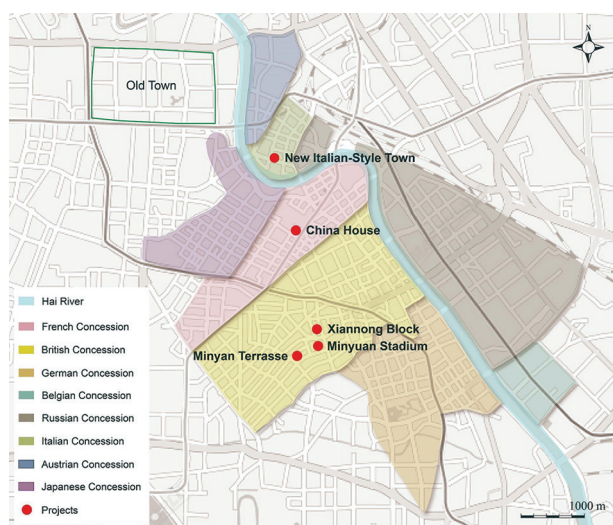


Figure 2. Main projects for creative tourism in the former concessions of Tianjin

Source: Illustration by Yue Lu.

getaway destinations and, increasingly, national tourist destinations (Tianjin Bureau of Statistics, 2016). This trend underscores the role of tourism in rewriting modern local, and even national, history.

### 3. Methodological considerations

This research is based on a number of empirical studies. A four-year research project (2016 – 2019), carried out as part of the international research project “Patrimondi,” funded by the French National Research Agency, explored the ways in which heritage dynamics interact with tourist mobilities and global circulations (of people, ideas, capital, and images). The data collected during this research were supplemented by additional information gathered during two field visits in September 2023 and October 2024. These visits enabled ongoing monitoring of the transformations of the heritage buildings in the former concessions and their evolving functions.

The findings and discussion are based on qualitative data collection methods. Throughout our fieldwork, we conducted an in-depth case study investigation (Yin, 2009) of the concessions and their various developments. Our approach combined urban analysis with both participatory (e.g., museum visits, consumption experiences, guided tours) and non-participatory observation of these sites over multiple visits. In addition, we conducted semi-structured interviews in Chinese with pre-identified stakeholders, including developers, public authorities, business owners, scholars, and members of conservation associations, to understand how they looked at the former concessions and grappled with the heritage (Table 1). Each interview was pre-scheduled and lasted approximately 1 h. The interviews were subsequently transcribed and translated to facilitate thematic analysis. Furthermore, we conducted a thematic analysis of institutional documents (both national and local) related to tourism strategies and heritage preservation policies from the 1990s onward.

#### 3.1. Data analysis: Creating the conditions for the development of creative tourism – The example of four urban projects in former concessions

To understand how local stakeholders in Tianjin have leveraged the heritage of the former concessions to create an urban tourism destination, four projects (Figure 2) were selected for analysis. These projects represent different heritage adaptation strategies within the creativity paradigm (Table 2). Each case illustrates a distinct approach to how heritage can serve as a vehicle for the development of creative and cultural tourism: (i) Minyuan Terrace (Figure 3) and Xiannong Block (Figure 4) illustrate the “creative” restoration of Wudadao district; (ii) the global renovation of the former Italian Concession exemplifies a façadist approach, transforming



Figure 3. Minyuan Terrace. Entrance to the Summer Night Market. Source: Photo by Lu (2019).



Figure 4. Xiannong Block. Source: Photo by Lu (2018).

heritage into a leisure and tourism district (Figure 5); (iii) the complete reconstruction of the historical Minyuan Stadium serves as an example of heritage simulacrum (Figure 6); (iv) finally, the China House in the French Concession, represents a new museographic space, characterized by the “creative destruction” of architectural heritage (Figure 7).

#### 3.2. Minyan Terrasse and Xiannong Block: Creativity, cultural heritage, and the commoditization of Wudadao district

THARD’s intervention in Wudadao began in 2006 with the renovation of a row of 2-story “British-style” buildings built in the 1930s (interview with THARD, 2018). This pilot project, later branded as the Minyuan Terrace Cultural Creative Block (Figure 4), aimed to initiate the renovation of the neighborhood.<sup>10</sup> Since its opening in 2009, Minyuan

<sup>10</sup> Interview with Li Qian, consultant, 2018.

**Table 1. List of interviews with stakeholders in Tianjin**

| Category                                      | Status  | Date                       |
|---|---|----------------------------|
| Institutional and operational actors          | Entrepreneur, Flight  | August, 2016, August, 2018 |
|   | Engineer, Office of the Historic Buildings Protection Commission of Tianjin Municipality                | August, 2016               |
|   | Civil servant, Office of the Historic Buildings Protection Commission of Tianjin Municipality           |                            |
|   | Engineer, Haichuang Company   | August, 2016               |
|   | Civil servant, Land Resource and Housing Management Bureau of Tianjin Municipality                      | August, 2016               |
|   | Inspector of Tianjin Municipal Tourism Bureau of Tourism  |                            |
|   | Civil servant, Italian Embassy in China   | June, 2017                 |
|   | Civil servant, Advisor of the Italian Embassy in China  |                            |
|   | Civil servant, Event Planning and Development Department of Tianjin, Municipal Bureau of Tourism Bureau | June, 2017                 |
|   | Employee, UAM   | August, 2016, August, 2018 |
|   | Director of Tianjin Municipal Tourism Bureau of Tourism   | August, 2018               |
|   | Vice-director of Land Resource and Housing Management Bureau of Tianjin Municipality                    | August, 2018               |
|   | President of THARD  |                            |
|   | Director of Historic Buildings Protection Commission of Tianjin Municipality                            |                            |
|   | Professor in Architecture, Tianjin University   | August, 2016               |
|   | Assistant Professor in Architecture, Tianjin University   |                            |
|   | Professor in Tourism, Tianjin University of Commerce  | August, 2016               |
|   | Writer and painter  | August, 2016, August, 2018 |
|   | Assistant professor in landscape, Tianjin University  | August, 2016               |
|   | Urban planner, Tianjin Urban Planning and Design Institute  |                            |
|   | Writer and painter  | June, 2017                 |
|   | Professor, Department of Tourism and Services of Nankai University                                      | June, 2017                 |
|   | Professor in Architecture, Tianjin University   | August, 2018               |
|   | Assistant Professor in Architecture, Tianjin University   |                            |
|   | Journalist and editor   | August, 2016               |
|   | Members of the Association Memory of Tientsin   | August, 2016, August, 2018 |
| Members of the Association Memory of Tientsin |   |                            |
| Employee, UAM                                 | August, 2016  |                            |
| Tourist guide                                 | August, 2016  |                            |
| Senior Analyst, JLL                           | June, 2017  |                            |
| Documentary director, ARTE                    | June, 2017  |                            |
| Director of Beijing World Park Office         | June, 2017  |                            |
| Analyst, JLL                                  | August, 2018  |                            |

**Table 2. List of the selected projects**

| Project name                       | Completion date | Main function                     | Owner/City manager   |
|------------------------------------|-----------------|-----------------------------------|----------------------|
| Minyan Terrasse and Xiannong Block | 2009, 2013      | Cultural and Creative District    | THARD                |
| New Italian-Style Town             | 2008            | Tourist site with Italian style   | Haihe Company        |
| Minyuan Stadium                    | 2014            | Tourist and commercial of Wudadao | THARD                |
| China House                        | 2007            | Museum                            | Private entrepreneur |



Figure 5. New I-Style Town  
Source: Photo by Lu (2018).

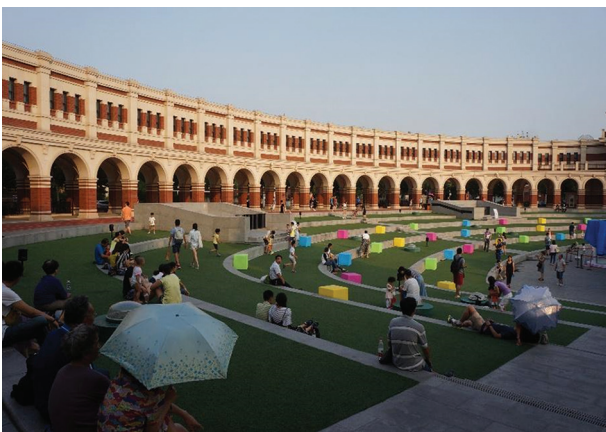


Figure 6. Minyuan Stadium  
Source: Photo by Maria Gravari-Barbas (2018).



Figure 7. China House  
Source: Photo by Maria Gravari-Barbas (2018).

Terrace has evolved into a vibrant gathering place for artists, designers, and millennials (Municipal Bureau of Land Resources and Housing and China Society of Cultural Relics, 2016). It features Western Style cafés, wine

and cigar bars, fusion cuisine restaurants, art galleries, and a museum of traditional Chinese art. The venue also hosts a variety of cultural activities, blending the neighborhood's historical character with cosmopolitan experiences.

Despite high business turnover, this pioneering project integrating creative activities into historic buildings was heralded as a success story for Wudadao district. Following this achievement, THARD launched a second major initiative in 2013 – the redevelopment of Xiannong Courtyard, originally the residence of Xiannong Company employees in the 1920s. This complex was transformed into a space for creative businesses, leisure, and tourism, aiming at a young clientele<sup>11</sup>. The design emphasizes the buildings' Western architectural features, while the promotional discourse plays on historical values in the service of creative tourist consumption. According to THARD: "Xiannong Business and Tourism District has defined and positioned itself as a lifestyle community."<sup>12</sup>

THARD insists on the cosmopolitan and creative reinterpretation of heritage: "Fashionable international elements have been introduced into buildings, and the use of new materials not only highlights the cultural dimension of historic buildings, it also attracts new fashion consumers."<sup>13</sup> The heritage nature of the project is decisive. Some companies located in Xiannong explicitly align their brand identify with heritage esthetics, as evidenced by statements such as: "looking for a Western, romantic venue, corresponding to their concept—a creative or unique café"<sup>14</sup>; "awakening the inspiration of artistic creation."<sup>15</sup>

In the case of Minyuan Terrasses and Xiannong Courtyard, heritage restoration was carried out with care and respect to preserving the original 20<sup>th</sup>-century architectural fabric. This rather sober and measured restoration is one of the reasons, or even the main reason, for the location of creative businesses in Wudadao.

The restored built environment and the creative development of cultural heritage in Xiannong Block contribute to the transformation of Wudadao into an urban tourism destination. Here, "creativity" functions as the new "packaging" of the historic setting, serving as a storytelling device for the rebranding and commodification of the old buildings.

### 3.3. "New Italian-style town": Urban theming and Disneyfication

The former Italian Concession is one of the most emblematic (and decried) examples of urban regeneration policies

<sup>11</sup> Interview with Ms Lu Hong, 2016.

<sup>12</sup> Signage elements for Xiannong Courtyard.

<sup>13</sup> Signage elements for Xiannong Courtyard.

<sup>14</sup> Interview, Simple Café, 2018.

<sup>15</sup> Interview, Huayou Café, 2016.

pursued by the Tianjin municipality<sup>16</sup>. Renovated in 2008, it was initially branded as the “picturesque Italian district” (意式风情区; *Yishi fengqing qu*) or the Italian Business Park. In 2009, the district was renamed “New I-Style Town” (新意街; *Xin Yi Jie*), with the “I” referencing Italy (Lu, 2017; Marinelli, 2010a). The redevelopment of I-Style Town is characterized by a redefinition of its “historic” elements, relying heavily on façadism, the brutal expulsion of original inhabitants, and the transformation of the area into a leisure zone – all of which have been strongly criticized by researchers (Marinelli, 2010a). The initial restoration project, which originally involved Italian teams in a unique Sino-Italian collaboration, gradually shifted in the 2010s toward an essentially commercial strategy. Initially envisioned as a cultural space, the district was intended to house Italian-themed galleries, small museums, a historical exhibition center, souvenir stores, and bookstores.<sup>17</sup> However, over time, it evolved into a tourism and leisure hub. Today, the only remaining element that recalls the original project is “Cinema Paradiso,” an initiative spearheaded by Li Yunfei, the original entrepreneur and founder of Tianjin International Design Week. Despite the Disneyfication of the area, its heritage, reinterpreted in a creative and playful way, represents the major attraction of the Italian Concession<sup>18</sup>, which is now one of Tianjin’s main tourist areas. As stated by one of our informants:

First of all, as a business card of the city, it is very successful. When a tourist searches for tourist information about Tianjin on websites, he immediately finds the Italian-style district. It has become a must-see tourist site in Tianjin.

On the other hand, we have many regrets; our original desires have been diluted over time. For example, we hoped that there would be more art galleries, small museums, and historical exhibition centers and to make unique souvenirs related to the history and culture of the district, such as books, records, and handicrafts. Similarly, we had to set up small kiosks at the request of the local government, but with the hope of removing them in the future so as not to damage the range and character of the district.

Basically, we would anticipate a unique cultural district and at least three or four public and non-profit points of interest funded by the municipality. However, these ideals could not be completely preserved and had to give way to economic interests. Today, this district has become a kind of food street. (Interview excerpt 3, Entrepreneur of Flight, 2014)

Despite the heavy Disneyfication of the area, the former Italian concession has developed a distinct tourism model

compared to Wudadao, emphasizing leisure-oriented experiences over cultural authenticity<sup>19</sup> (Lu et al., 2016).

### 3.4. Minyuan Stadium: The creative reinvention of a heritage site in Wudadao, former British Concession

The 18,000-capacity Minyuan stadium dates to the early development of Wudadao district (1926). Since its inception, the stadium has been rebuilt at least 4 times. Despite its historical importance, it was demolished in 2012 and entirely rebuilt in 2014. The new building replicates the template of the old stadium, incorporating the architectural elements of its façades while accommodating recreational, tourism, commercial, and cultural functions. It now houses Wudadao Museum, which showcases notable residents of the district and highlights the Western lifestyles of the first decades of the 20<sup>th</sup> century.

Minyuan Stadium is a flagship facility, a common feature in several urban redevelopment projects in Western cities (Lu et al., 2019). It functions as the geosymbol of Wudadao, acting as the focal point for visitors. The stadium corresponds to a new generation of commercial centers, transcending traditional retail functions to become a “lifestyle space.”<sup>20</sup> These lifestyle centers integrate playful elements, diverse dining options, leisure facilities, and cultural events.

The rebuilding of Minyuan Stadium was intended to create tourism services in Wudadao and offer a major new tourist destination in Tianjin<sup>21</sup>. Alongside Minyuan Terrace and Xiannong Block, the new Minyuan Stadium is an essential element of Wudadao’s tourism, leisure, and business strategy, skilfully combining new creative elements with its heritage foundations.

### 3.5. “Heritage fantasies” in China House

Built-in the late 1920s, the China House (also known as the Porcelain Museum) was originally the residence of Chinese diplomat Huang Rongliang (1876–unknown death date). It was purchased in 2002 by its current owner, businessman and collector Zhang Lianzhi. Although the building was designated as a historic building in 2005, this classification did not prevent the new owner from “beautifying” the building. Initially, the idea was to decorate the façades with porcelain and pottery fragments from the Tang (618 – 907), Song (960 – 1279), and Qing (1644 – 1912) dynasties. However, over time, the project expanded beyond the villa itself. The building is now adorned with dragons and organic forms covered in colorful ceramic shards, earning

<sup>16</sup> See Yue Lu’s contribution above on the heritage and tourism of the former Italian concession.

<sup>17</sup> Interview with Li Yunfei, 2016.

<sup>18</sup> Interview with Li Yunfei, 2016.

<sup>19</sup> Interview with Li Yunfei, 2016.

<sup>20</sup> CHAI Lesley, “Minyuan Stadium Retail Area, An Emerging Retail Destination,” Tianjin Property Insight, 2015, <https://www.businessstianjin.com>

<sup>21</sup> Interview with a finance consultant, 2018.

it the nickname “China’s Gaudi House.” In 2012, following the 2008 Beijing Olympics, a miniature replica of the “Bird’s Nest” Olympic Stadium, designed by architects Herzog & de Meuron, was added to the roof of China House. Over the years, the original French-style villa has been almost entirely obscured by a new “Chinese envelope.”

This project has been both praised and criticized. In September 2010, the “museum,” along with the Louvre and the Pompidou Centre, was featured in the American edition of the *Huffington Post* as one of the 15 most creative museums in the world. As a private museum, it was also registered in the Guinness Book of Records. Zhang Lianzhi has created a landmark attraction in Tianjin, but in doing so, he has completely concealed – and therefore erased – the building’s colonial architecture. The “Bird’s Nest” addition on the roof serves as a symbol of China’s modern identity, reinforcing a narrative of national supremacy over its Western architectural legacy. Indeed, the interventions on the building almost entirely cover, and thus erase, the pre-existing colonial architecture.

#### 4. Discussion

Tianjin presents itself as an emerging laboratory for heritage conservation, restoration, and reinterpretation, particularly through recent projects led by both the city and private entrepreneurs with a focus on leisure and tourism.

These examples show that creative approaches in China concern both (creative) approaches to restoring, reinterpreting, or rebuilding heritage and the introduction of new (creative) functions within recently restored or rebuilt buildings. In the strategies adopted by local players,

heritage and creativity are mutually supportive: if restored heritage represents added value for the creative activities hosted there (bringing a cachet of authenticity and historicity), the latter offers new life to the “old stones” and contribute to their reintegration into contemporary social and economic life.

Despite their diverse approaches, the four case studies presented above share a common feature: the “dissonant” heritage of the former concessions (Gravari-Barbas et al., 2023) today has been “cleaned up” from any negative image. Today, this Western architectural heritage serves as a catalyst for cultural and creative tourism, aligning with the vision of local players in repurposing the former concessions of Tianjin. Although the instrumentalization of heritage is a common guideline, the approaches vary significantly, resulting in distinct tourism products (Figure 8).

The carefully restored Minyuan Terrace and the redeveloped Xiannong Courtyard, with their new functions and activities, have been transformed into destinations for urban tourists and white-collar workers from the Tianjin metropole. These projects are reminiscent of the festival marketplaces of London’s Covent Garden Market or Boston’s Faneuil Hall, where significant architecture is integrated with creative or artisanal commercial functions, serving as a means of giving a new image to central urban areas.

The New I-Style Town follows the model of edutainment urban redevelopment projects, characterized by its highly enclosed character, which isolates it from the surrounding urban fabric. It lacks residential functions and is primarily specialized in tourism, leisure, and commerce. The

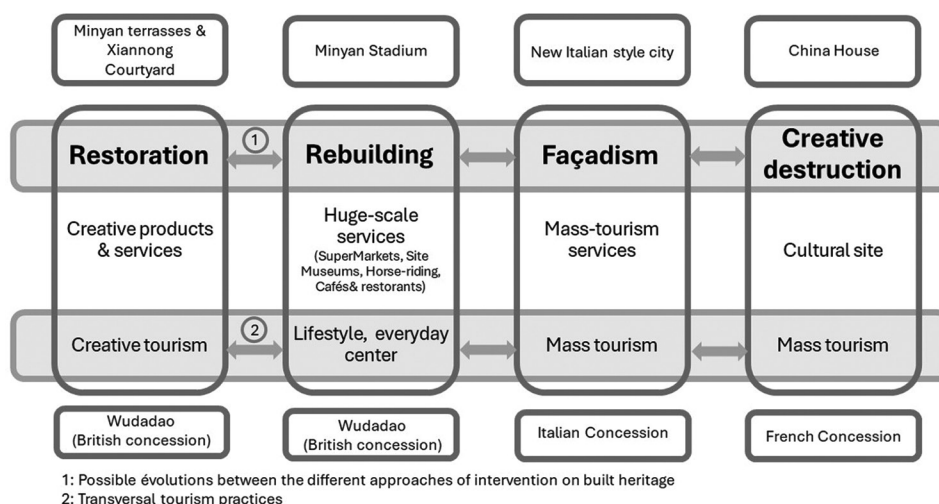


Figure 8. Different approaches to the architectural treatment of the four case studies in relation to the planned functions and the resulting tourism development Source: Diagram by Maria Gravari-Barbas.

originally intended creative dimension has gradually been replaced by a consumer-driven space, where heritage serves as a mere backdrop for a theme park-like environment.

While the first two examples (Minyuan Terrace and Xiannong Block) have adapted global urban paradigms, such as festival marketplaces and themed enclaves, to the context of Tianjin, Minyuan Stadium represents an original case of “creative destruction” of heritage redevelopment. The stadium was entirely demolished and then rebuilt in its current form. Although rebuilt *in situ*, it is a free reinterpretation of the historic site that has now disappeared.

Although the heritage authenticity of the new building – constructed in an “improved” manner on the *tabula rasa* of the pre-existing stadium – is questionable, the new Minyuan Stadium respects the original scale of the district. It thus satisfies the demands of local intellectuals and associations campaigning against the construction of high-rise buildings<sup>22</sup>.

Finally, China House exemplifies the creative use of a historic building as “raw material” to organically create a completely new artifact. The historical and architectural quality of this concessionary building has been irreversibly modified to create a new architectural and artistic work. This freedom to treat a heritage site in this way may come as a surprise. However, it is indicative of the new creative approaches to heritage enhancement.

In terms of tourism, the two more radical examples – the Minyuan Stadium, which was demolished and rebuilt, and China House, which was completely reinvented – are the most successful. In fact, these two sites are considered “must-sees” in the former concessions, visited by large numbers of locals and tourists.

The analysis of four case studies shows that the heritage of the former concessions serves as: (i) a receptacle for creative functions (Minyuan Terrace and Xiannong Block); (ii) a regulating framework for new construction, even after demolition (Minyuan Stadium); (iii) a thematic narrative framework for entertainment activities (New I-Style Town); and (iv) a foundation for the creation of a hybrid artifact (China House).

## 5. Conclusion

This article explores the ways “creative” heritage restoration, renovation, or reinvention projects – essentially undertaken for leisure and tourism purposes – contribute to the reappropriation of the dissonant heritage of the former concessions. Specifically, do tourism redevelopment projects positively transform perceptions of this dissonant concessionary heritage?

<sup>22</sup> Interview with writer, Feng Jikai, 2017.

The answer is undoubtedly yes. In Tianjin, the fusion of the creative paradigm with heritage enhancement serves as a breeding ground for tourism development. The former Western concessions have become significant leisure and tourism destinations. Their adaptation (often radical, as previously discussed) to the tourism and leisure industry has contributed to neutralizing their negative memorial dimension.

The incontestable public success of the redevelopment projects should not mask some critical questions: What is the place of heritage meaning, of history and memory, in this generalized creative ludicization of heritage? What is the role and participation of local inhabitants? We should not forget that all these projects are carried out within a top-down, state-led, strictly politically controlled framework, which leaves little room for open consultation and creativity with the local population. What is more, some of these sites, repurposed for creative functions, have been the scenes of brutal evictions of residents. The “success” of different heritage restoration approaches should therefore be examined more critically, factoring in the social cost of such projects.

Finally, a number of questions remain to be explored in the future: in 2024, THARD initiated a new development phase for Xiannong Courtyard and, at the same time, redefined the areas restored in 2011. Far from being definitive, the renovation or restoration of heritage is indeed variable, depending in particular on economic and tourism needs. Given the dynamic nature of these factors, ongoing monitoring of how heritage is treated in a context of rapid tourism transformation (particularly in a post-pandemic context) will provide insights into the amphidromic relationship between heritage and tourism. Such an approach will not only help track how heritage serves as an element of attraction for tourism but also reveal how tourism functions as a “heritage production machine” (Gravari-Barbas, 2018), shaping heritage artifacts in response to its evolving needs.

## Acknowledgments

None.

## Funding

Part of this research was funded by the French Agency for Research in the framework of the project PATRIMONDI: “The challenges of “heritage globalization” or the tourist production of cultural heritage in a globalized world: global models, identity recompositions, hybridizations” (ANR-15-CE27-0010).

## Conflict of interest

The authors declare that they have no competing interests.

## Author contributions

*Conceptualization:* All authors

*Formal analysis:* All authors

*Investigation:* All authors

*Methodology:* All authors

*Writing – original draft:* All authors

*Writing – review & editing:* All authors

## Ethics approval and consent to participate

Permission to conduct the interviews for the purposes of this research was obtained from all respondents, who were fully informed about the purposes of this research and how their responses would be used and stored. All interviewees have been anonymized.

## Consent for publication

Informed consent of participants/interviewees was obtained for publishing their data/interviews in this paper.

## Availability of data

Data used in this work can be made available to readers upon request. Interested parties can contact the corresponding author for access to the data sets or supplementary materials used in the study.

## References

- Bickers, R. (2013). British concessions and Chinese Cities, 1910s-1930s. In: KL Billy, SM Zelin (eds.). *New Narratives of Urban Space in Republican Chinese Cities*, Leiden/Boston, Brill: Emerging Social, Legal and Governance Orders, p. 155-195.
- Boswijk, A., Thijssen, T., & Peelen, E. (eds). (2007). *A New Perspective on the Experience Economy. Meaningful Experiences*. Amsterdam: Pearson Education.
- Bouteloup, E. (2011). Tourisme, Patrimoine et Disneylandisation de la Chine Contemporaine. Le cas de Lijiang [Tourism, Heritage and the Disneylandization of Contemporary China. In: GB Lee. (ed). *The case of Lijiang*, PhD Thesis in Asian Studies. Vol. 3. Université Jean-Moulin Lyon; 2011.
- Boyer, C. (1994). *The City of Collective Memory: Its Historical Imagery and Architectural Entertainments*. United States: MIT Press.
- Canavan, B., & Mccamley, C. (2021). Negotiating authenticity: Three modernities. *Annals of Tourism Research*, 88:103185.
- Carvalho, R. M., Costa, C. M., & Ferreira, A. M. (2019). Review of the theoretical underpinnings in the creative tourism research field. *Tourism and Management Studies*, 15(S1):11-22.
- Chauffert-Yvart, B., Ged, F., Lu, Y., Mengin, C., & Rousseau, E. (2020) Tourism and heritage in the enhancement of Tianjin. *Built Heritage*, 4:9.
- Chen, J., Judd, B., & Hawken, S. (2016). Adaptive reuse of industrial heritage for cultural purposes in Beijing, Shanghai and Chongqing. *Structural Survey*, 34(4-5):331-350.
- Chronis, A., & Hampton, R. (2008). Consuming the authentic Gettysburg: How a tourist landscape becomes an authentic experience. *Journal of Consumer Behaviour*, 7(2):111-126.
- Cohen, E. (1988). Authenticity and commoditization in tourism. *Annals of Tourism Research*, 15(3):371-386.
- D'ovidio, M., & Cossu, A. (2017). Culture is reclaiming the creative city: The case of Macao in Milan, Italy. *City, Culture and Society*, 8:7-12.
- Florida, R. (2004). *The Rise of the Creative Class: And How it's Transforming Work, Leisure, Community and Everyday Life*. Basic Books: New York.
- Florida, R. (2005). *Cities and the Creative Class*. London: Routledge.
- Fossa, G., & Milan. (2014). Creative industries and the use of heritage. In: HA Mieg and H Oevermann. (eds.). *Industrial Heritage Sites in Transformation: Clash of Discourses*. London: Routledge, p. 62-78.
- Fresnais, J. (2001). *La Protection du Patrimoine en République Populaire de Chine 1949-1999 [Heritage Protection in the People's Republic of China 1949-1999]*. Paris: Éditions du CTHS.
- Glaeser, E. L., Kolko, J., & Saiz, A. (2001). Consumer city. *Journal of Economic Geography*, 1:27-50.  
<https://doi.org/10.1093/jeg/1.1.27>
- Graburn, N., Gravari-Barbas, M., & Staszak, J. F. (2021). *Tourism and Architectural Simulacra*. London: Routledge.
- Gravari-Barbas, M. (1998). Belle, propre, festive et sécurisante: L'esthétique de la ville touristique. [Beautiful, Clean, festive and safe: The aesthetics of the tourist city]. *Norois*, 178:175-193.
- Gravari-Barbas, M. (2018). Tourism as a heritage producing machine. *Tourism Management Perspectives*, 26:5-8.
- Gravari-Barbas, M., Graburn, N., & Staszak, J. F. (2022). *Tourism Fictions, Simulacra and Virtualities*. London: Routledge.
- Gravari-Barbas, M., Guinand, S., & Lu, Y. (2020). Eat, play, visit: Tianjin's former western concessions as new hubs for creative cultural tourism. In KD Saurabh. (ed.), *Tourism in Asian Cities*. London: Routledge. 66-85.
- Gravari-Barbas, M., Guinand, S., Lu, Y., & Li, X. (2023). Heritage and tourism development in China's former international concessions. Tianjin as a place study. *International Journal of Tourism Cities*, 10(2):445-468.
- Guinand, S. (2015). *Régénérer la Ville. Patrimoine et Politiques D'image à Porto et Marseille [Heritage and Image Policies*

- in Porto and Marseille*. Rennes: Presses universitaires de Rennes.
- Guinand, S. (2022). *Festival Marketplaces, Entre Postérités et Discontinuités-après la Régénération Urbaine* [Festival Marketplaces, between Posterities and Discontinuities-after Urban Regeneration], Rolles. Switzerland: Editions Infolio.
- Harvey, D. (2007). Neoliberalism as creative destruction. *The Annals of the American Academy of Political and Social Science*, 610:22-44.
- Henriot, C. (2015). Les politiques chinoises de villes nouvelles: Trajectoire et ajustements de l'action publique urbaine à Shanghai [Chinese new city policies: Trajectory and adjustments of urban public action in Shanghai]. *Géocarrefour*, 90(1):27-38.
- Hevia, J. L. (2001). World heritage, national culture, and the restoration of Chengde. *Positions: East Asia Cultures Critique*, 9(1):219-243.
- Keane, M. (2007). *Created in China. The Great New Leap Forward*. London: Routledge.
- Kearns, G., & Philo, C. (1993). Culture, history, capital: A critical introduction to the selling of places. In: *Selling Places: The City as Cultural Capital, Past and Present*. Oxford: Pergamon Press, pp. 1-31.
- Kong, L. (2009). Making sustainable creative/cultural space in Shanghai and Singapore. *Geographical Review*, 99(1):1-22.
- Landry, C. (1994). *The Creative City: A Toolkit for Urban Innovators*. London: Earthscan Publications.
- Leng, T. K., & Chen, R. Y. (2017). Local state adaptation and grassroots participation: Tianjin and Nanjing's preservation of cultural relics in comparative aspects. *Journal of Contemporary East Asia Studies*, 6(2):187-209.
- Liu, J., & Liu, Y. (2010). Tourist revitalization of the historic district from an experiential perspective-the case of Sanfangqixiang in Fuzhou. *Geographical Research*, 29(3):556-564.
- Lu, H., & Li, R. (2005). *Tianjin jindai fengmao jianzhu* [Modern Architecture in Tianjin], *Tianjin jindai Jianshe keji*. China: Tianjin Sciences and Technology, p. 19-26.
- Lu, Y. (2017). In: M Gravari-Barbas. *De L'ancienne Concession Italienne de Tianjin à l'I-Style Town. Enjeux et Processus de la Patrimonialisation et du Développement Touristique* [From the Former Italian Concession of Tianjin to the I-Style Town. Stakes and Processes of Heritagization and Tourism Development], PhD thesis in Human Geography. France: Université Paris 1 Panthéon-Sorbonne.
- Lu, Y., Gravari-Barbas, M., & Debelle, D. (2016). *Pratiques de Visite et Imaginaires Touristiques des Quartiers Concessionnaires Italien et Britannique de Tianjin* [Visiting Practices and Tourist Imaginaries of the Italian and British Concessionary Districts of Tianjin], *Urbanités, Chroniques. Chinese Urban Worlds*. Available from: <https://www.revue-urbanites.fr/wp-content/uploads/2016/01/urbanite%cc%81s-chinese-urban-worlds-january-2016-lu-de-belle-et-gravari-barbas.pdf> [Last accessed on 2025 Feb 11].
- Lu, Y., Gravari-Barbas, M., & Guinand, S. (2019). Simulacra heritagization: The minyuan stadium in Wudadao, Tianjin. *Journal of Tourism and Cultural Change*, 17(1):55-68. <https://doi.org/10.1080/14766825.2019.1560910>
- Marinelli, M. (2010a). The "new i-style town": From Italian concession to commercial attraction. *China Heritage Quarterly*, 21:1-7.
- Marinelli, M. (2010b). "Tianjin, a permanent expo of world architecture. *China Heritage Quarterly*, 21:1-7.
- Marinelli, M. (2018). The politics of aesthetics in Tianjin. Between past and present. In YI Ding and X Zhang. (eds.). *China: A Historical Geography of the Urban*. Basingstoke: Palgrave Macmillan, p. 193-224.
- Mccann, E., & Ward, K, (eds). (2011). *Mobile Urbanism: Cities and Policymaking in the Global Age, Minneapolis*. Minnesota: University of Minnesota Press.
- Municipal Bureau of Land Resources and Housing. (2013). *China Society of Cultural Relics, 20<sup>th</sup> Century Architectural Heritage Committee, Wenjin xundao* [A Glimpse of Tianjin, An Appreciation of Historic Architecture Protection]. Tianjin: Tianjin University Press.
- Nyíri, P. (2006). *Scenic Spots. Chinese Tourism, the State, and Cultural Authority*. Washington: University of Washington Press.
- Nyíri, P. (2009). Between encouragement and control. Tourism, modernity and discipline in China. In T Winter, P Teo and TC Chang (eds.). *Asia on Tour: Exploring the Rise of Asian Tourism*. New York: Routledge, p. 153-169.
- O'Connor, J., & Xin, G. (2006). A new modernity? The arrival of "creative industries" in China. *International Journal of Cultural Studies*, 9(3):271-283. <https://doi.org/10.1177/1367877906066874>
- Oakes, T. (1998). *Tourism and Modernity in China*. Abingdon/ New York: Routledge.
- Peck, J. (2005). Struggling with the creative class. *International Journal of Urban and Regional Research*, 29(4):740-770. <https://doi.org/10.1111/j.1468-2427.2005.00620.x>
- Pine, J., & Gilmore, J. (1998). *Welcome to the Experience Economy*. *Harvard Business Review*. Available from: <https://hbr.org/1998/07/welcome-to-the-experience-economy> [Last accessed: 2024 Sep 18].
- Pine, J., & Gilmore, J. (1999). *The Experience Economy: Work is Theatre and Every Business a Stage*. Boston: Harvard Business Publishing.
- Qiang, L. I. P., & Kovacs, J. F. (2021a). Creative tourism and creative spectacles in China. *Journal of Hospitality and Tourism Management*, 49:34-43.

- <https://doi.org/10.1016/j.jhtm.2021.08.023>
- Qiang, L. I. P., & Kovacs, J. F. (2021b). Creative tourism and creative spaces in China. *Leisure Studies*, 41(2):180-197.
- <https://doi.org/10.1080/02614367.2021.1948596>
- Richards, G. (2011). Creativity and tourism: The state of the Art. *Annals of Tourism Research*, 38(4):1225-1253.
- <https://doi.org/10.1016/j.annals.2011.07.008>
- Rosi, M. (2014). Branding or sharing? The dialectics of labeling and cooperation in the UNESCO creative cities network. *City, Culture and Society*, 5:107-110.
- <https://doi.org/10.1016/j.ccs.2014.05.002>
- Ryckmans, P. (2008). The Chinese Attitude towards the past. *China Heritage Quarterly*, 14:1-16.
- Sundbo, J., & Sørensen, F. (2013). *Handbook on the Experience Economy*. Cheltenham, UK, Northampton, USA: Edward Elgar Publications.
- Tan, S. K., Kung, S. F., & Luh, D. B. (2013). A model of 'creative experience' in creative tourism. *Annals of Tourism Research*, 41:153-174.
- Thompson, C.J., & Tambyah, S.K. (1999). Trying to be cosmopolitan. *Journal of Consumer Research*, 26(3): 214-241.
- Tianjin Bureau of Statistics. (2016). *2015 Nian Tianjinshi Guomin Jingji he Shehui Fazhan Tongji Gongbao [2015 Tianjin Economic and Social Statistic Yearbook]* Available from: [https://stats.tj.gov.cn/tjsj\\_52032/tjgb/202007/t20200705\\_2780582.html](https://stats.tj.gov.cn/tjsj_52032/tjgb/202007/t20200705_2780582.html) [Last accessed on 2025 Feb 11].
- Tsai, W. L. (2008). *The Redevelopment and Preservation of Historic Linong Housing in Shanghai*, Master's thesis, Philadelphia, PA: University of Pennsylvania.
- Wang, J. (2004). The global reach of a new discourse. How far can 'creative industries' travel? *International Journal of Cultural Studies*, 7(1):9-19.
- Wang, K. (2010). Bowuguan zhidu: Tianjin chuangyi chengshi jianshe de moshi xuanze [Museum city: The model choice of Tianjin construction as a creative city]. *Chengshi Fazhan Yanjiu [Urban Studies]*, 17(4):1-4.
- Wang, N. (1999). Rethinking authenticity in Tourism experience. *Annals of Tourism Research*, 26(2):349-370.
- [https://doi.org/10.1016/S0160-7383\(98\)00103-0](https://doi.org/10.1016/S0160-7383(98)00103-0)
- Yin, R. (2009). *Case Study Research: Design and Methods*. 4<sup>th</sup> ed. London: Sage Publications.
- Zhang, A. Y., Roast, A., & Morris, C. (2022). Wanghong Urbanism: Towards a new urban-digital spectacle. *Deep Dives*, 7(4). Available From: <https://www.mediapolisjournal.com/2022/11/wanghong-urbanism/> [Last accessed on 2025 Feb 11].
- Zielke, P., & Waibel, M. (2014). Comparative urban governance of developing creative spaces in China. *Habitat International*, 41:99-107.
- <https://doi.org/10.1016/j.Habitatint.2013.06.00>
- Zukin, S. (1996). *The Culture of Cities*. Cambridge: Blackwell Publishers.

## ORIGINAL ARTICLE

“Saving” Lizhuang: Local preservation and  
resistance in a historical Sichuan town under  
tourism developmentYa Shu\* 

Department of Anthropology, Faculty of Arts, The Chinese University of Hong Kong, Hong Kong SAR, China

(This article belongs to the *Special Issue: Regenerating Views, Values, and Visions in Countryside Conservation in Chinese Societies*)

## Abstract

In recent years, the relationship between tourism and locality has garnered significant scholarly attention; however, few studies have analyzed a single tourist destination by integrating multiple locality-related concepts. This article examines the historical town of Lizhuang, Sichuan, China, as a case study, employing a research methodology that combines in-depth interviews and virtual ethnography. The concepts of “locality,” “placelessness,” and “relocalization” are utilized to elucidate how Lizhuang retains its sense of locality amid tourism development. In addition, the current study analyzes the strategies implemented in Lizhuang to preserve its locality and counteract the forces of placelessness and relocalization resulting from tourism expansion. The findings indicate that capital authority, local culture excavation, and the role of daily life form a three-pronged structure shaping Lizhuang’s locality in the context of tourism. Furthermore, architectural homogenization, inauthentic attitudes, mass media influences, and the role of community education and atmosphere are identified as key factors contributing to placelessness in Lizhuang. Finally, the study discusses the current relocalization measures undertaken by Lizhuang’s local authorities. This article contributes to the theoretical discourse on localization in tourism studies in historical towns and enriches empirical research by providing insights from the case of Lizhuang’s historical town. The findings offer valuable local experiences for guiding localization efforts in tourism development within historical towns.

**Keywords:** Tourism; Anthropology; Locality; Placelessness; Relocalization; Sense of place**\*Corresponding author:**Ya Shu  
(yashu@link.cuhk.edu.hk)

**Citation:** Shu, Y. (2025). “Saving” Lizhuang: Local preservation and resistance in a historical Sichuan town under tourism development. *Journal of Chinese Architecture and Urbanism*, 7(3): 4876.  
<https://doi.org/10.36922/jcau.4876>

**Received:** September 18, 2024**Revised:** January 9, 2025**Accepted:** January 22, 2025**Published online:** February 26, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher’s Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

In the current era of globalization, the continuous influx of foreign cultures and imports has compelled local cultures to undergo modernization, often resulting in a loss of local specificity and significance. Traditional folk and social cultures, including architecture and festivals, have experienced varying degrees of transformation in both their forms of expression and connotation. From a critical perspective, scholars have put forward the concepts of “placelessness” (Relph, 1976) and “delocalizing” (Heyman, 1994) to describe the challenges that locality faces in the context of globalization. Conversely, other scholars view modernization as a process that enables

the renewal and reconstruction of locality. In response to globalization, concepts such as “relocalization” (Thomas, 1998) have been proposed to describe processes of local reconstruction and reinvention.

Modernization and globalization have led to increasingly standardized landscapes, eroding local distinctiveness and creating a crisis in the significance of place. Places characterized by “placelessness” (Jacobs & Appleyard, 1987) have lost not only their functional significance – such as diversity and authenticity – but also their emotional significance, including people’s attachment to and identification with the place. Relph (1976, p. 90) defines placelessness as “places with a weakened sense of identity.”

The concept of “delocalization” has been explored through studies of material changes in architecture. For instance, in Mexico (Heyman, 1994), the replacement of indigenous building materials with standardized foreign materials was perceived as a loss of local culture. Placelessness, in this context, refers to both the process and the outcome of the destruction and replacement of local products or cultural consciousness by external, standardized ones, leading to diminished local distinctiveness. Building on these ideas, anthropologist Thomas (1988) proposed the concept of relocalization, arguing that delocalization is often accompanied by simultaneous processes of relocalization. His analysis of rural housing in southeast Madagascar identified two approaches to relocalization: first, the incorporation of non-indigenous building materials into existing local cultural patterns; and second, the construction of rural dwellings in external locations to maintain cultural significance and relationships. Relocalization, therefore, refers to the integration of external, standardized products or ideas into local contexts in a way that preserves local characteristics and maintains the authenticity of local culture (Sun, 2017).

In recent years, international research on heritage site tourism has primarily focused on two key areas: the development of tourism at heritage and the behaviors and impacts of various stakeholders involved in this process. Chark (2021) explored the relationship between heritage site tourism and nostalgia in Paris, finding that nostalgic emotions influence individuals’ sense of belonging, thereby shaping their preferences for heritage tourism. In addition, colonial heritage has become an increasingly popular tourist attraction worldwide. Jorgensen (2019) examined the perspectives of Indian residents in Puducherry, a former French colony, on local production and consumption after the city became a heritage tourism destination. The study found that

residents redefined and repurposed colonial heritage, integrating it into domestic tourism. Ross & Saxena (2019) investigated the Alentejo region in Portugal and found that even after architectural losses, memories and knowledge of historical monuments persist. Their research highlights how tourism stakeholders can creatively transform archaeological heritage into tourism resources through participatory innovation, thereby enhancing market appeal. Dans & González (2019), using the Altamira Conservation Plan in Spain as a case study, identified the social value of heritage in sustainable tourism, including its existence, esthetic, economic, and heritage value. Their findings highlight the balance between heritage conservation and tourism development. In another study, Lucchi (2023) examined the regeneration design of archaeological sites to enhance the interaction between architectural systems, human systems, and natural systems. Through a case study of the UNESCO-listed site of Castelseprio in Italy, the study demonstrated the dynamic interactivity between heritage, the environment, society, and economic development.

A review of studies on the local distinctiveness of historical towns in China reveals that as mobility and globalization continue to reshape the essence of place, the significance of places also evolves. Bai *et al.* (2017) proposed a framework for understanding the presentation and formation mechanisms of local distinctiveness, emphasizing three dimensions: location, place, and sense of place. Their study on the slow-living local distinctiveness in Lijiang historical town, Yunnan, China, highlights the unique characteristics of local distinctiveness within the context of tourism development. In addition, Mou & Cheng (2023) identified three main endogenous drivers of spatial production in historical town tourism: power structure, cultural production, and capital circulation. These elements, they argue, play a crucial role in shaping local creation and sustaining the distinctiveness of historical towns.

According to Zhu & Liu (2011), the sense of place comprises two primary dimensions: place attachment and place identity. It refers to individuals’ emotional connection with and identification with specific places, with its core meaning embedded in the continuous construction of local social cultures. Zhang & Xu (2023) found that tourist experiences in Lijiang historical town shape place attachment through physical, social, and natural dimensions. Similarly, Long *et al.* (2020), using samples from Fenghuang historical town, Hunan, China, identified place attachment as a key determinant of destination loyalty among tourists. These findings

suggest that protecting and shaping local distinctiveness in historical towns plays a crucial role in fostering place attachment among tourists. Hu & Bai (2015) analyzed the dimensions of place identity among tourists in Barkhor Street, Lhasa, China, identifying perceptual space, living space, and subjective space as its core components. Sun & Zhou (2015) explored the heritage site of Kaiping Diaolou in Jiangmen, Guangdong, China, and discovered that place identity manifests differently across local, national, and cross-regional spaces, emerging through interactions and integrations among multiple subjects.

In addition, scholars have explored the role of relocalization in historical town tourism. Research on Lijiang historical town's Yishang Community indicates that slow tourism development fosters a complex interplay between relocalization and delocalization within the cultural landscape. Relocalization of ethnic culture is reflected in architecture, clothing, and ethnic identity, whereas delocalization is manifested in the loss of ethnic languages. Conversely, in the Xinhua Community of Lijiang historical town, rapid tourism development has been a major driving force behind the delocalization of ethnic culture (Sun, 2015). This process is characterized by excessive commercialization and the loss of cultural heritage due to resident relocation. Furthermore, tourism shops and similar establishments exhibit characteristics of relocalization in their architectural exteriors, while their internal structures reflect delocalization through increasing homogenization and loss of cultural authenticity.

## 2. Methods

### 2.1. Research site

Lizhuang historical town is situated on the southern bank of the Yangzi river, approximately 19 km east of Yibin City, Sichuan, China. It was established in the 6<sup>th</sup> year of the Datong era (535 – 546) during the Southern Liang dynasty (502 – 557). During China's War of Resistance against Japan (1937 – 1945), Lizhuang became a hub for various research and academic institutions, including Tongji University, the Academia Sinica, and The Society for Research in Chinese Architecture (Feng *et al.*, 2023).

The core area of Lizhuang and the Moonfield (月亮田; *Yueliangtian*) scenic area are delineated by Tongji Avenue, which marks the entrance of the scenic area (Figure 1). The core area comprises the historic town of Lizhuang, which retains several historical alleys paved with bluestone and well-preserved temples, such as Xizi Lane and The Hall of Patriarch (祖师殿; *Zushidian*). These structures form the cultural foundation and heritage of Lizhuang.

The Moonfield scenic area underwent intensive development in 2020. This recently developed commercial scenic area features several newly constructed attractions, such as the Lizhuang Cultural Anti-War Museum.

Lizhuang was selected as the research site for two main reasons. First, as a historical town in the early stages of tourism development, its transformation remains ongoing. Unlike in more mature tourist destinations, the voices of local residents have not yet been overshadowed by promotional narratives from tourists and government agencies. This allows for a more authentic observation of local perspectives during its transition from a rural area to a tourist town. Second, despite ongoing development, Lizhuang is not yet one of China's major historical town tourist destinations, making it an ideal setting to observe the dynamic negotiations and communication between local residents and official institutions throughout the tourism development process. In addition, Lizhuang's proximity to the author's hometown enhances research feasibility. The author's familiarity with the local dialect and existing family connections provide high accessibility, facilitating both the fieldwork period and potential follow-up visits.

### 2.2. Research data collection and analysis methods

This study utilizes virtual ethnography, with the virtual environment as the primary research context. Data were collected from internet platforms and interactive tools to explore social and cultural phenomena online (Caliandro, 2018). Over 8,700 posts about "Lizhuang historical town" were identified on *Xiaohongshu* (小红书; a Chinese social media platform), along with numerous vlogs on Weibo (微博; a Chinese microblogging platform). The textual and visual content from these platforms provided a rich dataset for analyzing tourist evaluations and impressions (Table 1). Based on this analysis of travel posts, specific interview questions were developed (Table 2).

In-depth interviews were conducted with selected participants through recommendations from the key informant GW10 and the author's social network. Participants were sourced from offline fieldwork in Lizhuang (e.g., LZ11, LZ13) and referrals from GW10, a staff member of the Lizhuang Historical Town Scenic Area Management Committee. Due to similar ages, GW10 and the author share a prior acquaintance, which facilitated the research process. In addition to formal interviews, GW10 also participated in fieldwork activities in Lizhuang, sharing stories about her interactions with local people and events. These interactions often led to the identification of potential interviewees (e.g., LZ01, LZ06). In addition, participants were recruited through online engagement

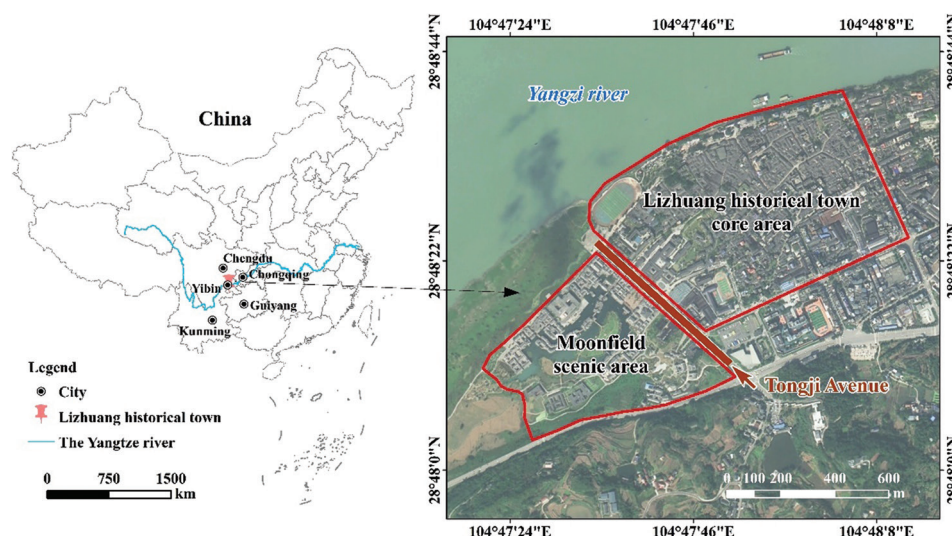


Figure 1. Geographical location of Lizhuang  
Source: Map labeled by the author.

Table 1. Summary of tourist-generated content on social media

| Blogger | Text and evaluation  | Summary  |
|---------|--|--|
| 01      | “Lizhuang historical town – The size of the town does not matter, its capacity does.”  | The local characteristics of Lizhuang historical town are recognized and perceived by tourists, as reflected in their social media narratives. |
| 02      | “Lizhuang historical town’s lifestyle is very rich, full of history, and the detailed and leisurely daily life exudes a sense of authenticity. This is a town with the original flavor of life.” |  |
| 03      | “In Lizhuang historical town, one’s heart naturally calms down as if it were a mirror, with no dust to be found.”  |  |
| 04      | “Lizhuang historical town is a peaceful ancient town where life slows down.”   |  |
| 05      | “Unlike other ancient towns, Lizhuang leaves an indelible mark with its riverbank and old dock used for silk trading during the war.”  |  |
| 06      | “I think Lizhuang historical town is more about its humanistic atmosphere, its buildings have a unique sense of beauty.”   |  |
| 07      | “The streets of Lizhuang are full of old wooden boards, the wind whispers through the historical city walls, and ancient engraved doors reveal the strong flavor of the southern regions.”       |  |
| 08      | “By understanding the history behind Lizhuang, I finally realized why the entire city has maintained its original form to this day.”   |  |
| 09      | “The historical legacy is thick, and the town is vibrant with life.”   |  |

and negotiations (e.g., YK17, YK18). From February to April 2023, the author conducted on-site observations and face-to-face interviews, followed by online video interviews from October to December 2023. Some interviews with shorter durations or lacking substantial content were excluded from the study, resulting in a final selection of 15 participants, with interview durations ranging from 40 to 180 min. The total word count of the interview transcripts is 85,672 words. Details of the participants are provided in Table 3.

### 3. Tourism evolution: The process of localization construction in Lizhuang

Tourism can be regarded as a process of meaning construction, in which local government, tourism developers, and residents jointly participate in shaping a destination’s local identity. This study examines Lizhuang’s localization process from the perspectives of three key stakeholders: governmental authorities, tourism enterprises responsible for development, and local

**Table 2. Development of interview questions based on social media content**

| Blogger | Text and evaluation  | Summary   |
|---------|--|---|
| 10      | "If you go to Jiangnan Wuzhen, then you should definitely take a detour to Lizhuang historical town."  | The portrayal of Lizhuang historical town as analogous to the water towns of Jiangnan in eastern China (such as Wuzhen) frequently appears in social media posts. This study incorporates these narratives into in-depth interviews, asking: How do local residents, staff from the scenic area management committee, and tourists perceive the portrayal of Lizhuang historical town as "Wuzhen of Sichuan" or "Jiangnan water town of Sichuan" on social media? |
| 11      | "Sichuan also has the charm of Jiangnan's water towns; Lizhuang's night view is as beautiful as a painting."   |   |
| 12      | "The smoke and mist blend into the river; this is Lizhuang's historical town."   |   |
| 13      | "Lizhuang historical town, with just one sentence, you capture spring and dusk, and I feel like I have arrived in the real Jiangnan."  |   |
| 14      | "The photos came out so great! Lizhuang historical town is indeed like Jiangnan's water towns."  |   |
| 15      | "Lizhuang's architecture, scattered across the landscape, reflects both human warmth and heavenly beauty, with no trace of modernization, preserving the charm of the old days."     |   |
| 16      | "Small alleys, dense fog, and ancient stone bridges make up the scenery here, just like Jiangnan. A rainy day in Lizhuang feels particularly nostalgic, as if time has slowed down." |   |
| 17      | "Lizhuang historical town is like an ancient building, standing firm and displaying the beauty of Jiangnan."   |   |
| 18      | "If you can't make it to Jiangnan's Wuzhen, you should visit Lizhuang historical town."  |   |
| 19      | "I didn't expect Sichuan to have such a Jiangnan-style town like Lizhuang; it's charming!"   |   |
| 20      | "Sichuan has its own Jiangnan in Lizhuang. The floating mist and smoke perfectly capture the poetry of Jiangnan's small towns."  |   |
| 21      | "Every time I take photos in Lizhuang, it feels like I'm in the Jiangnan water town."  |   |
| 22      | "Jiangnan's small town - Lizhuang, a place that thrives in both day and night."  |   |

**Table 3. Participant information from in-depth interviews**

| Number | Gender | Age | Identity   |
|--------|--------|-----|--|
| LZ01   | M      | 73  | Local cultural elite, writer   |
| LZ02   | F      | 32  | Local resident, coffee shop employee   |
| LS03   | M      | 22  | Volunteer Teacher from the Tongji University   |
| LZ04   | F      | 22  | Local resident, daughter of a specialty shop owner   |
| LZ06   | F      | 34  | Local resident, employee at the Moonfield Children's Bookstore                                 |
| GW08   | F      | 33  | Staff member of the Lizhuang Historical Town Scenic Area Management Committee                  |
| GW09   | F      | 32  | Deputy Director of the Lizhuang Historical Town Scenic Area Management Committee               |
| GW10   | F      | 21  | Staff member of the Lizhuang Historical Town Scenic Area Management Committee, recent graduate |
| LZ11   | M      | 45  | Local resident, owner of a tea shop  |
| LZ13   | F      | 40  | Local resident, owner of a milk tea shop in the Moonfield scenic area                          |
| YK14   | M      | 49  | Tourist, from other areas of Yibin city  |
| YK15   | F      | 48  | Tourist, from other areas of Yibin city  |
| LZ16   | M      | 48  | Local resident, owner of Fresh Fish Restaurant   |
| YK17   | F      | 20  | Tourist, university student from Yibin city  |
| YK18   | M      | 26  | Tourist, photography enthusiast from Yibin city  |

Note: F: Female; M: Male.

residents. By analyzing their respective influences, the study aims to summarize the specific contributions of each party to the construction of Lizhuang's locality.

Previous research has explored various elements influencing tourism development and examined its impact

on the locality of Zhouzhuang historical town through the interplay of authority, capital, and culture (Jiang & Su, 2016). Building on this framework, this study extends and refines the analysis to reflect the locality of Lizhuang's historical town. By summarizing and incorporating

existing tourism localization processes, it provides a comprehensive understanding of how tourism shapes Lizhuang’s locality (Figure 2).

**3.1. Leadership of capital authority**

The influence of capital authority in Lizhuang’s historical town is reflected in its government-led development and institutional embeddedness.

**3.1.1. Government-led development**

Throughout the development of Lizhuang historical town, the government has implemented multiple reforms and restructuring efforts. At present, the Lizhuang Historical Town Scenic Area Management Committee (hereafter referred to as “the Committee”) oversees the entire town, including the Moonfield scenic area and the core area. The Committee operates as a county-level administrative body under the Yibin City Government. Previously, the Lizhuang Historical Town Scenic Area Administration, a subordinate office of the Cuiqing District Government, managed the town’s core tourism area. However, in 2020, Yibin city announced a ¥2.5 billion investment in the Moonfield scenic area, necessitating a higher-level administrative body. Consequently, the Committee was established by selecting officials from various Yibin government agencies.

“The city government regarded this place (Moonfield scenic area) as very important, the construction was government-led, and at the same time, we (Scenic Area Management Committee) were specially organized. Of course, there was a management body before.” (GW08)

As a government-led cultural industry project, the Moonfield scenic area has actively developed its nighttime economy. On December 17, 2021, the Yibin Power Supply Company completed the Lizhuang power distribution project, enabling nighttime light shows. During the 2021 Lunar New Year (January 1 – 7), Moonfield hosted evening events, including a lantern festival from 6:00 to 9:00 p.m.

each night. To further promote the nighttime economy, the government implemented a lighting plan and increased investment in lighting infrastructure, transforming the nighttime environment to enhance visitor experience and stimulate consumer spending.

This year, when the lanterns were turned on at night (Moonfield Lantern Festival), many people came to see the lanterns and take photos. We locals all go to the Lantern Festival and use it as a place to relax and walk in the evening. (LZ04)

The development of the nighttime economy has undoubtedly boosted the popularity of Lizhuang’s historical town. More importantly, it has addressed the long-standing challenge of short-stay tourism, often described as a “half-day tour” phenomenon, where visitors previously spent only a few hours in the town before leaving. By extending tourist engagement into the evening, Lizhuang has improved its ability to retain tourists overnight. In addition, the nighttime light show provides local residents with an enhanced public space for evening leisure and social activities.

**3.1.2. Institutional embedding**

Institutional mechanisms are deeply embedded in the restoration and protection of historical buildings in the core area and the regulation of commercial esthetics in the Moonfield scenic area. The new architectural design integrates Lizhuang’s traditional culture, ensuring that the town’s historical character is preserved. In 2003, the School of Urban Planning at Tongji University developed a master plan for the core area, stipulating that historical buildings could only be repaired and not dismantled or rebuilt. This policy has preserved the historical features of streets such as Xizi Lane and Sheep Street, which are now among Lizhuang’s most attractive cultural landmarks.

“The reason the core area is well preserved is because of the Tongji University Planning Institute’s master plan. For example, Xizi Lane

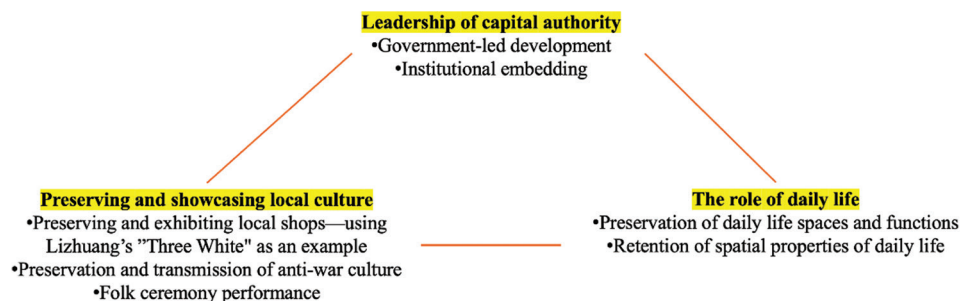


Figure 2. The process of localization construction in Lizhuang  
Source: Diagram by the author.

is at the heart of the core area, and we are not allowed to move anything.” (LZ01)

The Committee oversees key heritage sites such as Xizi Lane and the Zhang Clan Ancestral Hall, while the government retains ownership of the land beneath commercial stores along the main streets. Although these stores are operated by local residents, the Committee plays a role in their rental process, ensuring that local characteristics are not eroded by external commercial influences.

“In the core area, many public housing belong to the Committee rather than private residents, so we can reorganize the layout. We intend to introduce more diverse businesses.” (GW09)

To maintain a cohesive historical esthetic, the Committee supervises store selection and strictly controls storefront decorations. Merchants in the Moonfield scenic area must submit their renovation plans for approval to ensure that their designs align with the town’s “ancient” style before beginning any modifications. This institutional framework also extends to store signboards, which are uniformly designed for the core area. The Committee has commissioned calligraphers to create wooden signboards featuring handwritten store names, preserving the town’s traditional esthetic and reinforcing its officially supported locality.

“Our shopkeeper has submitted their renovation plans to the Committee for review. If they do not align with Moonfield’s ancient style, they would not be approved.” (LZ13)

“Previously, the Committee invited calligraphers to write store name signboards for our stores on the historical street. We only need to pay ¥200 for the signboard – how nice!” (LZ16)

## 3.2. Preserving and showcasing local culture

### 3.2.1. Preserving and exhibiting local shops – using Lizhuang’s “Three White” as an example

Lizhuang has sought to preserve and showcase its local culture by retaining demonstration-style shops. A key example is the “Three Whites” (三白; *sanbai*) of Lizhuang – *bairou* (白肉; white pork), *baigao* (白糕; white pastry), and *baijiu* (白酒; Chinese liquor) – which are characteristic of Lizhuang’s culinary heritage.

To highlight this tradition, the town has preserved a demonstration-style *baijiu* workshop on the main street of the core area, allowing visitors to observe the drying of *baijiu* lees and the *baijiu* brewing process. At the entrance of Tongji Avenue and within the core area, the old Lizhuang distillery has been preserved, with its entrance restored.

In addition, the Lizhuang Baijiu Company remains in operation in the core area. Lizhuang has also retained a demonstration-style *bairou* cutting table. Every Lizhuang *bairou* restaurant in the core area features a skilled butcher performing the traditional slicing technique (known in the Yibin dialect as “slice” [片; *pian*]), where white pork is thinly cut. The thinner and more intact the slices, the more prestigious the restaurant is considered, making this an essential element of Lizhuang’s culinary identity.

“What impressed me most about Lizhuang was the *bairou* display stands at the entrance of each restaurant. Each place has a butcher slicing meat at the entrance – I think it is quite distinctive.” (LS03)

Another key cultural feature is Baigao Street, where shopkeepers demonstrate the hand-packing process for white pastries. Tourists can choose their preferred flavors and watch as they are freshly packed. The presence of demonstration-style “Three Whites” shops in the core area preserves Lizhuang’s local food traditions, ensuring they remain an integral part of the town’s commercial and cultural identity.

“In Lizhuang, people come to eat *bairou* and *baigao*. That’s what the average visitor does. However, there are not many people who truly want to immerse themselves in Lizhuang’s deeper cultural heritage.” (LZ01)

“The leaders and I feel that we can’t relocate these restaurants and shops from the old streets to Moonfield. It would disrupt the overall atmosphere and feel somewhat inappropriate.” (GW09)

However, the long-standing dominance of the “Three White” business model has raised concerns among different stakeholders in Lizhuang. First, local cultural elites worry that this commercial focus may cause tourists to overlook Lizhuang’s broader cultural heritage. Second, the members of the Committee have expressed concerns about the sustainability and esthetic impact of this business model.

### 3.2.2. Preservation and transmission of anti-war culture

To preserve and document Lizhuang’s anti-war culture and history, the local government has undertaken extensive efforts to collect and protect historical records. To obtain firsthand accounts, officials interviewed elderly residents who had lived through that era, recording their narratives about Lizhuang’s wartime history. In addition, a government-led team visited the archives of Nanxi County, Yibin city – Lizhuang’s administrative region – to search for county records and other historical documents related to this period.

“The primary method of uncovering history is by interviewing elderly residents who experienced that era, speaking with the descendants of scholars, and searching archival records for historical materials related to Lizhuang.” (GW08)  
“This is the book I wrote to introduce Lizhuang. It covers three major aspects: history, ancient architecture, and legend. The town’s official branding slogan was also adopted by the government.” (LZ01)

Beyond government efforts, Lizhuang’s cultural elites also played a crucial role in preserving and transmitting this history. They compiled personal writings, assisted Yue Nan (author of *Nandu Beigui*) in collecting historical field data, and established a Lizhuang bookstore in the ancestral house on Xizi Lane, located in the town’s core area.

### 3.2.3. Folk ceremony performance

The Grass Dragon Dance of Lizhuang was recognized as part of the Intangible Cultural Heritage of Sichuan Province in 2011. Traditionally crafted from straw, Lizhuang’s grass dragons have undergone continuous refinements, with current designs representing the fifth generation of this evolving tradition. After 2011, Lizhuang Central School established a specialized training class to teach students the art of dancing with straw dragons, integrating this cultural heritage into the classroom.

“We took a boat from Nanxi to Lizhuang and saw the Grass Dragon Dance performed at the entrance of the Hall of Patriarch. It was then that we realized Lizhuang has its own distinctive folk culture.” (YK15)

During the Spring Festival and Lantern Festival in 2022, Lizhuang hosted performances of the Grass Dragon Dance (Figure 3). These events not only attracted numerous tourists but also provided them with an immersive visual experience of Lizhuang’s rich folk culture.

## 3.3. The role of daily life

### 3.3.1. Preservation of daily life spaces and functions

Unlike other historical towns, the core area of Lizhuang has continuously preserved local residents’ traditional business practices. By selling Lizhuang’s signature “Three White” products, locals not only sustain economic benefits but also subconsciously reinforce visitors’ impressions of the town’s cultural symbols. A notable example is He San Bai Pork Restaurant on Beijing Road, which remains a popular dining spot for local residents.

“Local people still prefer to eat in the old street, especially at He San Bai Restaurant, because the

pork tastes good. Moreover, it is an old, well-established store.” (LZ06)

To accommodate tourism development while protecting the town’s historic stone paths and monuments, Lizhuang has implemented a passageway renovation that prohibits private vehicle entry. Despite initial resident dissatisfaction, the introduction of free and convenient public transportation has helped resolve the conflict.

“Inside the scenic area, we have set up a special convenience car, specifically for the residents of the historical town, free of charge. It ensures their daily commute, with a car arriving every 10 min.” (GW08)

### 3.3.2. Retention of spatial properties of daily life

In contrast to “empty shell” historical towns, where the original community has been completely displaced by external entrepreneurs, and most or all local residents have moved out, Lizhuang has retained its character as a living space for residents. Mahjong parlors and teahouses remain prevalent in the alleys, while essential services – such as markets, barber shops, and health centers – continue to operate within the core area, ensuring the continuity of daily life.

Many traditional houses in the alley still serve as residences and elderly residents frequently gather at alley entrances to chat, forming part of the town’s everyday social landscape. Despite the impact of tourism development, local authorities aim to preserve Lizhuang’s core area as a residential space, ensuring that the living environment and lifestyle of local residents remain unchanged. To achieve this, commercial activities are being redirected toward the Moonfield scenic area, allowing the historic core to maintain its tranquility and livability.

We hope to attract all businesses to the Moonfield scenic area, slow down commercial activity in the core area, and reduce business density. Our goal is to maintain the town’s daily life operations so that the core area remains a truly living historical town. (GW09)

All of the above indicates that Lizhuang’s primary function as a residential town outweighs its function as a tourist destination. This approach ensures that Lizhuang continues to provide essential livelihood security, enabling local residents to sustain their way of life within Lizhuang.

## 4. Eroding identity: Placelessness in Lizhuang

Rolph (1976) describes placelessness as arising from an inauthentic attitude toward a place, the forced acceptance of



**Figure 3.** The performance of the Grass Dragon Dance in Lizhuang  
Source: Photo by the Secretary of Culture Center of Cuiping district, Yibin city (2019).

mass media influences, and the prioritization of efficiency and structure over local identity. Based on this framework, the causes of placelessness in Lizhuang can be categorized into four key aspects: homogenization of architectural styles, inauthentic attitudes, mass media influence, and changes in community education and atmosphere.

#### 4.1. Homogenization of architectural style

Placelessness in Lizhuang is most evident in the Moonfield scenic area, where architectural homogenization and disorderly development have altered the town's cultural authenticity. The design, lighting, and landscape elements of the Moonfield scenic area were created by a private design group with a broad, all-encompassing approach. Although some southern Sichuan architectural elements were retained, the widespread imitation of Wuzhen's water-town esthetic has failed to represent Lizhuang's unique local culture. As a result, both local residents and tourists perceive the Moonfield scenic area as disconnected from Lizhuang's historical and cultural identity.

"I think the Moonfield scenic area doesn't feel like a part of Lizhuang at all – it looks more like a large commercial complex. Even as a local, I still feel strange." (LZ16)

"The Moonfield scenic area has changed significantly. The old buildings in the core area are completely different from what they used to be." (YK15)

Tourist-generated social media posts reinforce this sentiment, noting that the atmosphere of Moonfield scenic area closely resembles that of the water town of Wuzhen, substantially diluting Lizhuang's distinctive cultural image and its historical association with the Yangzi river. Despite opposition from the Committee staff, they have little control over the branding strategies of Yibin Cui Tourism Investment Group Co., Ltd., which has actively promoted Lizhuang using the Wuzhen model – intensifying the homogenization of both architectural style and tourism marketing.

"Saying it's like Wuzhen might attract attention, but I work in Lizhuang and hope it stays unique." (GW08)

"We do not support the idea that Lizhuang is 'Yibin's Wuzhen' because Lizhuang has its own unique characteristics. We want to discourage people (tourists) from making such comparisons." (GW09)

The homogenized architectural style of the Moonfield scenic area is now spreading into Lizhuang's core area. Historical temples have been demolished to make way for souvenir stores, and the historic opera house along the Yangzi river is also being dismantled. These renovations threaten Lizhuang's traditional architectural heritage, pushing the town toward two critical choices: complete reconstruction in a foreign style or total redevelopment. The increasing presence of homogenized buildings

diminishes Lizhuang's local significance and its emotional connection with local residents. Without critical reflection on the long-term consequences of imitating Wuzhen's architectural style, Lizhuang's historical and cultural symbols may gradually fade – or disappear entirely.

## 4.2. Inauthentic attitudes

The placelessness of the Moonfield scenic area, characterized by a combination of generic and imitative landscapes, stems from several factors: advancement in information technology, increased mobility in tourism, and the spread of imitation across the entire historical town's tourism sector. However, what demands great scrutiny is the underlying attitude behind placelessness – an inauthentic perspective that seeks to treat people and places equally and uniformly, disregarding their distinctiveness. This inauthentic attitude is particularly evident in the construction of the Moonfield scenic area.

“As tourists, the Moonfield scenic area doesn't feel right. It does not match our childhood memories of Lizhuang. The buildings resemble Jiangnan towns in Zhejiang, but Lizhuang is by the Yangzi river, not like those water towns.” (YK14)

As Relph (1976) argues, the places we build and experience often lack depth, shaped by simplistic causality. Qian (2013) further explains that place-making is largely driven by capital accumulation and the cyclical nature of investment. Maximizing economic benefits through the commodification of locality is the primary objective of capital intervention in place-making practices. This rationale may explain why Lizhuang's Moonfield scenic area adopted a “Wuzhen-style” model – simply because the economic success of Wuzhen's tourism made it an attractive template.

The landscape of the Moonfield scenic area is the product of corporate-driven commercialization. While the Committee has attempted to regulate the esthetic consistency of stores and the broader scenic environment, commercial gain remains the dominant priority in tourism development, overriding local cultural significance.

“The main goal of Moonfield scenic area is to provide a venue for tourism consumption, mainly for profit. I have to admit, what is worth learning from Wuzhen is its mature commercial development and profitability.” (GW09)

From the perspective of placelessness, local residents of Lizhuang often describe the Moonfield scenic area with negative expressions such as “heavily commercialized.” By doing so, they assert the depth of their own sense of place in contrast to the superficiality of the Moonfield scenic area.

“The Moonfield side has been newly renovated – do not you think it's too commercialized? Tourists who want to understand the culture of Lizhuang need to visit the core area because that's where all the historical alleys are.” (LZ02)

The inauthenticity attitude is essentially an expression of placelessness – marked by a lack of concern for the deep symbolic meanings of place and an inability to appreciate its unique identity. In the Moonfield scenic area, visitors engage in the consumption of visually appealing but culturally shallow commodities. As Urry (1995) argues, tourism is fundamentally a process of consuming places. Destinations attract tourists precisely because of their unique cultural meanings, which distinguish them from other locations; thus, the meaning of place is an important part of what travelers seek to experience.

However, the Moonfield scenic area's neglect of place significance risks creating a dislocation in the way tourists consume local culture, ultimately triggering irreversible cultural degradation. For example, the Moonfield scenic area features a photography studio renting historical Chinese costumes, a type of business commonly found in other historical towns across China. This mass-produced commercial esthetic, designed for wide-scale consumption, not only shapes the mode of cultural production but also reinforces cultural homogenization, exacerbating the uniformity of tourist stores in China's historical towns. The construction of the Moon Field scenic area also reflects another inauthentic attitude – kitsch. In this context, superficial and trivialized aspects of place are magnified, while genuinely meaningful cultural elements are overlooked. The Committee demonstrated a kitschy attitude by deliberately excluding the “Three White” – a distinctive cultural representation of Lizhuang – from the Moonfield scenic area, instead introducing commercial businesses in an unorganized manner.

“As a management committee, we do not want to bring the traditional “Three White” stores to the Moonfield scenic area. We hope that Moonfield will position itself as an upscale destination.” (GW08)

Tourism, more than any other industry, serves as a prime expression of inauthentic attitudes toward place. In the tourism sector, perceptions of authenticity are often influenced by broader societal narratives rather than genuine cultural connections. The marketing materials for the Moonfield scenic area frequently borrow descriptions from other historical towns, using phrases such as “Jiangnan Water Town” – a misleading

label that misrepresents Lizhuang's identity. This misuse of borrowed imagery has evolved into a false evaluation, creating a disconnect between Moonfield's promotional content and Lizhuang's authentic cultural heritage. Even the Committee's official media platforms frequently use terms such as "water town," downplaying Lizhuang's true historical role as an important crossing point of the Yangzi river. This mislabeling demonstrates that the Committee has failed to establish stable local elements in its symbolic production, ultimately diluting the cultural significance of the place.

### 4.3. Mass media influence

Mass culture and values disseminate widely as people move and ideas spread on a large scale. In the context of mass consumption culture, these values and cultural forms are not organically created by individuals but are instead constructed by manufacturers, governments, and professional designers. The mass media plays a leading role in shaping and distributing these cultural constructs. Consequently, the tourism model in historical towns, such as Wuzhen, reflects this phenomenon, where tourists' needs and preferences are standardized by the Committee into what is known as the "Wuzhen model." This results in the uniform production of tourism-related commodities. For example, the Moonfield scenic area replicates the "lantern shop" concept from water towns, and the entire area is developed in a homogeneous manner, reinforcing standardized tourist needs and preferences.

MacCannell (2013) outlines the process of sacralizing tourism attractions in five stages: naming, framing and enhancement, sacralization, mechanical reproduction, and social reproduction. The publicity strategy for Lizhuang, as disseminated through mass media, reflects a distorted implementation of this process. Lizhuang's naming stage began in 1992 when it was designated a Famous Historical and Cultural Town of Sichuan Province (Yibin City Chronicles Office, 1992). Over time, it evolved into a national tourist attraction and a base for cross-strait exchanges.

During the framing and enhancement stage, original tourist symbols of Lizhuang historical town – such as Xizi Lane and Luoxuan Hall (Li Zhuang Lizhuang Town People's Government, 2006) – were emphasized to highlight the town's historical and architectural heritage. In particular, landmarks such as Luoxuan Hall, the Hundred-Crane Windows in Zhang Family Ancestral Hall, Kuixing Pavilion, and the Nine Dragons Monument of Yuwang Palace – collectively referred to as the "Four Greatest Features of Lizhuang" by architect Liang Sicheng (1901 – 1972) – serve as significant representations of Lizhuang's cultural identity.

However, following the completion of the Moonfield scenic area, these original symbols were largely overlooked as most tourists shifted their focus to Moonfield. In the sacralization stage, promotional descriptions of the Moonfield scenic area as a "water town" reinforced a misleading narrative, causing tourists to develop misconceptions about Lizhuang's cultural heritage.

During the mechanical reproduction stage, officials commercialized cultural symbols, such as Kuixing Pavilion, by transforming them into mass-produced cultural products, including trendy "internet-famous" ice cream and refrigerator magnets. This superficial commodification ignored the deeper historical and cultural significance of the original symbols.

Ultimately, in the social replication stage, tourists – influenced by social media – further propagated these misperceptions, leading to a decline in appreciation for Lizhuang's core cultural heritage.

"Lizhuang looks like it has a long history, and the buildings are quite characteristic, but its development has not been satisfactory. I do not think it has fully realized its potential." (LS03)

As discussed, the Moonfield scenic area represents a tangible manifestation of the deconstruction of Lizhuang's local landscape. Ideally, the preservation of historical alleys should serve as the foundation and driving force for tourism development. However, these authentic spaces are increasingly being replaced by homogenized, artificial water towns.

### 4.4. Changes in community education and atmosphere

The author observes a phenomenon: most residents of Lizhuang pay little attention to the town's anti-war sites, possibly because these sites have become a routine part of their daily environment. In addition, many locals show little interest in the newly built museum in the Moonfield scenic area and rarely visit and explore it deliberately. These observations highlight a lack of historical education and community engagement in Lizhuang's cultural heritage.

"For me, I generally don't visit those attractions, (I think) there's nothing interesting to see. We locals basically do not go to those places, except when taking relatives and friends who are visiting Lizhuang." (LZ07)

Although residents of Lizhuang still retain the names of historically significant places, such as the "Old Photo Studio" (destroyed in the August 2022 fire), the "Old

Cinema” (currently under construction as a scenic area-owned store), and the “Old Theater” (now enclosed and under construction as a tourist attraction), these places are increasingly being physically altered or erased. By continuing to use these historic place names, residents of Lizhuang have attempted to preserve the memory of old Lizhuang, passing down cultural knowledge from generation to generation. This practice serves as a form of resistance against the disappearance of historical landmarks due to tourism-driven redevelopment. However, the renewal of tourism infrastructure in the town’s core area persists, with old sites being demolished and replaced by new tourism facilities that fail to align with the architectural style of traditional southern Sichuan houses.

### 5. Discussion

The challenge of preserving and maintaining the uniqueness and meaning of a place has become the biggest dilemma in resisting the intrusion of placelessness (He & Cai, 2014). Within the framework of placelessness theory, Lizhuang faces the erosion of its place identity, and relocalization emerges as a strategy to counter this trend. Thomas (1988) theory of relocalization argues that foreign elements can integrate into a place, merge with local culture, and still retain distinctive local characteristics while preserving originality (Sun, 2017). In an effort to reinforce its cultural identity, Lizhuang has sought to emphasize its historical significance – particularly its contributions and sacrifices during the war period – through the display of historical materials (Nanxi County Chronicles Editorial Committee, 1992). This narrative of “selfless contribution” has become a core cultural symbol of Lizhuang. However, it largely lacks the perspective of local residents, raising questions about its ability to truly reflect community identity (Figure 4).

Lizhuang’s interaction with Tongji University provides an interesting case. Tongji University has contributed free

planning efforts for Lizhuang’s core area and annually sends outstanding graduate students to local schools for voluntary teaching programs. While these initiatives demonstrate institutional collaboration, they primarily reflect government-led interactions with the university. The key question remains: Do these programs genuinely benefit Lizhuang’s local residents?

Similarly, local officials have engaged with authors who have created literature on Lizhuang’s history, inviting them to hold book launches in the Moonfield core area as part of efforts to uncover and highlight Lizhuang’s cultural heritage. However, it is unclear whether such initiatives can attract tourists or encourage local residents to develop a deeper appreciation for their town’s historical past. The principles of relocalization have been partially integrated into Lizhuang’s tourism development. However, whether these measures – amid the production of a homogenized tourist landscape – can truly preserve Lizhuang’s sense of place remains debatable.

The limitations of this study are as follows: first, the framework proposed in this article is unable to determine the tourism demand for historical town culture within the context of the “internet influencer” economy or predict the trends and direction of historical town tourism development before the emergence of the next tourist hotspot. Second, this study uses Lizhuang historical town as its research focus, but due to variations in tourism development paths and scales, the frameworks of locality constructed in different types of tourism towns may vary. Finally, this study integrates and analyzes various concepts of place to explain a single tourist town. Future research could develop a multi-place perspective framework to examine multiple tourist towns, allowing for a broader analysis and identification of commonalities in locality development within the tourism industry. These limitations provide insights for future research on the tourism development of historical towns in China.

### 6. Conclusion

This study concludes that the construction of place identity in Lizhuang’s historical town follows a three-faceted process: the leadership of capital authority, the excavation of local culture, and the role of daily life. The influence of capital authority is evident through government leadership and institutional embedding, local culture is preserved through heritage shops and the transmission of wartime culture, and daily life contributes to maintaining the town’s attributes and functions. This framework allows Lizhuang to retain its unique local identity despite pressures from tourism development. The findings offer strategic insights

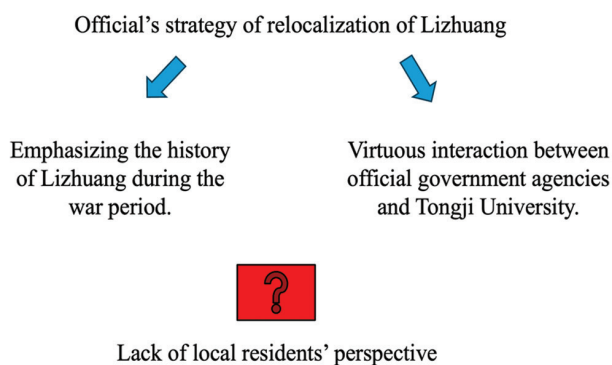


Figure 4. Two approaches of the official strategy of relocalization in Lizhuang  
Source: Diagram by the author.

for preserving localities in other historical towns in China that are in the early stages of tourism development.

Furthermore, based on Relph's theory of placelessness, this study innovatively identifies four specific manifestations of placelessness in Lizhuang: homogenization of architectural style, lack of authenticity in local attitudes, mass cultural dissemination, and weakening of historical atmosphere and educational significance. Identifying these manifestations of placelessness can serve as a warning to other tourist towns in China, highlighting the potential consequences of placelessness during tourism development.

In addition, the article discusses relocation measures currently being officially implemented in Lizhuang, questioning whether these initiatives benefit both local residents and tourists. This poses a challenge to government agencies involved in historical town tourism development: how to incorporate local voices and balance tourism growth with the preservation of local culture – a critical issue that requires urgent attention.

Finally, Lizhuang's experience demonstrates that effective strategies can help preserve a place identity, offering a model for other historical towns seeking to maintain their uniqueness amid tourism expansion. By emphasizing Lizhuang's local experience, the town can retain its local characteristics, serving as an example for other historical towns to preserve their cultural heritage while adapting to tourism-driven changes.

## Acknowledgments

Thank Lizhuang for allowing me to conduct my research and to all the interviewees who generously shared their time and kindness during my fieldwork.

## Funding

None.

## Conflict of interest

The author declares no conflicts of interest.

## Author contributions

This is a single-authored article.

## Ethics approval and consent to participate

In this study, informed consent was obtained through a verbal presentation and explanation, and all respondents agreed to it before the interview began.

## Consent for publication

Verbal consent was obtained from all interviewees, who also granted permission for their words and statements

to be used. In addition, all interviewees remained anonymous.

## Availability of data

The data used in this study are confidential due to ethical clearance requirements and to protect the privacy of the interviewees.

## References

- Bai, K., Hu, X. Y., Lü, Y. Y., & Du, T. (2017). Lijiang Gucheng manhuo difangxing de chengxian yu xingcheng [Study on the identity with placeness of slow living in Lijiang]. *Dili Xuebao*, 72(6):1104-1117. [Article in Chinese]  
<https://doi.org/CNKI: SUN.0.2017-06-013>
- Caliandro, A. (2018). Digital methods for ethnography: Analytical concepts for ethnographers exploring social media environments. *Journal of Contemporary Ethnography*, 47(5):551-578.  
<https://doi.org/10.1177/0891241617702960>
- Chark, R. (2021). Midnight in Paris: On heritage and nostalgia. *Annals of Tourism Research*, 90:103266.  
<https://doi.org/10.1016/j.annals.2021.103266>
- Dans, E. P., & Alonso González, P. (2019). Sustainable tourism and social value at world heritage sites: Towards a conservation plan for Altamira, Spain. *Annals of Tourism Research*, 74:68-80.  
<https://doi.org/10.1016/j.annals.2018.10.011>
- Feng, D., Huang, Q. Y., & Huang, F. D. (2023). Zhongguo Yingzaoxueshe xinan bian nian shi ji (1941-1946)-Lizhuang [Chronicle of the society for research in chinese architecture in Southwest China (1941-1946)-Lizhuang]. *Jianzhushi Xuekan*, 2023(3):68-77. [Article in Chinese]  
<https://doi.org/cnki: sun.0.2023-03-005>
- He, H. L., & Cai, X. M. (2014). Guowai wu difang yu fei difang yanjiu jinzhuan yu qishi [Progress and implications of research on placelessness and non-place abroad]. *Renwen Dili*, 29(6):47-52, 31. [Article in Chinese]  
<https://doi.org/10.13959/j.issn.1003-2398.2014.06.008>
- Heyman, J. M. (1994). Changes in house construction materials in border Mexico: Four research propositions about commoditization. *Human Organization*, 53(2):132-142.
- Hu, X. Y., & Bai, K. (2015). Lasa Bakuo Jie difangxing de youke rentong jiangou [Tourist identity construction of placeness in Barkhor Street, Lhasa]. *Dili Xuebao*, 70(10):1632-1649. [Article in Chinese]  
<https://doi.org/cnki: sun.0.2015-10-009>
- Jacobs, A., & Appleyard, D. (1987). Toward an urban design manifesto. *Journal of the American Planning Association*, 53(1):112-120.

- <https://doi.org/10.1080/01944368708976642>
- Jiang, L., & Su, Q. (2016). Lüyou dui guzhen difangxing de yingxiang yanjiu-Jiyu Zhouzhuang de duo anli kaocha [Study on the impact of tourism on the placeness of ancient towns: A multi-case study based on Zhouzhuang]. *Dili Kexue*, 36(5):766-771. [Article in Chinese]
- <https://doi.org/10.13249/j.cnki.sgs.2016.05.015>
- Jorgensen, H. (2019). Postcolonial perspectives on colonial heritage tourism: The domestic tourist consumption of French heritage in Puducherry, India. *Annals of Tourism Research*, 77: 117-127.
- <https://doi.org/10.1016/j.annals.2019.05.001>
- Li Zhuang Town People's Government, Cuiping District, Yibin City. (2006). *Li Zhuang Town Chronicles*. Sichuan: Fangzhi Publishing House.
- Long, J. Z., Duan, H. R., & Zhang, F. X. (2020). Difang yilian dui youke zhongchengdu de yingxiang yanjiu-Jiyu Fenghuang Gucheng de shizheng yanjiu [Study on the impact of place attachment on tourist loyalty: An empirical study based on Fenghuang Ancient Town]. *Beijing Shifan Daxue Xuebao (Ziran Kexue Ban)*, 56(1):68-77. [Article in Chinese]
- <https://doi.org/10.16360/j.cnki.jbnuns.2020.01.011>
- Lucchi, E. (2023). Regenerative design of archaeological sites: A pedagogical approach to boost environmental sustainability and social engagement. *Sustainability*, 15(4):3783.
- <https://doi.org/10.3390/su15043783>
- MacCannell, D. (2013). *The Tourist: A New Theory of the Leisure Class*. 2013<sup>th</sup> ed. California: University of California.
- Mou, L. C., & Cheng, L. (2023). Kongjian shengchan shiyu xia “gu” zhen lüyou de difang yingzao-Yi Enshi Tujia Nüer Cheng weili [Place-making in ancient town tourism from the perspective of spatial production: A case study of Enshi Tujia Daughter Town]. *Lüyou Xuekan*, 38(3):107-124. [Article in Chinese]
- <https://doi.org/10.19765/j.cnki.1002-5006.2022.00.037>
- Nanxi County Chronicles Editorial Committee. (1992). *Nanxi County Chronicles*. Sichuan: Sichuan People's Publishing House.
- Qian, J. X. (2013). Difangxing yanjiu de lilun shijiao ji qi dui lüyou yanjiu de qishi [Theoretical perspectives on local studies and their implications for tourism research]. *Lüyou Xuekan*, 2013(3):5-7. [Article in Chinese]
- <https://doi.org/CNKI:SUN:LYXK.0.2013-03-004>
- Relph, E. C. (1976). *Place and Placelessness*. Billerica: Pion.
- Ross, D., & Saxena, G. (2019). Participative co-creation of archaeological heritage: Case insights on creative tourism in Alentejo, Portugal. *Annals of Tourism Research*, 79:102790.
- <https://doi.org/10.1016/j.annals.2019.102790>
- Sun, J. X. (2015). Lvyou shangyehua yu naxizu minju de “qudifanghua”-Yi Lijiang Xinhua shequ weili. [Tourism commercialization and the “placelessness” of Naxi residential architecture: A case study of Xinhua Community in Lijiang]. *Shehui Kexuejia*, 11:7-13. [Article in Chinese]
- <https://doi.org/cnki:sun:shkj.0.2015-11-002>
- Sun, J. X. (2017). Zuowei yizhong “shehui xingshi” de lüyou: “Difang” shijiao [Tourism as a “social form”: A “place” perspective]. *Lüyou Xuekan*, 32(12):12-14. [Article in Chinese]
- <https://doi.org/cnki:sun.0.2017-12-008>
- Sun, J. X., & Zhou, Y. (2015). Yichan lüyou di jumin de difang rentong-“Diao xiang” fuzhao, jiyi yu kongjian [Place identity of residents in heritage tourism sites: “Diaoxiang” symbols, memory, and space]. *Dili Yanjiu*, 34(12):2381-2394.
- Thomas, P. (1998). Conspicuous construction: Houses, consumption and ‘relocalization’ in Manambondro, Southeast Madagascar. *The Journal of the Royal Anthropological Institute*, 4(3):425-446.
- <https://doi.org/10.2307/3034155>
- Urry, J. (1995). *Consuming Places*. England, UK: Routledge.
- Yibin City Local Chronicles Office. (1992). *Yibin City Local Chronicles*. Beijing: Xinhua Publishing House.
- Zhang, H., & Xu, H. G. (2023). Chu “jing” hui sheng “qing” ma?- Lüyou tixian changjing he mudi di shuxi du dui youke difang yilian de yingxiang [Does “scenery” evoke “emotion”?- The impact of tourism experience scenes and destination familiarity on tourists’ place attachment]. *Lüyou Xuekan*, 38(6):122-135. [Article in Chinese]
- <https://doi.org/10.19765/j.cnki.1002-5006.2022.00.004>
- Zhu, H., & Liu, B. (2011). Difang gan, difang yilian yu difang rentong deng gainian de bianxi ji yanjiu qishi [Analysis of concepts such as place sense, place attachment, and place identity and research implications]. *Huanan Shifan Daxue Xuebao (Ziran Kexue Ban)*, 43(1):1-8. [Article in Chinese]
- <https://doi.org/CNKI:SUN.0.2011-01-002>

## ORIGINAL ARTICLE

# Khmer shophouses: From Chinese origins to the present day

Carlo Santoro<sup>1\*</sup> 

<sup>1</sup>Department of Architecture, American University of Phnom Penh, Phnom Penh, Cambodia

(This article belongs to the *Special Issue: Transcultural Dialogues in Architecture and Urbanism: Intersections Between Chinese Architecture and Global Influences*)

## Abstract

In Cambodia, Phnom Penh's architectural history reflects a complex interplay of local mythology, trade networks, and colonial influence. Since the pre-Angkorian period, it has undergone significant transformations shaped by cultural, economic, and political forces. Notably, the contributions of Chinese mercantile communities and the impact of French colonial urban planning played a pivotal role in these changes. This paper examines the architectural evolution of Phnom Penh's shophouse typology, tracing its development from pre-colonial trade settlements to its contemporary manifestations in satellite cities. The Chinese merchant shophouse, introduced in the 19<sup>th</sup> century, played a pivotal role in shaping Phnom Penh's urban fabric, blending Chinese, Khmer, and later French influences. During the French colonial period (1863 – 1953), the shophouse evolved into hybrid forms, integrating French design elements while maintaining its traditional mixed-use functionality. Post-independence, the shophouse further adapted to modernist architectural principles, influenced by Soviet urban planning, giving rise to larger multi-story blocks that accommodated increasing urban density. In the post-war era, the shophouse re-emerged as a key component in peri-urban expansion and satellite city development, reflecting Phnom Penh's rapid economic and urban growth. Its adaptability to technological, economic, and social changes underscores its continued relevance in shaping Phnom Penh's urban landscape. Through fieldwork and literature review, this study provides a typological analysis of shophouse variations, exploring their role in defining the city's architectural identity. The findings highlight the shophouse's resilience as an adaptable urban form, preserving architectural traditions while responding to modern urban challenges.

**Keywords:** Mixed-use typology; Urban development; Socio-spatial organization; Cambodia

### \*Corresponding author:

Carlo Santoro  
([carlouni2@gmail.com](mailto:carlouni2@gmail.com))

**Citation:** Santoro, C. (2025). Khmer shophouses: From Chinese origins to the present day. *Journal of Chinese Architecture and Urbanism*, 7(3): 5410.  
<https://doi.org/10.36922/jcau.5410>

**Received:** October 22, 2024

**1st revised:** January 8, 2025

**2nd revised:** January 22, 2025

**Accepted:** February 11, 2025

**Published online:** March 11, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

Phnom Penh, Cambodia's capital, has an architectural history deeply rooted in a complex interplay of local myth, trade, and colonization (Osborne, 2008). The city's origins can be traced back to the legend of Lady Penh and the establishment of Wat Phnom in the late 14<sup>th</sup> century (Igout, 1993), but urbanization in the area extends much further, with pre-

Angkorian settlements strategically located along the Mekong River. Despite the need for further investigation, archeological findings at Wat Oulalong suggest the existence of pre-Angkorian settlements in this region, reinforcing the area's historical significance as a pre-existing site of worship predating the establishment of Wat Phnom (Boswell, 2016). Excluding the brief period between 1432 and 1505, when Phnom Penh served as the capital of the Cambodian Kingdom, scholarly literature often characterizes the city as a minor riverine settlement before 1866, when it was re-established as the capital under the French Protectorate (1863 – 1949) (Stetten, 1997). Nevertheless, historical landmarks such as the Cantonese temple Mountain of the Jade Palace (碧山宮; *Bishangong*), dating back to the 18<sup>th</sup> century, indicate that Phnom Penh was home to a significant Chinese community well before the colonial period. Organized into congregations, this community benefited from established regional trade routes (Filippi, 2012; Willmott, 1969).

This study examines the shophouse in Cambodia, a pivotal architectural typology shaped by the merchant enclaves of Phnom Penh. This typology has profoundly influenced not only the city's urban landscape but also suburban areas and rural settlements across the entirety of Cambodia. Indeed, it can be argued that the shophouse has become the dominant architectural model propelling the country's contemporary morphological transformation. While this typology is prevalent across Southeast Asia, Cambodia's unique blend of Sino-Khmer and French colonial influences has produced a distinctive

hybrid shophouse model that continues to evolve. This article traces the architectural and urban development of shophouses from their pre-colonial origins to their contemporary developments.

## 2. Methodology and objectives

This research integrates historical analysis with field surveys conducted over the past 7 years by the Urban Lab research team at the American University of Phnom Penh. Employing a multi-method approach, it synthesizes primary fieldwork with a wide range of secondary sources, including scientific articles and monographs published over the past 3 decades. The study traces the evolution of the shophouse typology, from its pre-colonial origins through colonial and post-colonial transformations to its present-day forms, with a particular emphasis on Phnom Penh as representative of Cambodia's broader urban context (Figure 1). By addressing gaps in existing literature, the research provides a comprehensive analysis of the typology's adaptability and its responses to technological, spatial, and socio-economic changes in urban environments.

A key objective of this study is to present an unbiased understanding of the Cambodian shophouse typology, which reflects a nuanced interplay between local and global forces. It deliberately avoids simplistic reliance on imported or misinterpreted urban theories, instead introducing the shophouse as a dynamic architectural model that successfully reconciles traditional and modern spatial organization. This model significantly



**Figure 1.** Shophouse distribution in Phnom Penh, Cambodia  
Source: Drawing by the author (using Google Earth Image as background).

contributes to the structural framework of urban forms in contemporary Khmer cities. While the study provides a broad but not exhaustive analysis, it does not delve deeply into historical events or general socio-political factors influencing Phnom Penh's urban development, as these aspects have been extensively covered in previous studies by the Atelier parisien d'urbanisme (APUR, 1997; APUR, 2003), Fauveaud (2015) and Carrier (2019), as well as historians such as Igout (1993), Chandler (1991), and Osborne (2008).

The research focuses on essential characteristics of the urban fabric that define typological variations, rather than providing an exhaustive examination of each variation. For detailed morphological articulations, it draws on foundational studies by Japanese scholars such as Hirohata *et al.* (2007), Wakita & Shiraishi (2007), Shiraishi *et al.* (2020), and Fujisawa & Kuzuhara (2023). This groundwork establishes a fundamental framework for subsequent qualitative and quantitative analyses, including comparative studies of models adopted in the Asia Pacific region.

Adopting a constructive perspective, the research highlights the productive potential of architectural transformations in fostering more inclusive and diverse urban forms. It consciously avoids cultural biases that overly critique the backgrounds of those shaping these transformations, instead focusing on their contributions to the evolution of Cambodia's urban landscape.

### 3. The origins of the traditional Sino-Khmer merchant shophouse in Cambodia

The Chinese merchant shophouses originated in China during the Song dynasty (960 – 1276) and subsequently spread across the southern provinces, particularly Fujian and Guangdong (Han & Beisi, 2015). These multi-story structures were designed to fulfill multiple purposes concurrently, with the ground floor typically dedicated to commercial activities and the upper floors allocated to storage and residential use. The spatial organization of these buildings was optimized for land use efficiency, particularly in densely populated areas along thoroughfares or within city blocks, which were eventually served by internal ventilated courtyards, corridors, and back alleys.

As Chinese merchants expanded their commercial networks across Southeast Asia beyond the Maritime Silk Road, this architectural model was adopted in various cities. The most notable instances of this phenomenon emerged in the 19<sup>th</sup> century, particularly in Singapore, Penang, and Malacca, as well as in Bangkok and Medan (Dai & Zhou, 2019; Han & Beisi, 2015; Han & Beisi, 2016; Ongsavangchai & Funo, 2004; Savage, 2001; Zahrah

*et al.*, 2020). In the 20<sup>th</sup> century, similar urban typologies appeared, such as the tube houses in Hanoi (Ngo, 2021), while earlier precedents can be as far back as the 18<sup>th</sup> century in Batavia (present-day Jakarta) and Hoi An (Luengo, 2021). The shophouse typology developed as a hybrid architectural form, integrating Chinese architectural traditions with local influences from Malay, Javanese, Vietnamese, and Siamese cultures, along with Western colonial influences. Recent studies by Luengo (2021) and Zhao *et al.* (2024) suggest a broader pattern of cultural hybridization, emphasizing that the Chinese-origin shophouse model exhibits notable morphological similarities with traditional mixed-use typologies found in 18<sup>th</sup>-century Nagasaki, as well as earlier examples from the 16<sup>th</sup>-century Surat and Manila.

In Cambodia, the shophouse became a prominent urban form in the early 19<sup>th</sup> century, appearing not only in Phnom Penh (Figure 2) but also in other cities such as Battambang (Figure 3), Siem Reap, and Kampot, where the Chinese merchants played a crucial role in establishing these buildings along major trading routes (Collins, 2006; Han & Lim, 2019). The shophouse soon became a defining feature of the urban landscape, particularly along main roads, where commerce and domestic life intersected most visibly. The first official land concession for shophouse construction in Phnom Penh dates back to 1872, near the Mekong River. These early examples followed the regional pattern, featuring a commercial front and a residential upper floor (Yam & Ju, 2016).



Figure 2. Traditional shophouses in Phnom Penh, Cambodia  
Source: Photo by the author (2024).



Figure 3. Traditional shophouses in Battambang, Cambodia  
Source: Photo by the author (2022).

Phnom Penh's urban landscape experienced significant transformations during the French Protectorate, which began in 1863. After the 1890s, Western architectural elements became increasingly prevalent (Filippi, 2012; Guérin, 2011). However, the traditional Chinese shophouse demonstrated remarkable adaptability, responding to French colonial strategies while retaining its distinctive mixed-use character. The urban planning rhetoric of the period often emphasized modernization through European urbanism, drawing from Camillo Sitte's (1843 – 1903) ideas on picturesque city layouts (Blancot & Hetreau-Pottier, 1997) and the garden city movement, which was promoted in Indochina by the French Society of Urban Planners (Doyle, 2012; Kolnberger, 2015; Phillips, 1977). Yet, Phnom Penh's development during this period followed a more complex trajectory than strict planning schemes would suggest. For instance, the 1925 plan proposed by Ernest Hébrard (1875 – 1933), head of the Indochina Architecture and Town Planning Service, is unquestionably significant in consolidating a vision of Cambodia's capital subdivided into ethnically defined neighborhoods and functionally zoned districts. Nevertheless, this plan was indebted not only to Tony Garnier's (1869 – 1948) pioneering discourses on industrial cities for Lyon but also to the spontaneous local processes of spatial appropriation (Kolnberger, 2014). This influence remains evident even when disregarding the geomantic organization of the north-south and east-west street network that structures the Chinese quarter adjacent to the Royal Palace.

During the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, the shophouse continued to evolve into a hybrid typology that incorporated both Sino-Khmer elements and French colonial design features. New spatial configurations allowed for greater density and more flexible uses of space. This hybrid model proliferated in key areas of Phnom Penh, particularly around the Old Market, contributing to the creation of vibrant urban districts where commerce and domestic life coexisted as integral parts of the community fabric (Hirohata *et al.*, 2007). In Cambodia, the term “shophouse” is currently used to describe all mixed-use building blocks, particularly those in communities predominantly inhabited by people of Chinese origin (Yam & Ju, 2016; Fujisawa & Kuzuhara, 2023). However, its internal organization has undergone a notable evolution over time, with clear associations with various mixed-use typologies prevalent in southern China. These include the Zonary Bungalow (寿金寮; *Shoujinliao*) and the Arcade-House (骑楼; *Qilou*), as identified by Han & Beisi (2015).

In the 1930s, French town planners in Phnom Penh expanded upon market-centered urban design principles, developing the commercial district around the New Central Market (Figure 4). The grid system facilitated the construction of shophouses that merged French

Hausmannian principles of urban block design with the traditional Chinese shophouse form. This reflected a continued fusion of colonial and local architectural practices, a characteristic unique to Cambodia. Yam & Ju (2016) categorized this particular shophouse typology under the designation of “apartment-type shophouse.”

## 4. Post-colonial social-populist transformations and modernist shophouse models

Cambodia's post-colonial period brought significant changes to the urban form of Phnom Penh. Following the country's independence in 1953, rapid population growth led to increased demand for both housing and commercial spaces. Early urban planning efforts in the post-colonial era were heavily influenced by modernist architectural principles, particularly those advanced by the *Congres Internationaux d'Architecture Moderne* Movement, alongside Soviet-inspired functionalism. These ideas were introduced to Cambodia by a new generation of architects returning from Paris, supported by foreign consultants primarily from Russia, Japan, and France (Ross & Collins, 2012). The planning approach of this period typically emphasized the separation of residential, administrative, commercial, and industrial zones. Prominent infrastructure projects reflected the social-populist ideals promoted by Prince Norodom (1922 – 2012) (Silva, 2021), marking a distinct departure from the mixed-use approach characteristic of colonial-era shophouses. This shift was evident in the construction of large, isolated compounds for social housing, public buildings, administrative palaces, stadiums, and universities (Lemarchands, 1997).

Despite these rationalizing urban tendencies, the traditional shophouse typology persisted and continued to evolve. In the Orussey Market neighborhood, planners introduced a new variation of the shophouse (Figure 5), drawing on the mixed-use logic previously experimented with in the vicinity of the New Market. The area continues to be predominantly populated by a Sino-Khmer community, and its distinctive urban fabric has largely remained intact until the present day.

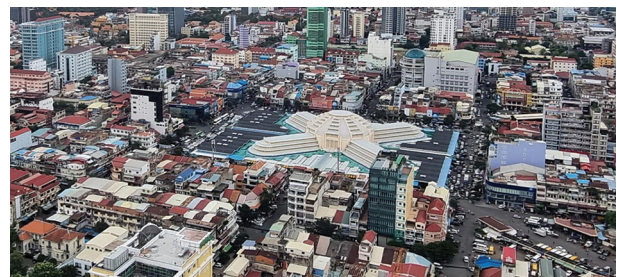


Figure 4. Central market area, Phnom Penh, Cambodia  
Source: Photo by the author (2023).

The dissemination of reinforced concrete technology combined with prefabricated elements in the 1960s – introduced from the Soviet Union under the direction of Lu Ban Hap (1931 – 2023), head of the Municipal Planning and Housing Department – facilitated the construction of multi-story blocks, typically four to five floors in height (Hap & Moritz, 2021). These buildings featured regular subdivisions with dual street access: a main street designed for vehicular traffic and a secondary pedestrian alley for service purposes. Architectural elements included mezzanine levels, vertical circulation components such as staircases and courtyards, as well as balconies. This typology facilitated the reorganization of internal layouts, allowing for the creation of micro-units served by common corridors, thereby fostering a higher degree of inclusivity within the community (Weinberger, 2010).

This evolving shophouse typology developed in parallel with the Vietnamese “tube houses” of the same period, supporting increased vertical expansion (Ngo, 2021). The model not only facilitated the accommodation of a greater number of residents but also aligned with urban planning objectives that prioritized compact and efficient land use (Shiraishi *et al.*, 2020).

Despite the Cambodian Civil War (1970 – 1980) and the subsequent impoverishment of the population, which impeded significant construction projects, the adaptability of the modernist shophouse design enabled its resurgence at the beginning of the 1990s, particularly as Cambodia started to embrace private entrepreneurship (Blancot, 1997). These buildings grew beyond 6 stories, contributing to the development of entire mid-rise neighborhoods and expanding the city further west of Orussey Market (Figure 6), reaching the Toul Kork district.

## 5. Peri-urban expansion and the emergence of neo-liberal satellite cities

In the wake of Cambodia’s economic liberalization efforts in the 1990s—accelerating significantly in the beginning of the 2000s—along with the advent of new land laws facilitating private ownership and foreign investments,



Figure 5. Modernist shophouses in Phnom Penh, Cambodia  
Source: Photo by the author (2024).

urban development surged (Menzies *et al.*, 2008). This period saw the densification of Phnom Penh’s peri-urban fringe and the adoption of a polycentric urban model, leading to the rise of satellite cities (Paling, 2012; Percival & Waley, 2012). These developments marked a distinct shift in urban form, moving away from the compact growth of the traditional city center toward more sprawling, planned environments (Mialhea *et al.*, 2019). A notable example of this transformation is the reclamation of Koh Pich island, shaped by private developers seeking to capitalize on Phnom Penh’s growing population and economic potential (Pierdet, 2011). This development has been particularly geared toward accommodating the influx of the Chinese community, which began resettling in this part of the city in the early 2000s.

At the center of Koh Pich Island, around the multifunctional city hall, a new iteration of the shophouse typology emerged (Figure 7). This variation was adapted to meet the needs of middle-income households, particularly in accommodating car ownership, while preserving pedestrian-friendly urban design principles. These modern shophouses incorporate underground parking and larger residential units while retaining the mixed-use functionality of their historical predecessors, especially on the ground floor. The evolution of the shophouse in Koh Pich, along with other peri-urban areas, illustrates its adaptability, ensuring its continued role as a key element of Phnom Penh’s urban landscape as the city expands.



Figure 6. Westward expansion areas of Phnom Penh, Cambodia  
Source: Photo by the author (2024).



Figure 7. Peri-urban shophouses in Phnom Penh, Cambodia  
Source: Photo by the author (2024).

In parallel with the development of Koh Pich, Phnom Penh's peripheral areas also witnessed the advent of neighborhood organizations, primarily composed of residential communities designated as “Borey” (Fauveaud, 2015). Initially, these communities were characterized by row housing that mirrored the modernist shophouse typology but at lower population densities. Over time, these neighborhoods evolved in various configurations, transitioning from open communities to gated communities of compact townhouses. These were bounded by multifunctional, street-facing elements that offered a flexible interface between residential, commercial, and service uses.

The most typical of these configurations (Figure 8) consists of 2- or 3-story row houses with commercial fronts along main roads, while residential areas extend along internal streets. In districts such as Russei Keo, this model reflects a return to the shophouse's original multifunctional nature, utilizing shared front street setbacks while incorporating features such as semi-private rooftop terraces.

This housing model, which aligns more closely with the socio-spatial characteristics of the Chinese work unit (单位; *danwei*) than with American gated communities, is widely regarded as an affordable solution (Leakhana & Brugman, 2022; Traub & Sweeting, 2020). It has since become the preferred typology for Cambodia's suburban population, playing a crucial role in transforming rural settlements into industrial ones (Figure 9). In doing so, it has contributed to the ongoing suburbanization of Phnom Penh (Carrier, 2019) and, arguably, the entire country.

In recent years, Phnom Penh's urban development has been increasingly shaped by foreign direct investments, not only from China but also from other Asian countries such as South Korea, Japan, Indonesia, and Singapore. These investments have been complemented by the growing influence of locally financed groups, which have amassed significant capital through investment diversification and the commodification of real estate



**Figure 8.** Shophouses in Phnom Penh's satellite areas  
Source: Photo by the author (2024).

(Carrier, 2019; Fauveaud, 2014). Large-scale, mixed-use developments have been influenced by the Asian adaptation of global city models and, more recently, by Singaporean mid-rise townships (Bertrais *et al.*, 2023). These projects have incorporated shophouse typologies from Phnom Penh's peri-urban areas into the expanding urban sprawl.

To illustrate, the Star Platinum Borey (Figure 10), developed by the Peng Huoth Group in Phnom Penh's southern suburbs, aspires to establish a self-sufficient suburban community. It seeks to achieve this by blending residential units with essential services such as schools, healthcare facilities, sports centers, and retail spaces while also incorporating dispersed gardens and parks. Architecturally, the contemporary shophouse has fully embraced global post-modernist trends, with claims of incorporating energy-efficient technologies and sustainable building practices. These features reflect growing societal concerns about environmental issues, evolving consumer preferences among Phnom Penh's younger demographic (Yen *et al.*, 2016), and the increasing demand for exclusivity among the city's affluent population. As a result, the shophouse typology continues to evolve, balancing the needs of modern urban life with the multifunctional flexibility that has long been defined its traditional character.



**Figure 9.** Commercial houses in industrialized suburban areas of Cambodia  
Source: Photo by the author (2024).



**Figure 10.** Cambodian township, Borey Peng Huoth, The Star Platinum  
Source: Map by Google Hearth.

## 6. Conclusion

The architectural evolution of the shophouse in Cambodia vividly reflects the nation's socio-cultural, economic, and political transformations over the past 2 centuries. As this study demonstrates, the shophouse typology, which originated within Chinese merchant communities in the 19<sup>th</sup> century, has developed into a highly adaptable urban form. This adaptability highlights the shophouse's central role in shaping Cambodia's urban landscape, particularly in its capital, Phnom Penh, as the city has transitioned through various phases of colonial influence, modernization, and contemporary urban expansion.

The findings of this research reveal the shophouse's remarkable ability to absorb external influences while preserving its core multifunctional characteristics. Originally conceived as a dual-purpose structure for both commerce and residence, the traditional shophouse evolved beyond its initial trading function to become a defining element of Phnom Penh's urban fabric. During the colonial period, French architectural elements were integrated into the design of the shophouse, resulting in a unique hybrid form that merged Sino-Khmer traditions with European influences. This hybridization not only reflects the city's colonial history but also illustrates how pre-existing local architectural forms coexisted with – and were reshaped by – the colonial presence, contributing to the distinctiveness of Phnom Penh's built environment.

The study further emphasizes that, while many Southeast Asian cities share a tradition of shophouses, Phnom Penh's Sino-Khmer-French hybrid shophouse developed a unique architectural identity. French colonial influence, especially through town planning initiatives, laid the groundwork for the continued evolution of the shophouse. Despite the rise of modernist urban planning in the post-colonial era, which emphasized functional zoning and introduced new construction technologies, the shophouse retained its relevance, particularly within key urban expansions. While modernist principles were instrumental in supporting the vertical development of the shophouse, they also contributed to a multifunctional typology that transcended the original intentions of modernist theory. This resulted in a compact and efficient form capable of accommodating Phnom Penh's growing population and increasing urban density. Even today, the shophouse typology remains unparalleled in its effectiveness at fostering an inclusive community.

This study also sheds light on the shophouse's role in the contemporary urban expansion of Phnom Penh, especially in the development of peri-urban areas and satellite cities. In these contexts, the shophouse continues to adapt to

new socio-economic dynamics, including increased car ownership, the rise of the middle class, and the influence of foreign investment, all within the broader framework of Cambodia's shift to a neoliberal economy. The capacity of the shophouse to evolve in response to these new forces underscores its versatility as an architectural model capable of navigating both local and global socio-economic changes.

The findings of this research demonstrate that the shophouse remains a resilient architectural model, playing a central role in shaping the identity of Cambodia's increasingly suburbanized landscape. However, its latest evolution faces challenges in integrating the necessary compactness of the urban fabric. Identifying solutions that reorient new developments toward a more transit-oriented approach while ensuring harmony with the surrounding environment will be essential. As the shophouse continues to adapt, it holds significant potential, especially as the country contends with the dual pressures of real estate commodification and the growing demand for self-sufficient suburban communities that integrate residential, commercial, and recreational functions. These contemporary developments highlight not only the shophouse's ability to accommodate the physical demands of urban life but also its responsiveness to shifting economic and social contexts in the era of globalization.

In conclusion, the ongoing evolution of the shophouse exemplifies how an urban typology rooted in historical tradition can maintain its relevance in contemporary urban development. The future of Cambodia's urban landscape will likely continue to be shaped by this flexible architectural form. By integrating new technologies, evolving lifestyles, and changing spatial requirements, the shophouse remains a cornerstone of Cambodia's architectural and cultural identity.

## Acknowledgments

The documentation for this article was collected by the author between 2017 and 2024 during his tenure as an associate professor of architecture and urban design and as lead researcher of the Urban Lab at the American University of Phnom Penh, Cambodia. The author extends his gratitude to all his colleagues in the Department of Architecture for their invaluable support and mentorship throughout this period.

## Funding

None.

## Conflict of interest

The author declares no conflicts of interest.

## Author contributions

This is a single-authored article.

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

The data used in this study are available from the corresponding author upon reasonable request.

## References

- APUR. (1997). *Phnom Penh, Développement Urbain et Patrimoine [Phnom Penh, Urban Development and Heritage]*. France: Atelier Parisien d'Urbanisme.
- APUR. (2003). *Phnom Penh à l'aube du XXI<sup>e</sup> Siècle [Phnom Penh at the Dawn of the XXI<sup>st</sup> Century]*. France: Atelier Parisien d'Urbanisme.
- Bertrais, D., Fauveaud, G., & Choplin, A. (2023). Fabriquer la ville-verte en Asie: La green city, de Singapour à Phnom Penh [Constructing the green city in Asia: From Singapore to Phnom Penh]. *Espaces et Sociétés*, 189(2):39-57.  
<https://doi.org/10.3917/esp.189.0039>
- Blancot, C. (1997). *La Reconstruction [The Reconstruction]*. Phnom Penh, Développement Urbain Et Patrimoine. France: Atelier Parisien d'Urbanisme, p. 61-71.
- Blancot, C., & Hetreau-Pottier, A. (1997). 1863-1953, *Une ville neuve dans un site d'occupation ancienne [1863-1953, A new city in an old settlement area]*. Phnom Penh, Développement Urbain Et Patrimoine. France: Atelier Parisien d'Urbanisme, p. 29-39.
- Boswell, S. (2016). *King Norodom's Head*. Denmark: Nias Press.
- Carrier, A. (2019). *Phnom Penh Privatisée [Phnom Penh Privatized]*. Bangkok: Irasec and Péninsule.
- Chandler, D. P. (1991). *The Tragedy of Cambodian History: Politics, War, and Revolution Since 1945*. Connecticut, US: Yale University Press.
- Collins, D. L. (2006). Siem reap: Then and now. *Udaya*, 7:73-99.
- Dai, M., & Zhou, X. (2019). Research on the overseas Chinese shophouse culture in Penang, Malaysia in Qing Dynasty a case study of Penang Island. In: *Proceedings of the 3<sup>rd</sup> International Conference on Art Studies: Science, Experience, Education (ICASSEE 2019)*. Vol. 368. p. 190-192.
- Doyle, S. E. (2012). City of water: Architecture, urbanism and the floods of Phnom Penh. *Nakhara Journal of Environmental Design and Planning*, 12, 135-154.
- Fauveaud, G. (2014). Mutations of real estate actors' strategies and modes of capital appropriation in contemporary Phnom Penh. *Urban Studies*, 51(16):3479-3494.  
<https://doi.org/10.1177/0042098014552767>
- Fauveaud, G. (2015). *La Production des espaces urbains à Phnom Penh [The Production of urban spaces in Phnom Penh]*. Paris: Publication de la Sorbonne.
- Filippi, J. (2012). *Strolling Around Phnom Penh*. Kenya: Kam Editions.
- Fujisawa, T., & Kuzuhara T. (2023). Historic cityscape characteristics in the city center of Phnom Penh, Cambodia. *KEIO SFC Journal*, 23(1):5-24.
- Guérin, M. (2011). Domination coloniale et modernisation au cambodge [Colonial domination and modernization in Cambodia]. *Siksacakr: Journal of Cambodia Research*, 13:30-38.
- Han, S. S., & Lim, Y. (2019) Battambang City, Cambodia: From a small colonial settlement to an emerging regional centre. *Cities*, 87:205-220.  
<https://doi.org/10.1016/j.cities.2018.10.003>
- Han, W., & Beisi J. (2015). A morphological study of the traditional shophouse in China and Southeast Asia. *Social and Behavioral Sciences*, 179:237-249.  
<https://doi.org/10.1016/j.sbspro.2015.02.427>
- Han, W., & Beisi J. (2016). Urban morphology of commercial port cities and shophouses in Southeast Asia. *Procedia Engineering*, 142:190-197.  
<https://doi.org/10.1016/j.proeng.2016.02.031>
- Hap, L. B., & Moritz, (2021). "I wanted to marry Cambodia with the occidental world", Lu Ban Hap in conversation with Moritz Henning. In: *Contested Modernities, postcolonial architecture and the construction of identities in Southeast Asia*. Switzerland: Birkhauser, p. 48-52.
- Hirohata, D., Shiraishi, H., & Wakita, Y. (2007). Space organization of markets in Phnom Penh, Cambodia: Case study of the old market. *Proceedings of Annual Research Meeting Chugoku*, 30:569-572.
- Igout, M. (1993). *Phnom Penh then and Now*. 2<sup>nd</sup> ed. Bangkok: White Lotus.
- Kolnberger, T. (2014). Between planning and spontaneous order: The 'equivocal' production of urban space in colonial Phnom Penh (1860s-1930s). *Geographische Zeitschrift*, 102(2):86-105.  
<https://doi.org/10.25162/gz-2014-0009>
- Kolnberger, T. (2015). Between water and land: urban and rural settlement forms in Cambodia with special reference to Phnom Penh. *Urban Morphology*, 19(2):135-144.  
<https://doi.org/10.51347/jum.v19i2.4027>
- Leakhana, K., & Brugman, J. (2022). *Affordable Housing Policy*

- in Cambodia and Southeast Asia*. [Report]. Cambodia: Equitable Cambodia.
- Lemarchands, G. (1997). *Phnom Penh, Capitale De l'état Independent du Cambodge [Phnom Penh, Capital of the Independent State of Cambodia]*. Phnom Penh, Développement Urbain et Patrimoine. France: Atelier Parisien d'Urbanisme, p. 44-49.
- Luengo, P. (2021). Architecture in eighteenth-century East and Southeast Asia Chinese quarters. *Journal of Urban History*, 49(4):745-766.  
<https://doi.org/10.1177/00961442211029249>
- Menzies, N., Ketya, S., & Adler, D. (2008). *Land, Development and Conflict: Urban and Peri-urban Phnom Penh*, [Working Paper]. United States: Center for Advanced Study.
- Mialhea, F., Gunnella, Y., Navratil, O., Choi, D., Sovann, C., Lejot, J., Gaudou, B., Se, B., & Landon, N. (2019). Spatial growth of Phnom Penh, Cambodia (1973–2015): Patterns, rates, and socio-ecological consequences. *Land Use Policy*, 87:104061.  
<https://doi.org/10.1016/j.landusepol.2019.104061>
- Ngo, M.H. (2021). A critical view of tube-house architecture on urban type in Vietnam. *Horizon Journal of Humanities Social Sciences Research*, 3(1):111-122.  
<https://doi.org/10.37534/bp.jhssr.2021.v3.n1.id1100>
- Ongsavangchai, N., & Funo, S. (2004). Consideration on formation and typology of shophouse in Ratanakosin area. Bangkok, Thailand. *Journal of Architectural and Planning Research*, 577:9-15.  
[https://doi.org/10.3130/aija.69.9\\_2](https://doi.org/10.3130/aija.69.9_2)
- Osborne, M. E. (2008). *Phnom Penh: A Cultural and Literary History*. United Kingdom: Signal Books.
- Paling, W. (2012). Planning a future for Phnom Penh: Mega projects, aid dependence and disjointed governance. *Urban Studies*, 49(13):2889-2912.  
<https://doi.org/10.1177/0042098012452457>
- Percival, T. D., & Waley, P. (2012). Articulating intra-Asian urbanism: The production of satellite cities in Phnom Penh. *Urban Studies*, 49(13):2872-2888.  
<https://doi.org/10.1177/0042098012452461>
- Phillips, R.A. (1977). *The Garden city Movement, Its Origin and Influence on Early Modern Town Planning*, [Master's Thesis]. Canada: University of British Columbia.
- Pierdet, C. (2011). Private investors in Phnom Penh (Cambodia) and the reconfiguration of the city center in relation to the periphery since the 1990s. *Annales de Géographie*, 681(5):486-508.
- Ross, G. H., & Collins, L. D. (2012). *Building Cambodia: 'New Khmer architecture' 1953-1970*. Lincolnshire: The Key Publisher.
- Savage, V. (2001). Singapore shophouses: Conserving a landscape tradition. *SPAFA Journal*, 11(1):5-22.
- Shiraishi, H., Wakita, Y., & Maki, N. (2020). Habitation characteristics of city blocks consisting of shophouses: A case study in Phnom Penh, Cambodia. *Journal of Asian Architecture and Building Engineering*, 85(768):329-337.
- Silva, G. (2021). *Journey through Cambodia*. Contested Modernities, Postcolonial Architecture and the Construction of Identities in Southeast Asia. Switzerland: Birkhauser, p. 27-45.
- Stetten, G. (1997). *La ville et l'eau: Phnom Penh, Développement Urbain et Patrimoine [The City and Water: Phnom Penh, Urban Development, and Heritage]*. France: Atelier Parisien d'Urbanisme.
- Traub, E., & Sweeting, D. (2020). *Affordable Housing in Phnom Penh - Ensuring Decent Housing Opportunities for All*, [Report]. Cambodia: The Urban Plan Platform Studio.
- Wakita, Y., & Shiraishi, H. (2007). Considerations on space organization of shophouse and block formation in Phnom Penh, Cambodia. *Journal of Asian Architecture and Building Engineering*, 615:7-14.
- Weinberger, N. (2010). *The Shophouse as a Tool for Equitable Urban Development: The Case of Phnom Penh, Cambodia*, [Master's Thesis]. Pennsylvania: University of Pennsylvania.
- Willmott, W. E. (1969). Congregations and associations: The political structure of the Chinese community in Phnom-Penh, Cambodia. *Comparative Studies in Society and History*, 11(3):282-301.
- Yam, S., & Ju, S. R. (2016). Transformation of shophouses in Phnom Penh, Cambodia: In the aspect of spatial organization. *Family Environment Research*, 54(1):13-26.  
<https://doi.org/10.6115/fer.2016.002>
- Yen, Y., Wang, Z., Shi, Y., & Soeung, B. (2016). An assessment of the knowledge and demand of young residents regarding the ecological services of urban green spaces in Phnom Penh, Cambodia. *Sustainability*, 8(6):523.  
<https://doi.org/10.3390/su8060523>
- Zahrah, W., Loebis, M N., Ginting, N., Aulia, D. N. (2020). Community perception and adaptation about living in shop house in Medan, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 452:012020.  
<https://doi.org/10.1088/1755-1315/452/1/012020>
- Zhao, C., Zhang, L., Zhao, K. & Gan, G. (2024). A study on the block pattern and spatial characteristics of gara in Surat, India. *Journal of Chinese Architecture and Urbanism*, 6(1):1979.  
<https://doi.org/10.36922/jcau.1979>

## ORIGINAL ARTICLE

## Numerical investigation of the seismic performance of steel shear plate walls reinforced with cross-shaped and circular stiffeners

Morteza Naghipour<sup>1\*</sup>, Abbasali Jahani<sup>2</sup>, and Seyed Mohammad Reza Hasani<sup>1</sup><sup>1</sup>Department of Civil Engineering, Faculty of Civil Engineering, Babol Noshirvani University of Technology, Babol, Mazandaran, Iran<sup>2</sup>Department of Civil Engineering, Faculty of Civil Engineering, Mohaghegh Ardebil University, Ardebil, Ardebil, Iran

## Abstract

Steel plate shear walls are among the most promising lateral load-resisting systems. However, a major drawback of this system is that the thin steel plate infill is susceptible to buckling under its own weight or when exposed to seismic loads. To solve this problem, stiffeners are effectively employed. In this study, steel plate shear wall models incorporating perpendicular and horizontal cross-shaped and circular configurations were investigated. Finite element models of frame structures, comprising steel plate infill along with adjacent beams and columns, were developed in ANSYS and validated against experimental data from the scholarly literature. The numerical model demonstrated excellent agreement with published experimental results. After confirming model accuracy and material suitability, a series of 3-span, 5-story frame models, was generated to evaluate the effects of stiffener quantity (0, 2, 3, and 4) and configuration. To this end, pushover analyses were performed, and the resulting capacity curves were plotted. These curves were subsequently idealized following Federal Emergency Management Agency recommendations, and seismic parameters – including ductility factor, response modification factor, stiffness, and shear capacity – were thoroughly examined. In addition, cyclic loading analyses were performed by applying incremental displacements at the roof level, and the corresponding energy dissipation capacities were determined. The results indicate that steel plate shear walls with circular reinforcements exhibit a ductility factor of 29.41, whereas those with cross-shaped stiffeners have a ductility factor of 17.10, indicating the superior ductility performance of circular stiffeners. However, cross-shaped stiffeners outperform circular stiffeners in terms of shear capacity, reaching 5,815 kN compared to 4,020 kN. In addition, the highest stiffness value (921.5 kN/mm) was observed in the hybrid model incorporating both cross and circular stiffeners. Optimization analysis revealed that four perpendicular circular stiffeners yield the maximum energy dissipation capacity, while three circular stiffeners optimize ductility, response modification factor, and shear strength.

**Keywords:** Steel plate shear wall; Circular stiffener; Cross-shaped stiffener; Ductility factor; Finite element method

**\*Corresponding author:**Morteza Naghipour  
(m-naghi@nit.ac.ir)

**Citation:** Naghipour, M., Jahani, A., & Hasani, S. M. R. (2025). Numerical investigation of the seismic performance of steel shear plate walls reinforced with cross-shaped and circular stiffeners. *Journal of Chinese Architecture and Urbanism*, 7(3): 5781. <https://doi.org/10.36922/jcau.5781>

**Received:** November 6, 2024**1st revised:** February 3, 2025**2nd revised:** February 8, 2025**Accepted:** February 25, 2025**Published online:** March 19, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

Lateral load-resisting systems can be classified into moment-resisting frames, braced frames, shear walls, or core walls (e.g., central core in high-rise structures). Steel shear walls are a type of lateral load-resisting system designed to withstand wind and earthquake loads, functioning similarly to reinforced concrete shear walls and bracings. However, steel shear walls offer superior performance and numerous advantages over other lateral load-resisting systems.

Among the key advantages of steel shear walls are their high elastic stiffness, reduced structural weight (due to the low thickness of steel plates compared to concrete shear walls), and greater architectural space allocation (Bai *et al.*, 2022; Ghamari & Johari Naeimi, 2023; Nayel *et al.*, 2022; Zhang *et al.*, 2022; Zhang *et al.*, 2022). This type of lateral load-resisting system consists of discrete panels, each comprising a steel plate bolted or welded to the surrounding structural components. The steel plates and panels are divided into multiple parts along the building height based on the number of floors, forming a continuous vertical shear wall, similar to a reinforced concrete shear wall. Lateral forces are transmitted horizontally through floor diaphragms to the beams and columns enclosing the shear wall. The adjoining steel frame for each panel may feature either simple or fixed beam-to-column connections, and the steel plate itself can be fabricated with or without stiffeners. The use of steel shear walls is more prevalent in North America and Japan. Nevertheless, while unstiffened steel shear walls are commonly implemented in North American countries, those used in Japan – particularly in earthquake-prone regions – are typically reinforced with stiffeners (Beyranvand & Hosseini, 2022). One major drawback of this load-bearing system is that the thin steel plate is highly susceptible to buckling, both under its own weight and when exposed to seismic loads. To solve this problem, increasing the steel plate thickness is one option, though it is economically impractical. A more effective and cost-efficient solution is the incorporation of stiffeners, which significantly enhance the stability and performance of the system.

Due to the simplicity of fabricating stiffeners in a controlled environment and their ease of installation on-site, the implementation speed of the system is high, and the associated construction costs are significantly reduced. Therefore, steel shear walls serve as efficient alternatives in terms of performance and load-bearing capacity compared to similar systems (Ebadi-Jamkhaneh & Kontoni, 2022). Numerous studies have been published in the technical literature, investigating various aspects of steel shear walls. For example, Lubell *et al.* (2000) performed cyclic

tests on one 4-story and two 1-story building specimens, all of which lacked stiffeners. Their results indicated a ductility factor of 6, derived from experimental data. Similarly, Elgaaly & Liu (1997) performed cyclic tests on six 3-story, single-span frame structures containing unstiffened steel plates. They concluded that the non-linear behavior of these structural systems initiates with the yielding of the steel plate. Moreover, their findings highlighted that system strength is primarily governed by plastic hinge formation in the columns, suggesting that the shear wall plate should fully yield before column buckling occurs. Takahashi *et al.* (1973) investigated steel shear panels of varying thicknesses reinforced with stiffeners of different dimensions, spacings, and configurations. Their results confirmed that S-shaped hysteresis curves can be transformed into spindle-shaped diagrams by strategically reinforcing the steel plates. Sabouri-Ghomi & Golhaki (2008) conducted cyclic loading tests on 3-story steel shear walls with thin plates, using both rigid and hinged beam-to-column connections. Their experiment aimed to determine the ductility coefficient of the steel shear walls by analyzing hysteresis curves, employing low-strength steel for the wall plate and high-strength steel for the frame members. Astaneh-Asl (2001) examined two half-scale moment-resisting frames with coupled shear walls, representing 2- and 3-story sections of a tall building. Their results showed that the first frame exhibited superior ductility, with story displacements reaching approximately 7% while remaining almost elastic. The compression flange buckled at a drift ratio of 22%, while the tension flange yielded. In addition, the non-load-resisting I-shaped column was subjected to localized buckling. This specimen endured 79 loading cycles, 38 of which were in the plastic range. At peak loading, the floor displacement exceeded 4.4%, and the beam failed at a maximum shear capacity of approximately 404.834 kN. The frame shear strength subsequently declined to about 60% of its ultimate capacity. The second frame exhibited similar ductility, with a story displacement of approximately 7% and 29 loading cycles (15 in the plastic range). It reached a maximum shear capacity of 54.51 kN at a drift of 2.2%. The shear strength of the column accounted for 75% of the maximum shear force, while the frame capacity dropped to 80%. Recently, Labibzadeh and Khayat (2023) investigated stiffeners with different geometries and distributions in steel plate shear walls, focusing on premature buckling of steel plates under lateral loads. Wu *et al.* (2022) conducted cyclic loading tests on diagonally stiffened stainless steel plate shear walls, illustrating the seismic performance variations between stainless steel shear walls and conventional steel shear walls. Parvizi *et al.* (2022) carried out experimental and numerical investigations to assess initial stiffness,

lateral load capacity, equivalent hysteretic damping, and energy dissipation. Es'haghioskui *et al.* (2023) proposed a new type of steel plate shear wall designed to resist lateral loads more effectively. In this configuration, tension field-guiding stiffeners were added, introducing a link beam. Finite element (FE) modeling (FEM) was adopted to evaluate the failure modes, revealing that failure was primarily driven by tension yielding of the steel plate and flexural stresses or shear plastic hinge formation at the link beam ends. Shi *et al.* (2022) experimentally assessed the seismic behavior of high-performance steel plate shear walls, concluding that cold-formed steel walls exhibit high shear capacity and stable mechanical behavior.

Several studies have investigated the influence of various parameters on the seismic performance of steel frame systems (Chen *et al.*, 2023; Hao *et al.*, 2023; Je Too & Isoda, 2023; Qiao *et al.*, 2023; Wang *et al.*, 2022; Xing *et al.*, 2022; Yang *et al.*, 2023; Yu *et al.*, 2023). To incorporate non-linear material behavior, an approximate elasto-plastic hysteresis model was developed to account for the effects of shear buckling, web plate yielding, and surrounding frame interactions.

Thorburn *et al.* (1983) recognized that thin-panel steel plate shear walls buckle under low in-plane shear loads but can sustain considerable post-buckling strength. Their model was based on Wagner's (1931) pure diagonal tension theory, which assumes that story shear resistance is governed primarily by diagonal tension fields – a concept formalized through the strip model. Later, Mimura and Akiyama (1977) developed a method for predicting the hysteretic behavior of unstiffened steel plate shear walls where the plates buckle before reaching shear yield load. Their approach separately considered the contributions of the panel and the surrounding frame. The shear buckling load of the plate was calculated using a pinned boundary condition and classical elastic plate buckling theory. For loads exceeding the elastic buckling threshold, shear resistance was assumed to be dominated by a diagonal tension field, as described by Wagner (1931).

In this model, the plate yield strength and ultimate shear strength were determined by assuming pure diagonal tension inclined at an angle derived from Wagner's formulation. The moment-resisting frame's contribution was assessed using an elastoplastic frame analysis, with the total load–deflection response modeled as the sum of the contributions from the shear wall and the frame. In addition, the hysteresis model proposed by Mimura and Akiyama (1977) incorporated assumptions regarding hysteretic response. Because the model accounted for inelastic stretching of the plate along its diagonal, plate slackening occurred on load reversal. To define the

displacement required to reestablish the tension field after load reversal, a simplified shear panel representation was used, assuming a 45° inclination angle for the tension field.

All applied cycles were considered equivalent to the most severe loading cycles expected in a multi-story shear wall frame. During closing cycles, the vertical tensile load – representing the diagonal tension field – was approximately equal to the yield stress of the plate. Characteristic diagonal tension yield patterns formed at the mid-plane of the wall, with the tension field acting as a diagonal tie. Notably, the reduced moment demand on the moment-resisting frame in a steel plate shear wall, due to the diagonal bracing effect from the tension field, improves structural performance. Furthermore, the FE model assumes that the primary mechanism resisting story shear is the diagonal tension field, which develops after the wall plate buckles. In general, buckling occurs at relatively low lateral loads due to the large aspect ratio of the plate (relative to its thickness) and the presence of initial out-of-plane imperfections. The post-buckling strength of plates has long been considered in plate girder web design, largely based on the work of Basler (1961). When shear walls are modeled this way, only the pure tension field action is explicitly represented. However, it is evident that the actual behavior of steel shear walls is more complex than this idealized assumption.

Numerous research studies have confirmed the significant influence of stiffeners on the non-linear performance of steel shear walls. However, the manufacturing and application of multiple horizontal and vertical stiffeners can present implementation challenges, including increased cost and extended construction time compared to unreinforced structures. This study proposes stiffening systems with different geometric configurations to improve the performance of reinforced steel shear walls while minimizing the stiffener ratio. First, the FEM process is detailed, and the proposed model is validated using experimental data. Next, the cyclic loading pattern is explained, followed by pushover analysis performed on 1-story frames using FE models. Subsequently, the energy dissipation and failure patterns of 1-story frames are assessed. Finally, the effect of the number of stiffeners on the structural performance of reinforced frames is evaluated by analyzing a set of 3-span, 5-story frames.

## 2. Methods

### 2.1. General description and validation of the FE analysis model

As previously acknowledged, steel follows an elasto-plastic stress–strain curve. Since a non-linear material analysis is required, accurately modeling the post-yield behavior is critical. In this research, an ideal tri-linear model,

as illustrated in Figure 1, was adopted. Given that the objective was to determine the endpoint in the capacity curve, it was observed that the curve became horizontal on further increasing the applied force during the modeling process. Therefore, the onset of this horizontal segment was considered the termination point of the analysis for all models.

The selected steel material was st37 steel, a common structural steel type. As depicted in Figure 1, the first segment's slope, representing the elastic modulus of steel, was set to  $2.1 \times 10^{11}$  N/m<sup>2</sup>. The yield stress was defined as  $2.4 \times 10^8$  N/m<sup>2</sup>, the ultimate stress as  $4 \times 10^8$  N/m<sup>2</sup>, and Poisson's ratio was taken as 0.3. In addition, the hardening rate was set at 0.03, leading to a tangent elastic modulus of  $6.3 \times 10^9$  N/m<sup>2</sup> in the second segment of the curve. The von Mises yield criterion was employed, as it effectively captures the response of steel. The same material properties were applied in both compression and tension, adhering to the kinematic hardening law.

To account for geometric non-linearities, large deformation effects and stress stiffness were incorporated in the ANSYS software (Ansys, Inc., United States). For element selection, Beam188 elements were assigned to beams, while Shell181 elements were used for columns and infill steel plates.

To verify the accuracy of the FE model, including the selected element types and material properties, a 4-story steel plate shear wall system, experimentally tested by Driver *et al.* (1998) under cyclic loading at the University of Alberta, Canada, was replicated in ANSYS. Figure 2 illustrates the schematic of the experimental model of Driver *et al.* (Driver *et al.*, 1998) alongside the FE model mesh of the present study used in the validation process. The total height of the shear wall was 7,400 mm, with a wall width of 3,400 mm, including the side columns. The 1<sup>st</sup>-floor height was 1,930 mm, while the upper stories measured approximately 1,830 mm each. The 1:2 scaled model represented a system in which the infill steel plate was welded to a special moment-resisting frame. The mechanical specifications of the test model are summarized in Table 1.

Figure 3 presents a comparison of the envelope curve from Driver *et al.* (1998) and the present FEM results in ANSYS. The results demonstrate a strong correlation, with only a 4% difference in the ultimate load capacity. This agreement confirms the appropriateness of the selected elements and materials, as well as the accuracy of the numerical modeling process in ANSYS.

Despite the strong agreement between the experimental and numerical results, minor discrepancies exist between

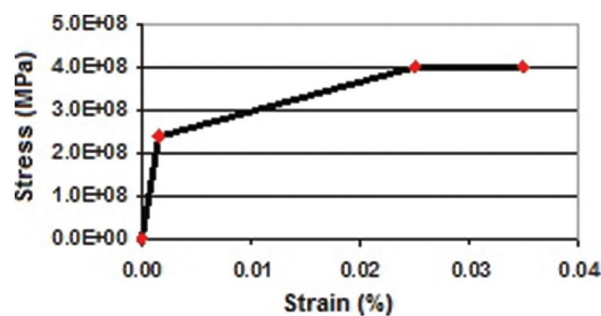


Figure 1. The ideal tri-linear curve representing steel behavior  
Source: Graph by the authors.

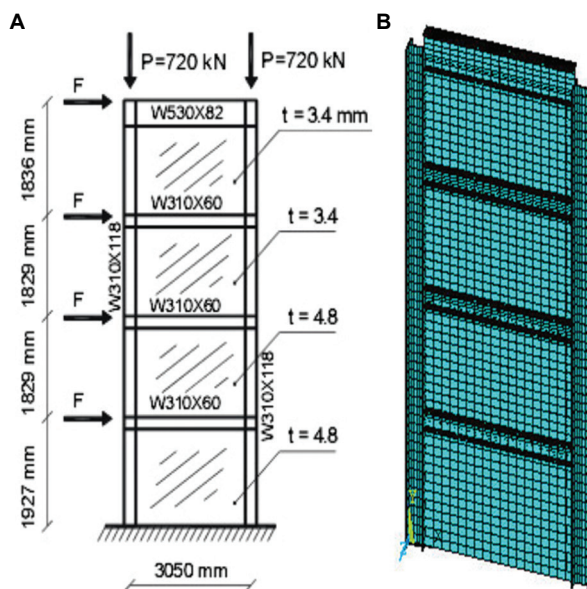


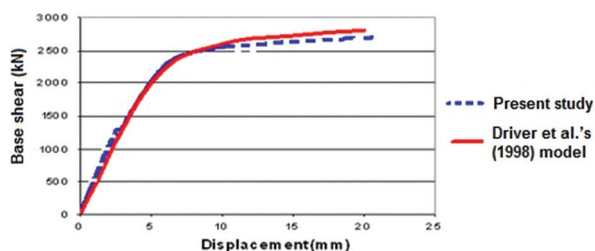
Figure 2. The schematic of (A) experimental model (from Driver *et al.* [1998]) and (B) numerical model in ANSYS (from the present study)  
Source: Schematics by the authors.

Table 1. Mechanical specifications of the 4-story model

| Element  | Yield stress<br>( $\sigma_y$ ; N/mm <sup>2</sup> ) | Elastic modulus<br>(E, N/mm <sup>2</sup> ) |
|--|--|--|
| 1 <sup>st</sup> - and 2 <sup>nd</sup> -floor steel plate | 341  | 208, 800                                   |
| 3 <sup>rd</sup> -floor steel plate                       | 257  | 208, 800                                   |
| 4 <sup>th</sup> -floor steel plate                       | 262  | 208, 800                                   |
| Beam and column  | 308.8  | 203, 000                                   |

Note: Specifications obtained from experimental data (Driver *et al.*, 1998).

the experimental specimen and the ANSYS model. These differences can be attributed to limited experimental data on certain model details and challenges in simulating the restrictions along the z-direction for frame elements in the experimental model. This limitation resulted in a lower stiffness in the laboratory model compared to the FEM



**Figure 3.** Validation of the shear wall capacity curve: Experimental data (Driver *et al.*, 1998) versus FE modeling results (present study, ANSYS)  
Source: Graph by the authors.

system. In addition, random experimental errors may have contributed to these variations. However, given the overall accuracy of the numerical results, the model is deemed sufficiently reliable for proceeding with further numerical analyses.

Figure 4 presents the von Mises stress distribution contour and buckling mode of the shear wall. According to Wagner’s (1931) model, the dominant mechanism for resisting story shear is the diagonal tension field, as shown in Figure 4B. The figure shows the full development of the diagonal tension field in the wall plate. Similarly, the hysteresis model proposed by Mimura and Akiyama (1977) assumes that the tension field forms at an inclination angle of 45°, as shown in Figure 4B in the modeling of the present study.

## 2.2. Cyclic loading

To account for the effect of P-Δ, a gravity load of 720 kN was applied at the top of each column and sustained throughout the cyclic loading process. In addition, equal lateral loads were implemented at each floor level to simulate cyclic loading conditions. Through additional load analysis, the estimated stiffness and ultimate capacity of the steel shear wall closely matched the envelope curve of cyclic loading. However, to evaluate energy dissipation capacity and the overall behavior of the steel shear wall under cyclic loading, the numerical model must accurately capture the system’s cyclic response. The cyclic load was applied to the roof beam in the form of horizontal displacement. Figure 5 illustrates the displacement versus loading step curve pattern, following the ATC-24 recommendations for cyclic loading. The cyclic loading was applied at each stage as a coefficient of the yield displacement ( $\delta_y$ ), using the sequence:  $1/3 \delta_y$ ,  $2/3 \delta_y$ ,  $\delta_y$ ,  $2 \delta_y$ ,  $3 \delta_y$ , and so forth.

## 2.3. Determination of the response modification factor

The most accurate analysis method for capturing a structure’s actual behavior during an earthquake is

non-linear dynamic analysis. However, due to its computational intensity, designers often rely on simpler analysis methods. One such method is non-linear static analysis (also known as pushover analysis), which considers the response modification factor. This factor provides an estimate of the structure’s non-linear behavior. There are two main approaches for determining the response modification factor: (i) Young’s ductility coefficient and (ii) Freeman’s capacity spectrum method.

In this study, Young’s method was utilized. According to Young’s ductility coefficient method, the load-displacement curve of the structure is simplified into a bilinear curve, as depicted in Figure 6. In this diagram,  $\Omega$  represents the system overstrength factor, which is the ratio of the actual ultimate lateral strength to the code-based design lateral force. Furthermore,  $\mu_s$  represents the ductility factor, defined as the ratio of maximum deformation to yield deformation.

Based on Young’s ductility coefficient method, the response modification factor ( $R$ ) of the structure is expressed as Equation I:

$$R = R^u \cdot \Omega \cdot Y \quad (I)$$

In which coefficient  $Y$  is the ratio of the strength at the first formation of a plastic hinge ( $C_s$ ) to the design seismic base shear coefficient ( $C_w$ ).  $R_u$  is the ductility reduction factor.

The main challenge in determining  $R_u$  is that it requires  $C_{eu}$ , the maximum base shear coefficient assuming elastic behavior. However, because actual structure behavior is non-linear,  $C_{eu}$  cannot be directly obtained. Extensive research has been conducted on the relationship between  $R_u$  and  $C_{eu}$ . Among these studies, Newmark and Hall (1982) proposed a new model where for structures with higher natural periods (above 1 s),  $R_u = \mu_s$ , and for structures with lower natural periods, Equation II applies:

$$\frac{\mu_s}{R_u} = \frac{\mu_s}{\sqrt{2\mu_s - 1}} \geq 1 \quad (II)$$

## 2.4. FE models of 1-story frames

To compare the effects of different stiffener configurations on the behavior of steel plate shear walls, 1-story shear wall models were created in ANSYS. The study focused on evaluating the impact of various reinforcement parameters on the seismic performance of shear walls. Given that horizontal and vertical stiffeners are heavy and difficult to implement, an alternative reinforcement approach using cross-shaped and circular stiffeners was proposed. These non-conventional stiffeners were designed to potentially outperform conventional horizontal and

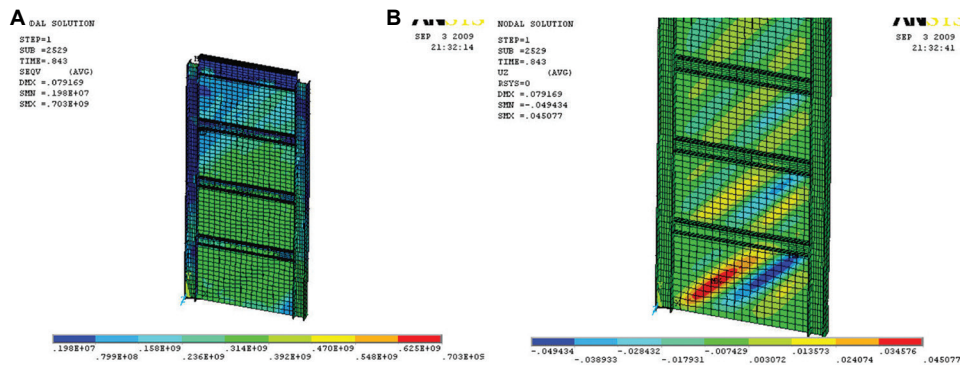


Figure 4. (A) Von Mises stress distribution contour and (B) buckling mode of the shear wall  
Source: Models by the authors.

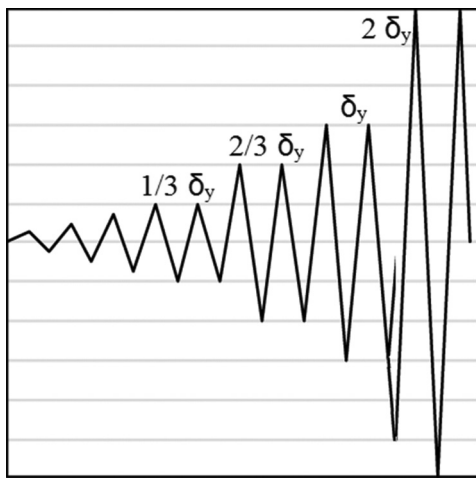


Figure 5. Cyclic loading pattern based on ATC-24 recommendations  
Source: Diagram by the author.

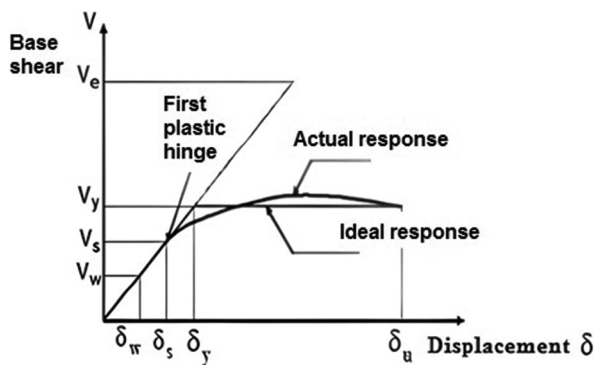


Figure 6. Overall behavior of a conventional structure  
Source: Graph by the authors.

vertical reinforcements. It is important to note that all models had identical section properties, ensuring that weight differences were negligible and the steel material behavior was consistent across all models.

Accordingly, four configurations of cross-shaped and circular stiffeners were modeled, with stiffeners attached to the shear wall in both perpendicular and horizontal orientations. Figures 7 and 8 illustrate the shear wall configurations reinforced with cross and circular stiffeners, respectively. Cross-shaped stiffeners were positioned diagonally, connecting the beam and column ends along the diameters of the wall plane. Similarly, two concentric circular stiffeners were placed on the infill steel plate shear wall in a circular configuration.

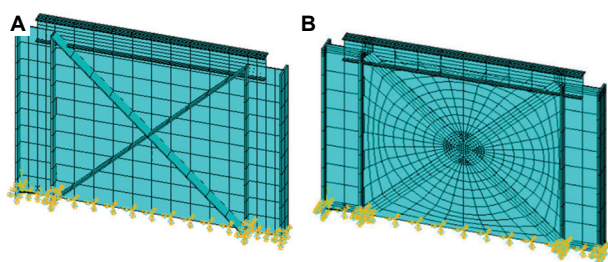
In these models, the width and thickness of both cross and circular stiffeners were 200 mm and 16 mm, respectively, while the thickness of the steel shear wall plate was set at 5 mm for all specimens. Shear walls reinforced with perpendicular and horizontal cross-shaped stiffeners were designated as Stiff-X-P and Stiff-X-H, respectively, while those reinforced with circular stiffeners were denoted as Stiff-C-P and Stiff-C-H.

Moreover, another FE model was created in ANSYS, incorporating both cross and circular stiffeners simultaneously to examine their combined effect on the shear wall's behavior. This model was termed Stiff-XC-H, as the stiffeners were placed horizontally on the steel wall plane. Figure 9 demonstrates the FEM mesh of this configuration.

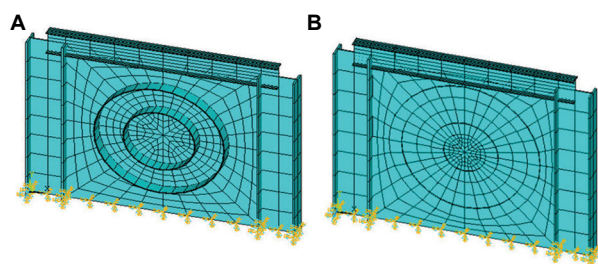
### 3. Results and discussion

#### 3.1. Pushover analysis in 1-story frames

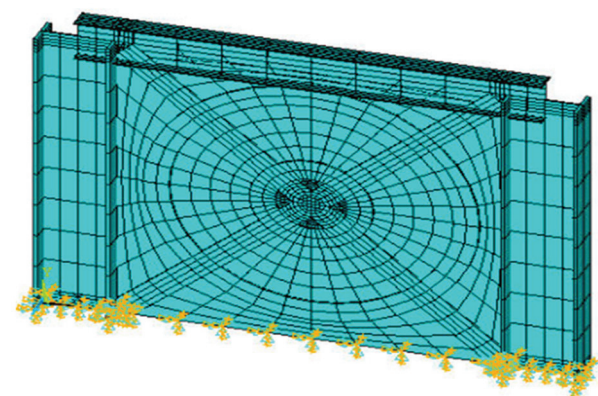
Pushover analysis is commonly applied to assess the seismic capacity of structural systems by generating capacity curves through the application of incremental static loads to an inelastic structural model. Based on the results obtained from the push-over analysis, the ductility factor, response modification factor, frame stiffness, and shear capacity of the models were evaluated, as reported in Table 2.



**Figure 7.** Finite element model mesh of a steel shear wall reinforced with cross stiffeners in (A) perpendicular and (B) horizontal configurations  
Source: Models by the author.



**Figure 8.** Finite element model mesh of a steel shear wall reinforced with circular stiffeners in (A) perpendicular and (B) horizontal configurations  
Source: Models by the author.



**Figure 9.** Finite element model mesh of a steel shear wall reinforced with cross and circular stiffeners in a horizontal configuration  
Source: Model by the authors.

In Table 2,  $K$  represents the system stiffness (kN/mm), while  $V_y$  denotes the shear capacity (kN). The results indicate that the Stiff-C-P model exhibited the highest ductility factor of 29.41, whereas the Stiff-X-P model had the lowest ductility factor of 17.10, highlighting the superior ductility performance of circular stiffeners compared to cross-shaped counterparts. The combined model, Stiff-XC-H, showed the highest response modification factor of 31.22, while the perpendicular cross-stiffened model, Stiff-X-P, exhibited the lowest response modification factor of 17.70.

**Table 2. Results of the pushover analysis of 1-story models in ANSYS**

| Model ID   | $\mu$ | $\Omega$ | $R_u$ | $R$   | $K$ (kN/mm) | $V_y$ (kN) |
|------------|-------|----------|-------|-------|-------------|------------|
| Stiff-C-H  | 23.55 | 2.23     | 6.79  | 21.79 | 743.1       | 4,087      |
| Stiff-C-P  | 29.41 | 1.78     | 7.60  | 19.44 | 591.2       | 4,020      |
| Stiff-X-H  | 22.26 | 2.70     | 6.60  | 25.64 | 816.8       | 4,574      |
| Stiff-X-P  | 17.10 | 2.13     | 5.76  | 17.70 | 796.5       | 5,815      |
| Stiff-XC-H | 19.39 | 3.53     | 6.15  | 31.22 | 921.5       | 5,713      |

In terms of system stiffness, the highest value of 921.5 kN/mm was observed in the Stiff-XC-H model, while the lowest value of 591.2 kN/mm was associated with the Stiff-C-P model. Regarding shear capacity, the highest recorded value was 5,815 kN in the Stiff-X-P model, which had two perpendicular cross reinforcements, whereas the lowest shear capacity of 4,020 kN occurred in the Stiff-C-P model, which featured two perpendicular circular stiffeners.

### 3.2. Energy dissipation in 1-story frames

The amount of energy dissipated by each steel shear wall model can be determined using the area enclosed by the loops in the hysteresis curves. Figures 10-12 present the hysteresis curves for the 1-story frame models analyzed in the previous section. It should be noted that only the first four cycles of all models were selected for the investigation.

According to the hysteresis curves, the Stiff-X-P model exhibits the highest shear capacity and provides the best resistance against steel plate buckling. This can be attributed to the fact that when the steel plate starts to buckle, the stiffener must bend around its strong axis. Since the moment of inertia around the bending axis is higher in the Stiff-X-P model compared to other reinforcement configurations, more energy is dissipated during plate buckling. On the contrary, the Stiff-C-P model, which features two perpendicular circular stiffeners, has the lowest energy dissipation capacity. This occurs because the Stiff-C-P reinforcement covers only a small area of the steel plate along the buckling direction. In addition, this reinforcement has a lower stiffness compared to other configurations. Furthermore, buckling in the steel plate initiates diagonally, extending from one end of the plate's diameter to the opposite end.

The results also indicate that the circular reinforcement perpendicular to the steel shear wall plane (Stiff-C-P) exhibits the highest ductility factor. Therefore, if this reinforcing configuration was combined with perpendicular cross stiffeners (Stiff-X-P) positioned at both ends of the plane's diameter, the overall structural performance could be significantly enhanced. Figure 13

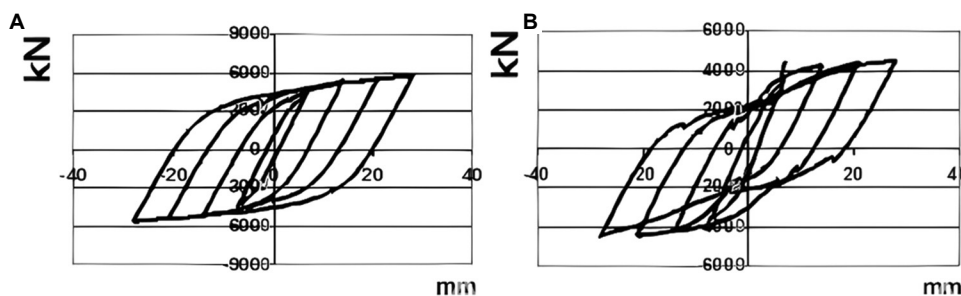


Figure 10. Hysteresis curve of a steel shear wall reinforced with cross stiffeners in (A) perpendicular (Stiff-X-P) and (B) horizontal (Stiff-X-H) configurations  
Source: Graphs by the authors.

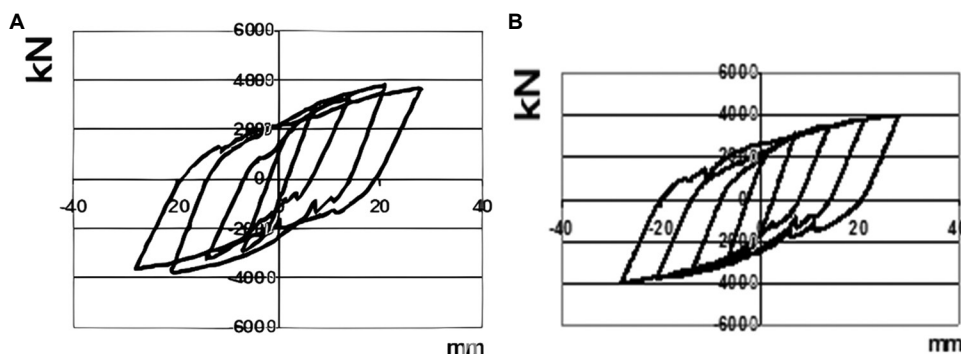


Figure 11. Hysteresis curve of a steel shear wall reinforced with circular stiffeners in (A) perpendicular (Stiff-C-P) and (B) horizontal (Stiff-C-H) configurations  
Source: Graphs by the authors.

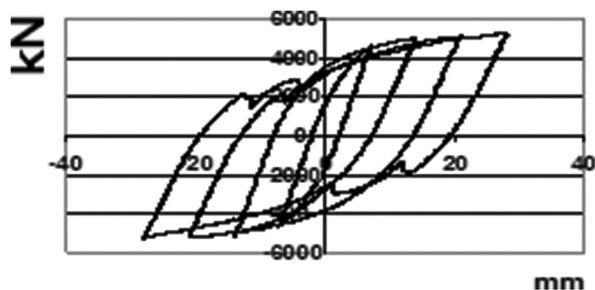


Figure 12. Hysteresis curve of a combined steel shear wall reinforced with cross and circular stiffeners in a horizontal configuration (Stiff-XC-H)  
Source: Graph by the authors.

demonstrates the calculation process used to determine the area enclosed by the hysteresis loops for each cycle, representing the energy dissipation capacity of each stiffening system model. Based on Figure 13, the overall energy dissipation capacity of cross stiffeners is greater than that of circular reinforcements, primarily due to the higher stiffness of cross configurations compared to circular counterparts. Furthermore, the specimens reinforced with cross stiffeners demonstrate improved pinching behavior.

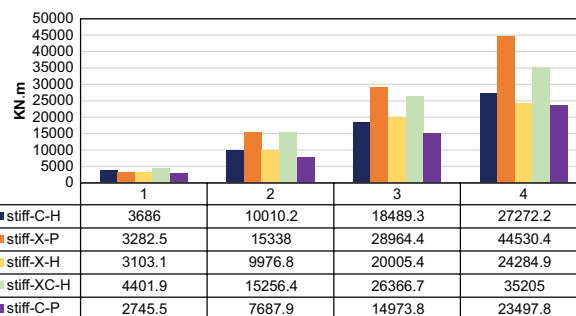


Figure 13. Energy dissipation in 1-story frame models  
Source: Graph by the authors.

### 3.3. Failure pattern in 1-story frames

Non-linear analysis using FEM requires a yield criterion, which is defined as a function of multi-axial stress variables. This function, known as the yield limit, determines the onset of material yielding. One of the most well-known yield criteria is the von Mises yield criterion, which is widely used due to its mathematical simplicity and effectiveness in predicting failure. The von Mises yield criterion states that a material will yield when its von Mises

stress under load equals or exceeds the yield limit of the same material under simple tension. The equivalent stress ( $\sigma_e$ ) is calculated using Equation III:

$$\sigma_e = \left\{ \frac{1}{2} \left[ (\sigma_1 - \sigma_2)^2 + (\sigma_3 - \sigma_1)^2 + (\sigma_2 - \sigma_3)^2 \right] \right\}^{\frac{1}{2}} \quad \text{(III)}$$

where  $\sigma_1$ ,  $\sigma_2$ , and  $\sigma_3$  are the principal stresses. The ANSYS software calculates the equivalent stress using Equation III and presents the output under the abbreviation SEQV. According to this criterion, it is possible to identify the initiation of failure and determine the element from which the failure mechanism begins. Figures 14-16 illustrate the von Mises stress representation of the 1-story frame models analyzed in the previous sections. Based on Table 2, cross-shaped reinforcements provide higher shear capacity than circular reinforcements, enhancing resistance against elastic shear buckling of the infill plate.

### 3.4. Effect of the number of stiffeners on frame performance

The effect of the number of stiffeners on the performance of the reinforced frame structure was evaluated using a set of 3-span, 5-story frames with circular stiffeners arranged in a horizontal configuration. Figure 17 presents the schematics of the frame model mesh for systems with and without circular stiffeners.

To assess the impact of stiffener quantity, the capacity curves and hysteresis loops of frames with 0, 2, 3, and 4 circular stiffeners were compared, as shown in Figures 18 and 19. Initially, pushover analysis was conducted for all models, and their capacity diagrams were generated. By simplifying these curves into ideal bilinear curves, key seismic parameters – such as stiffness, ductility factor, response modification factor, and shear capacity – were determined using ANSYS software. Subsequently, the models were subjected to cyclic loading, and their energy absorption capacities were compared. Incremental

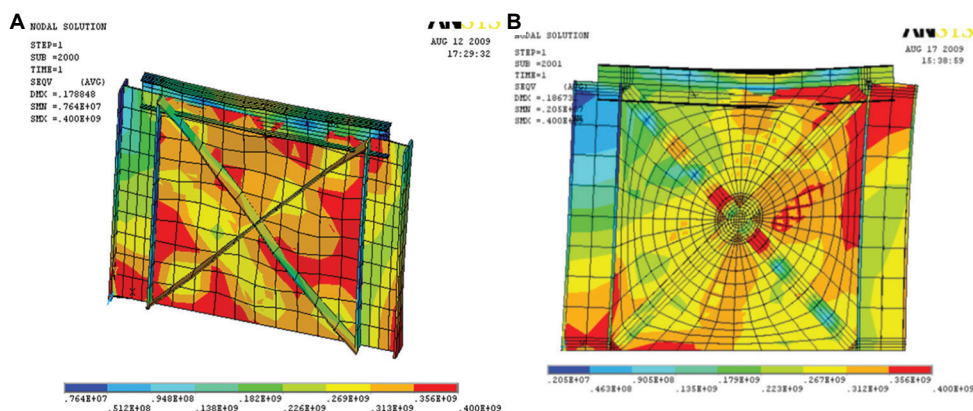


Figure 14. Finite element model mesh of a steel shear wall reinforced with cross stiffeners in (A) perpendicular and (B) horizontal configurations  
Source: Models by the authors.

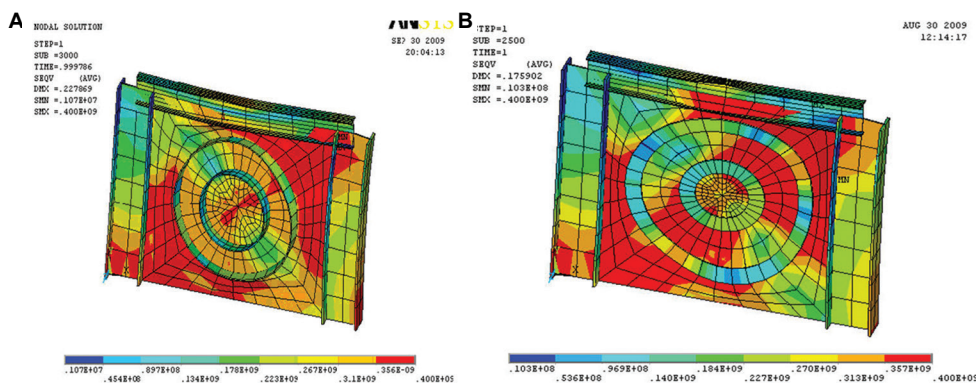


Figure 15. Finite element model mesh of a steel shear wall reinforced with circular stiffeners in (A) perpendicular and (B) horizontal configurations  
Source: Models by the authors.

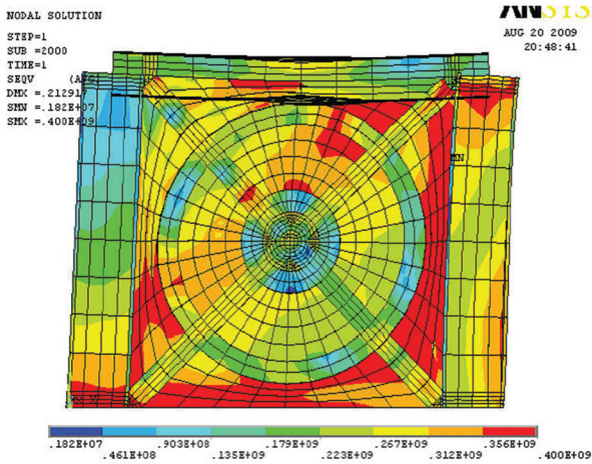


Figure 16. Finite element model mesh of a steel shear wall reinforced with cross and circular stiffeners in a horizontal configuration  
Source: Model by the authors.

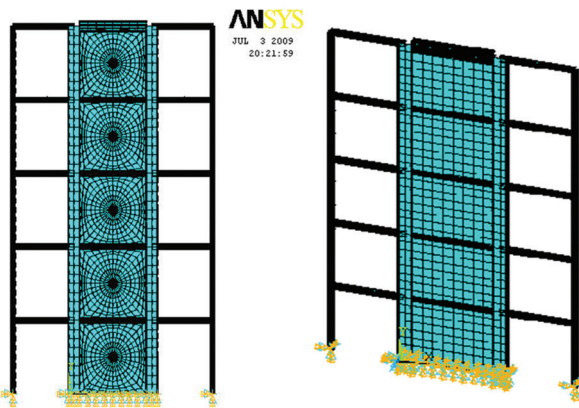


Figure 17. Frame model mesh: (A) with and (B) without horizontal circular stiffeners  
Source: Models by the author.

displacements were applied at the top level of the structure during loading.

Based on the results obtained from the pushover analysis of the 5-story models, the ductility factor, response modification factor, frame stiffness, and shear capacity were evaluated, as reported in Table 3. The results indicate that steel plate shear walls with three perpendicular circular stiffeners exhibit the highest ductility factor of 9.15. On the contrary, unreinforced models display the lowest ductility. Furthermore, the response modification factor and shear capacity are highest in shear walls with three reinforcements.

Table 3. Pushover analysis results for the 5-story models

| Number of circular stiffeners | $\mu$ | $\Omega$ | $R_{\mu}$ | R     | K (kN/mm) | $V_y$ (kN) |
|-------------------------------|-------|----------|-----------|-------|-----------|------------|
| 0                             | 5.91  | 1.46     | 3.29      | 6.9   | 28.8      | 1,957.5    |
| 2                             | 8.91  | 1.51     | 4.10      | 8.89  | 32.3      | 2,100.3    |
| 3                             | 9.15  | 2.00     | 4.16      | 11.97 | 32.6      | 2,120.4    |
| 4                             | 8.52  | 1.46     | 4.01      | 8.42  | 32.7      | 2,058.1    |

According to the graphs of the reinforced models presented in Figure 19, the hysteresis curves exhibit a spindle-shaped behavior, indicating that local and overall buckling of the sheet has been prevented. These curves follow an ever-increasing trend, with the slope, representing stiffness, remaining nearly constant without significant reduction. This consistency suggests that the shear wall performs effectively during seismic events.

In contrast, the hysteresis curves of the unreinforced models exhibit disturbances due to buckling within the shear wall plane, leading to a reduction in energy dissipation during an earthquake. Figure 20 provides a summary of the energy dissipation per loading cycle for all models subjected to cyclic loading. The results indicate that 5-story wall models with four perpendicular circular reinforcements exhibit the highest seismic energy dissipation capacity.

Several limitations must be considered when modeling steel shear walls. These include mesh refinement strategies, element type selection, material behavior modeling, and inherent modeling assumptions. Steel shear walls are complex structures comprising beams, columns, braces, and connections, making it challenging to accurately model all components and their interactions. Material properties, particularly for steel and concrete, can vary significantly, complicating efforts to capture these variations accurately within the model. Furthermore, the behavior of these materials under cyclic loading, a common condition in steel shear walls, is highly complex and difficult to simulate. Even with experimental data, the complexity of these structures and various sources of uncertainty can make the validation process significantly more challenging. Uncertainties in material properties, geometric imperfections, loading conditions, boundary constraints, and model assumptions must be addressed, as they can introduce variability in model predictions. Moreover, modeling steel shear walls can be a time-consuming and costly process, particularly for complex structural systems such as frame-supported steel shear walls.

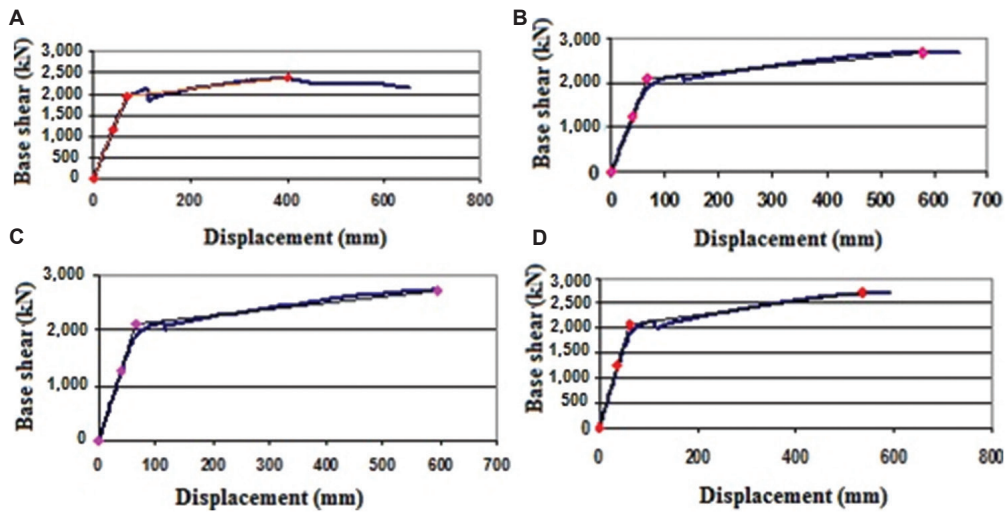


Figure 18. Frame capacity curves for models featuring (A) 0, (B) 2, (C) 3, and (D) 4 horizontal circular stiffeners  
Source: Graphs by the authors.

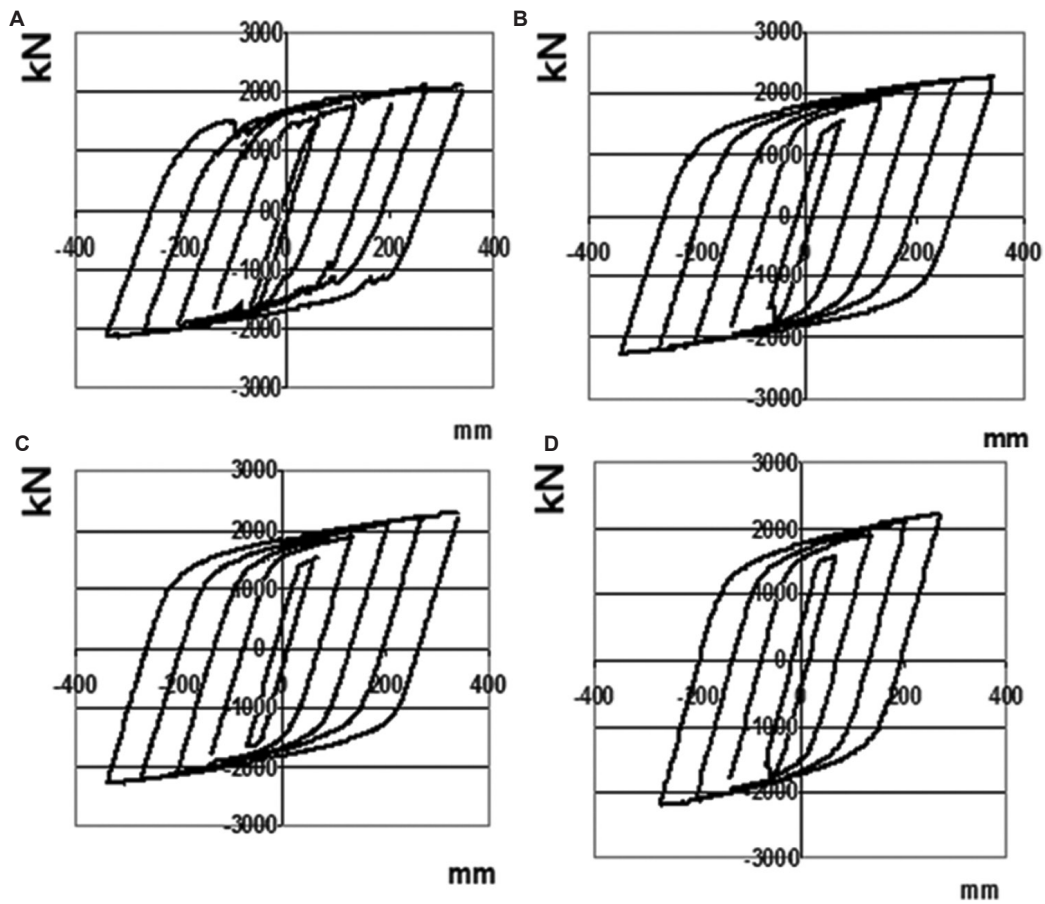


Figure 19. Frame hysteresis loops for models featuring (A) 0, (B) 2, (C) 3, and (D) 4 horizontal circular stiffeners  
Source: Graphs by the authors.

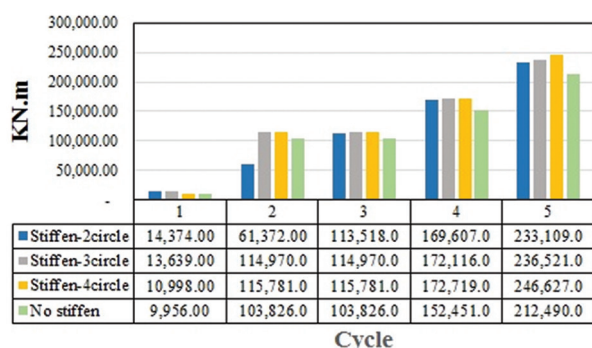


Figure 20. Bar graph of the amount of energy absorption in the tested samples

#### 4. Conclusion

In this research, steel plate shear wall models with perpendicular and horizontal cross-shaped and circular configurations were studied. FE models were created in ANSYS, and after verifying model accuracy and material properties, a series of 3-span, 5-story frame models were created to evaluate the effect of stiffener configurations and quantity. Pushover analyses were performed, and the corresponding capacity curves were generated. Key seismic parameters, including ductility factor, response modification factor, stiffness, and shear capacity, were assessed. Subsequently, the models underwent cyclic loading through incremental displacements, and their energy dissipation capacities were determined.

The following conclusions can be drawn:

- The presence of stiffeners on the infill wall plate improves the non-linear behavior of the shear wall system, enhancing both shear capacity and energy absorption under lateral loads.
- Steel plate shear walls with circular reinforcement exhibit higher ductility factors than those with cross-shaped reinforcement. In 1-story models, perpendicular circular stiffeners achieve the highest ductility factor of 29.41, whereas perpendicular cross stiffeners display the lowest ductility factor of 17.10.
- Cross-shaped reinforcements provide greater shear capacity than circular reinforcements, effectively preventing elastic shear buckling of the infill plate. For example, the shear capacity of 1-story frames with perpendicular circular stiffeners is approximately 4,020 kN, whereas that of cross-shaped stiffeners is 5,810 kN, representing a 45% increase.
- Analysis of hysteresis curves reveals that shear wall models with cross-shaped reinforcements dissipate more energy than those with circular configurations. The highest energy dissipation is observed in the model with four cross-shaped stiffeners, reaching

44,530.4 kN·m, compared to 35,205 kN·m for circular reinforcements, which is 21% lower. This difference is primarily due to the higher stiffness of cross-shaped configurations compared to circular counterparts.

- The optimum number of perpendicular circular stiffeners is four for achieving maximum energy dissipation capacity, measured at 246,627 kN·m, and three for attaining the highest ductility (9.15), response modification factor (11.97), and shear strength (2,120.4 kN).
- Models with combined cross-circular reinforcements exhibit the highest frame stiffness, reaching 921.5 kN/mm, whereas the lowest stiffness is recorded in perpendicular circular stiffener frames, with 591.2 kN/mm.

#### Acknowledgments

None.

#### Funding

None.

#### Conflict of interest

The authors declare that they have no competing interests.

#### Author contributions

*Conceptualization:* Morteza Naghipour

*Formal analysis:* Abbasali Jahani, Seyed Mohammad Reza Hasani

*Investigation:* Abbasali Jahani, Seyed Mohammad Reza Hasani

*Methodology:* All authors

*Writing – original draft:* Abbasali Jahani, Seyed Mohammad Reza Hasani

*Writing – review & editing:* Seyed Mohammad Reza Hasani, Morteza Naghipour

#### Ethics approval and consent to participate

Not applicable.

#### Consent for publication

Not applicable.

#### Availability of data

Data can be provided on reasonable request.

#### References

- Astaneh-Asl, A. (2001). *Seismic Behavior and Design of Steel Shear Walls*. Moraga, CA: Structural Steel Educational Council.
- Bai, J., Huang, J., Chen, H., Xu, L., Wang, Y. H., & Jin, S. (2022). Loading protocols for seismic qualification of steel plate

- shear walls. *Structures*, 38:848-860.  
<https://doi.org/10.1016/j.istruc.2022.02.020>
- Basler, K. (1961). Strength of plate girders in shear. *Journal of the Structural Division*, 87(7):151-180.  
<https://doi.org/10.1061/JSDEAG.000069>
- Beyranvand, S., & Hosseini, M. (2022). Studying the effect of thickness, diameter, and arrangement of hemispherical ridges in steel shear walls. *Journal of Civil Engineering and Structures*, 6(1):13-17.  
<https://doi.org/10.21859/jces.6142>
- Chen, Z., Amer, M., Du, Y., Mashrah, W. A. H., Zhao, B., & Huang, J. (2023). Experimental and numerical study on seismic performance of square and I-shaped Concrete-filled steel tubes column Frame-Buckling steel plate shear walls. *Engineering Structures*, 274:115155.  
<https://doi.org/10.1016/j.engstruct.2022.115155>
- Driver, R. G., Kulak, G. L., Kennedy, D. L., & Elwi, A. E. (1998). Cyclic test of four-story steel plate shear wall. *Journal of Structural Engineering*, 124(2):112-120.  
[https://doi.org/10.1061/\(ASCE\)0733-9445\(1998\)124:2\(112\)](https://doi.org/10.1061/(ASCE)0733-9445(1998)124:2(112))
- Ebadi-Jamkhaneh, M., & Kontoni, D. P. N. (2022). Numerical finite element investigation of thin steel shear walls retrofitted with CFRP layers under reversed cyclic loading. *Journal of Building Pathology and Rehabilitation*, 7(1):62.  
<https://doi.org/10.1007/s41024-022-00200-2>
- Elgaaly, M., & Liu, Y. (1997). Analysis of thin-steel-plate shear walls. *Journal of Structural Engineering*, 123(11):1487-1496.  
[https://doi.org/10.1061/\(ASCE\)0733-9445\(1997\)123:11\(1487\)](https://doi.org/10.1061/(ASCE)0733-9445(1997)123:11(1487))
- Es'haghioskui, F., Asl, M. H., Hosseinzadeh, Y., & Gallego, E. (2023). Experimental and numerical investigation of a new type of steel plate shear wall with diagonal tension field guiding stiffeners. *Journal of Building Engineering*, 76:107181.  
<https://doi.org/10.1016/j.jobe.2023.107181>
- Ghamari, A., & Johari Naeimi, A. (2023). Investigating the seismic behaviour of high-performance steel plate shear walls. *Proceedings of the Institution of Civil Engineers-Structures and Buildings*, 176(3):177-189.  
<https://doi.org/10.1680/jstbu.20.00108>
- Hao, J., Li, S., Tian, W., & Wu, X. (2023). Seismic performance of coupled steel plate shear wall with slits. *Journal of Constructional Steel Research*, 201:107674.  
<https://doi.org/10.1016/j.jcsr.2022.107674>
- Je Too, R. Y., & Isoda, H. (2023). Seismic performance of CLT shear wall infilled hybrid steel frames with concealed steel plates and drift pin connections. *Journal of Structural Engineering*, 149(9):04023111.  
<https://doi.org/10.1061/JSENDH.STENG-12074>
- Labibzadeh, M., & Khayat, M. (2023). Damage assessment of stiffened steel plate shear walls with different configurations under far-fault and near-fault ground motions. *Journal of Constructional Steel Research*, 200:107685.  
<https://doi.org/10.1016/j.jcsr.2022.107685>
- Lubell, A. S., Prion, H. G., Ventura, C. E., & Rezai, M. (2000). Unstiffened steel plate shear wall performance under cyclic loading. *Journal of structural Engineering*, 126(4):453-460.  
[https://doi.org/10.1061/\(ASCE\)0733-9445\(2000\)126:4\(453\)](https://doi.org/10.1061/(ASCE)0733-9445(2000)126:4(453))
- Mimura, H., & Akiyama, H. (1977). Load-deflection relationship of earthquake resistant steel shear walls with a developed diagonal tension field. *Transactions of AIJ*, 260:109-114.  
[https://doi.org/10.3130/AIJSAXX.260.0\\_109](https://doi.org/10.3130/AIJSAXX.260.0_109)
- Nayel, I. H., Broujerdian, V., & Ghamari, A. (2022). Investigating the behavior of semi-supported steel plate shear walls compounded of two flat and two corrugated plates: A numerical and parametrical study. *International Journal of Civil Engineering*, 20(10):1197-1210.  
<https://doi.org/10.1007/s40999-022-00726-z>
- Newmark, N. M., & Hall, W. J. (1982). *Earthquake Spectra and Design. Engineering Monographs On Earthquake Criteria*. Oakland, CA: Earthquake Engineering Research Institute.
- Parvizi, M., Fathi, M., Zamani, S. S. M., Shakib, H., & Karami, A. (2022). Experimental and numerical study of concrete frames with steel plate shear walls. *Journal of Constructional Steel Research*, 196:107404.  
<https://doi.org/10.1016/j.jcsr.2022.107404>
- Qiao, W., Zhang, X., Xu, Q., & Wang, G. (2023). Seismic performance of thin-walled steel and concrete composite column-corrugated steel shear wall structure. *Journal of Constructional Steel Research*, 201:107745.  
<https://doi.org/10.1016/j.jcsr.2022.107745>
- Sabouri-Ghomi, S., & Gholhaki, M. (2008). Ductility of thin steel plate shear walls. *Asian Journal of Civil Engineering (Building and Housing)*, 9(2):153-166.  
[https://doi.org/10.1061/41016\(314\)109](https://doi.org/10.1061/41016(314)109)
- Shi, Y., Luo, Z., Xu, Y., Zou, Y., Xu, L., & Ma, Q. (2022). Experimental study on the seismic behavior of high-performance cold-formed steel plate shear walls. *Engineering Structures*, 251:113552.  
<https://doi.org/10.1016/j.engstruct.2021.113552>
- Takahashi, Y., Takemoto, Y., Takeda, T., & Takagi, M. (1973). Experimental study on thin steel shear walls and particular bracings under alternative horizontal load. In: *Preliminary Report, IABSE, Symp. On Resistance and Ultimate Deformability of Structures Acted on by Well-defined Repeated Loads*. Lisbon, Portugal: IABSE, p. 185-191.

<https://doi.org/10.5169/seals-13766>

- Thorburn, L. J., Montgomery, C. J., & Kulak, G. L. (1983). *Analysis of Steel Plate Shear Walls. Structural Engineering Report No. 107*. Edmonton, Alta: Department of Civil Engineering, University of Alberta.
- Wagner, H. (1931). *Flat Sheet Metal Girders with Very Thin Metal Web. Part I: General Theories and Assumptions (No. NACA-TM-604)*. Available from: <https://hdl.handle.net/2060/19930094812> [Last accessed on 2025 Mar 18].
- Wang, W., Quan, C. C., Li, Y., Zhen, G. K., & Zhao, H. T. (2022). Experimental study and numerical simulation analysis on seismic performance of corrugated steel-plate shear wall with replaceable bottom corner dampers. *Soil Dynamics and Earthquake Engineering*, 152:107061.  
<https://doi.org/10.1016/j.soildyn.2021.107061>
- Wu, Y., Fan, S., Zhou, H., Guo, Y., & Wu, Q. (2022). Cyclic behaviour of diagonally stiffened stainless steel plate shear walls with two-side connections: Experiment, simulation and design. *Engineering Structures*, 268:114756.  
<https://doi.org/10.1016/j.engstruct.2022.114756>
- Xing, Y., Wang, W., Ou, Y., Jiang, X., & Al-azzani, H. (2022). Seismic behavior of steel truss and concrete composite shear wall with double X-shaped braces. *Journal of Building Engineering*, 62:105399.  
<https://doi.org/10.1016/j.jobe.2022.105399>
- Yang, J., Sun, C., Xu, X., Fang, Y., & Sun, B. (2023). Experimental study on seismic behavior of a new precast shear wall system with angle steel connectors. *Structures*, 52:30-41.  
<https://doi.org/10.1016/j.istruc.2023.03.166>
- Yu, J. G., Zhu, S. Q., & Feng, X. T. (2023). Seismic behavior of CFRP-steel composite plate shear wall with edge reinforcement. *Journal of Constructional Steel Research*, 203:107816.  
<https://doi.org/10.1016/j.jcsr.2023.107816>
- Zhang, J., Liu, J., Zhang, D., & Huang, X. (2022). Hysteretic behavior of high-performance frame-shear wall composite structure with high-strength steel bars. *Journal of Building Engineering*, 45(3):103416.  
<https://doi.org/10.1016/j.jobe.2021.103416>
- Zhang, Y., Huang, Z., Liu, Z., Jin, B., & Wang, Y. (2022). Seismic behaviour of prefabricated self-centring steel frames with different energy dissipation devices. *Structures*, 38:502-518.  
<https://doi.org/10.1016/j.istruc.2021.12.081>

## ORIGINAL ARTICLE

Spatial analysis of urban garden space  
production in relation to rural land use: A case  
study of Zanjan CityManijeh Ahmadi<sup>1</sup>, Zahra Khodakarami<sup>2</sup>, Ahmad Asadi<sup>3</sup>,  
Mohammad Taghi Heydari<sup>4\*</sup>, and Mohammad Sadeg Azizi<sup>2</sup><sup>1</sup>Department of Geography, Faculty of Humanities, University of Zanjan, Zanjan, Iran<sup>2</sup>Department of Geography and Rural Planning, Faculty of Geography, Kharazmi University, Tehran, Iran<sup>3</sup>Department of Geography and Urban Planning, Faculty of Humanities, Bozorgmehr University of Qaenat, Qaen, Iran<sup>4</sup>Department of Geography and Urban Planning, Faculty of Humanities, University of Zanjan, Zanjan, Iran**Abstract**

The present study examines land use pattern changes from a food security perspective. In this study, Landsat series satellite images were classified using R software, applying two different classification methods: Neural network and random forest. These methods were applied to satellite images from five different years – 2000, 2005, 2010, 2015, and 2020. The findings indicate a growing trend in Garden City development, driven by the conversion of barren lands and pastures into gardens and arboretums. This transformation can have both potential positive and negative impacts on the region's physical and environmental indicators. In addition, the expansion of urban and industrial spaces has been one of the primary causes of natural vegetation loss. Furthermore, an analysis of land cover changes from 2000 to 2020 using IDRISI TerrSet software revealed that a significant portion of barren land was converted into tree plantation. This shift is in line with the expansion of Garden City activities in the studied area, particularly in the past decade.

**Keywords:** Production of space; Garden City; Land use; Food security; Zanjan City

---

**\*Corresponding author:**  
Mohamad Taghi Heydari  
(Mt.heydari@znu.ac.ir)**Citation:** Ahmadi, M., Khodakarami, Z., Asadi, A., Heydari, M.T. & Azizi, M.S. (2025). Spatial analysis of urban garden space production in relation to rural land use: A case study of Zanjan City. *Journal of Chinese Architecture and Urbanism*, 7(3): 6234. <https://doi.org/10.36922/jcau.6234>**Received:** November 18, 2024**Revised:** February 11, 2025**Accepted:** February 20, 2025**Published online:** March 20, 2025**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.**1. Introduction**

Urban food supply has gained prominence in academic discourse (Zerbian & Romero, 2021). In 2020, an estimated 720 – 811 million people worldwide faced hunger, highlighting the urgency of addressing food security (Food and Agriculture Organization [FAO] *et al.*, 2021). Despite global efforts, progress toward the Sustainable Development Goal (SDG) of ensuring year-round access to safe, nutritious food for all remains insufficient, and malnutrition persists. One promising approach to enhancing food security and livelihoods is urban agriculture. By cultivating crops and raising livestock within city boundaries, urban agriculture strengthens local food systems

(Orsini *et al.*, 2013). Recognizing its potential, planners and policymakers in both the Global South and Global North are increasingly integrating urban agriculture into city-region food systems. Initiatives such as the Milan Urban Food Policy Pact and the New Urban Agenda underscore the responsibility of urban governments in fostering sustainable food systems (Cabannes & Ross, 2018).

Urban community gardens contribute not only to food security but also to climate resilience by mitigating extreme temperatures. This dual benefit is particularly relevant for dryland metropolises (Zhang *et al.*, 2022). Zezza and Tascioti (2010) define urban agriculture as the production of crops and livestock within city and town limits. Their research across multiple countries reveals a positive correlation between urban agricultural practices and improved household dietary diversity.

In China, the government has implemented various policies to promote the development of Garden Cities. For example, Beijing's Garden City initiative integrates green spaces and public areas into the city's urban structure. Similar efforts are being implemented in other major Chinese Cities, with recent development plans aiming to increase Beijing's urban forest coverage to over 45% by 2035.

Urban gardens have played a significant role in shaping cities throughout history, evolving from traditional "community gardens" to more contemporary urban spaces, sparking renewed interest in urban gardening (Ribeiro *et al.*, 2023). However, when considering food security, it is essential to recognize that environmental conditions vary significantly across countries. Simply adopting models from other contexts without accounting for local differences and environmental characteristics is not a viable strategy. Within the framework of Iran's National Food and Nutrition Security policy, the principle of "thinking globally and acting regionally" is crucial. While policymakers can draw on global experiences and existing knowledge, they must also prioritize indigenous knowledge and localization strategies (Soltani & Sharifi., 2022). This balanced approach ensures that strategies align with Iran's unique context while benefiting from international best practices. The concept of Garden Cities gained prominence in Iran when the government proposed their development in 2007. The plan aimed to establish Garden City complexes across 30 provinces, adhering to specific guidelines. These cities were designed to feature abundant green spaces, rivers, and artificial lakes while deliberately avoiding high-rise buildings (Research Center of the Islamic Council, 2013). By integrating natural elements and sustainable design principles, Garden

Cities contribute to both environmental well-being and community resilience.

Rooted in the European Garden City movement and the village-town planning tradition, the Garden City concept has significantly influenced urban development in Iran (Yaghoubi & Hamidi, 2015). However, its implementation in Iran has followed a distinct trajectory, primarily characterized by the segregation and transformation of agricultural and garden lands surrounding cities. Initially, housing cooperatives, and later the private sector, converted these lands into new urban gardens. While this approach has both advantages and disadvantages, the proliferation of gardens around cities – particularly in major urban centers – has become a noticeable phenomenon. Rapid land-use changes have affected not only designated garden areas but also surrounding agricultural lands, giving rise to several critical issues. One major issue is the rising prices of garden plots and the conversion of agricultural lands into garden complexes, which have reshaped the urban landscape. In addition, the emergence of speculative land trading practices has further complicated the situation, leading to new urban challenges. Moreover, economic considerations often take precedence over social benefits, resulting in haphazard urban expansion. Rather than serving agricultural purposes, these lands are increasingly treated as commodities.

Excessive water consumption due to garden development has also contributed to water scarcity and lowered groundwater levels. Furthermore, gardens have been subdivided and transformed into villas, often with uncontrolled construction practices. Finally, the changing urban fabric has introduced social and security issues; stratification in settlement patterns has become evident, and a novel pattern of land trading has emerged (Daviran, 2023).

The ongoing trend of converting agricultural lands into urban spaces poses a significant risk to both gardens and farmlands on the outskirts of cities. This transformation has far-reaching consequences, including irreparable damage to the country's food security. Studies indicate that each hectare of converted agricultural land jeopardizes the food security of approximately 20 people, underscoring the critical impact of land-use changes on Iran's overall food availability (Safari, 2023). At present, there are approximately 2,400 sqm of agricultural land per Iranian citizen. However, this apparent abundance contrasts sharply with the reality of malnutrition and food insecurity. According to the FAO's 2020 report, 5.5% of Iran's total population faced malnutrition, and 2.8% experienced food insecurity (FAO, 2021, as cited in Safari, 2023). Zanjan, a province in Iran, grapples with

the conversion of agriculturally productive lands into non-productive and consumptive areas. The University of Medical Sciences established the first Garden City in Zanjan in 2001. Since then, the trend has accelerated, with nearly 80 Garden Cities currently existing in the province. These Garden Cities cover a total area of approximately 2,907 ha, subdivided into 23,605 plots of varying sizes (Yaghoubi & Hamidi, 2015).

In the present study, the central research question revolves around understanding the underlying patterns governing the production of Garden Cities in Zanjan and assessing the quantitative and qualitative impact of this growth on the affected lands.

## 2. Research background

A variety of studies have explored the potential of home gardens and urban agriculture in addressing food security, urban sustainability, and sustainable development, though challenges remain in fully realizing their benefits.

Du Toit *et al.* (2022) examined why home gardens fail to significantly improve food security in South Africa. Their study revealed that, despite 72% of households growing vegetables and fruits, only 10% were fully food secure. Barriers to success included cultural practices favoring ornamental plants, reliance on purchased food, and a lack of dietary diversity. Similarly, Ghosh (2021) pointed out that home gardens in Dubbo, Australia, could significantly contribute to local food production if optimized, though factors such as land size, configuration, and cultural practices influence their success.

Blanco Pastor *et al.* (2023) emphasize the potential of Garden City models to foster decentralized, self-reliant, and sustainable urban growth. They argue that integrating these principles into urban planning can revitalize existing settlements and mitigate food insecurity through community-driven projects. Ribeiro *et al.* (2023) echo this sentiment, highlighting how urban gardens can reclaim abandoned spaces while offering additional benefits beyond food security, including improved public health, environmental sustainability, and educational opportunities.

Thaman (1995) further argues that small-scale urban food gardening plays a critical role in food security, especially in rapidly urbanizing small island nations, though policymakers often overlook its potential. Wu & Fang (2022) emphasize that urban land use policies in China should prioritize green spaces and sustainable development to align urban growth with environmental preservation and improved quality of life.

Shi *et al.* (2023) and the Beijing Municipal Commission of Planning and Natural Resources (2024) highlight the

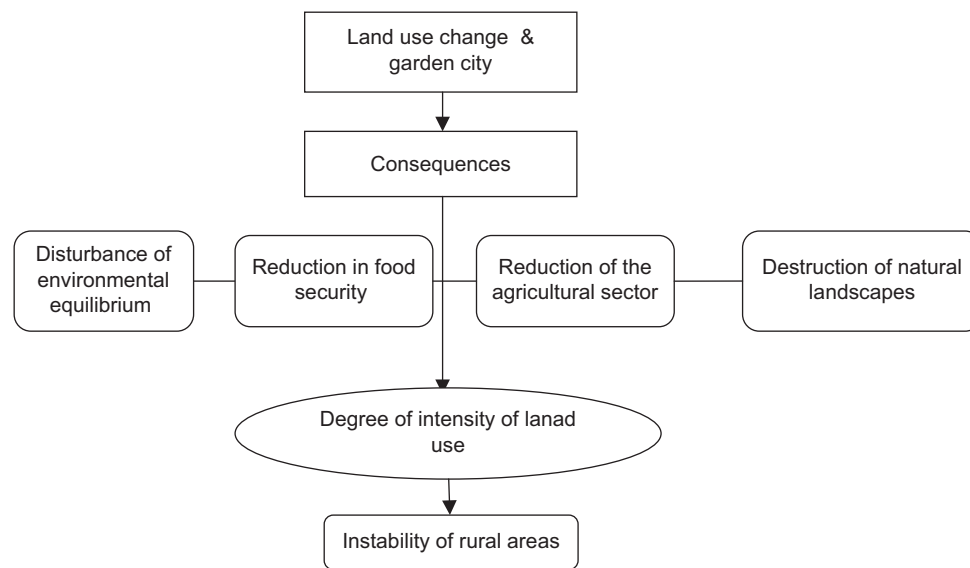
role of urban green spaces, particularly river restoration projects, in fostering sustainable cities. These initiatives contribute to the Garden City concept by integrating nature with urban spaces, though their success may be influenced by regional climatic conditions.

Amirzadeh Moradabadi (2017) underscores the importance of strategic investments in agricultural infrastructure, including the optimization of water resources and the selection of plant species suited to local environments. Such investments are vital for ensuring long-term food security. In addition, Reyhan Kalvanagh *et al.* (2023) argue that the failure to integrate Garden City principles into urban development plans often leads to the loss of fertile agricultural land and the emergence of inefficient peri-urban spaces.

Thus, while the integration of urban agriculture and Garden City models can significantly enhance food security and sustainability, their success hinges on overcoming barriers such as cultural practices, reliance on external food sources, and inefficient land use. Strategic investments in infrastructure, land use policies that prioritize green spaces, and the promotion of community-based initiatives can amplify the impact of home gardens and urban agriculture, fostering more resilient, self-sustaining urban communities. Ultimately, the key to success lies in the effective coordination of urban planning, agricultural policies, and environmental sustainability.

## 3. Research area and methodology

The concept of the Garden City was first introduced by Howard in 1898 in England. His aim was to create cities that combined the advantages of both urban and rural living while mitigating the drawbacks of each. This idea quickly spread across the globe and significantly influenced urban planning in various countries (Howard, 1898). In recent years, numerous studies have been conducted on Garden Cities and their influence on sustainable urban development. For example, the Research Frontiers Report 2023, published by the Institute of Science and Development, Chinese Academy of Sciences, and Clarivate, highlights emerging trends in urban planning and the importance of integrating green spaces into urban development (Institutes of Science and Development *et al.*, 2023). The Garden City model was initially designed to address the social, economic, and environmental issues arising from the 19<sup>th</sup>-century industrial revolution by integrating the advantages of urban and rural areas into new rural settlements (Blanco Pastor *et al.*, 2023). Sustainability-based urban gardens have flourished worldwide, shaped by a diverse array of social, cultural, political, and geographical contexts. These modern



**Figure 1.** Land use and its changes from a sustainability perspective  
Source: Flowchart by the author.

iterations vary in purpose and include social gardens, urban organic gardens, community gardens, recreational gardens, domestic gardens, and educational gardens. The diversity in nomenclature reflects their distinct objectives (Ribeiro *et al.*, 2023). [Figure 1](#) illustrates land use and its changes from a sustainability perspective.

Similarly, the Iranian garden has evolved by adapting to different environmental and socio-political conditions, creating a functional spatial environment that meets emerging urban needs. Historical sources indicate that the Iranian garden has reinvented itself in various forms over centuries. Its enduring presence and sustained form throughout history highlight its deep interconnection with Iranian cultural, social, and ecological systems (Khansari *et al.*, 2004). In the 20<sup>th</sup> century, the concept emerged with Howard's (1898) theories on the Garden City. Following the urban transformations of the Pahlavi era (1925 – 1979) and modernization efforts, it became one of the key urban planning models under discussion in Iran.

However, in recent decades, capitalism, land-use changes, and urban neoliberalism have profoundly transformed the nature of Iranian Garden Cities (Shah & Ali, 2022). The rapid expansion of large-scale construction and the conversion of urban gardens – particularly in cities, such as Tehran and Mashhad – reflect the economic pressures imposed on traditional Garden City spaces (Mirzaei & Rezaei, 2021). Studies indicate that contemporary Iranian garden cities in regions such as Karaj, Mashhad, and Isfahan face water supply crises and deteriorating soil quality, threatening their ecological sustainability (UNESCO, 2023).

One of the most significant drivers behind the expansion of Garden Cities in Iran is the intervention of capitalism in the urban spatial system. This process can be analyzed in several key dimensions:

- Urban neoliberalism and marketization: According to Harvey's theories (2006), urban neoliberalism – characterized by marketization and land privatization – leads to the conversion of traditional spaces to serve capitalist interests. This theory asserts that market-driven economic policies commodify urban space, often at the expense of social and cultural values. Research by Shah & Ali (2022) indicates that in Iran, the privatization of garden land has resulted in its repurposing into villa-city projects. While these changes generate economic benefits for investors, they contribute little to local food production or ecological diversity.
- Investment by large corporations in new developments: Research by Hosseini and Amini (2023) indicates that major corporate investments in new urban developments – often marketed as Garden Cities with a green façade – frequently fail to meet environmental sustainability standards. These projects exploit the economic value of garden lands, prioritizing profit over ecological preservation.
- Increasing spatial inequality: Esfandiar & Fadaei (2022) demonstrate that class segregation and land monopolization by affluent groups exacerbate spatial inequality, restricting low-income populations' access to green spaces and locally produced food.
- Decline in food security: The widespread privatization of garden lands in suburban areas has significantly reduced local food production, limiting access to

affordable, fresh food for vulnerable communities. The conversion of agricultural land into residential and commercial developments not only worsens food inequality but also undermines urban food supply sustainability (Esfandiari & Fadaei, 2022; Soltani & Sharifi, 2022).

The City of Zanjan, located on the Tehran–Tabriz route, is one of the major urban centers in eastern Zanjan province, Iran. It sits at an average elevation of 1,640 m above sea level (Molaei Yeganeh, 2019). With a population exceeding 430,000 and a land area of 6,500 ha, Zanjan City serves as the provincial capital (Daviran, 2023). Due to its climate and geographical conditions, the areas surrounding Zanjan are primarily dedicated to agricultural and horticultural activities, alongside industrial development. Figure 2 presents the distribution of Garden Cities around Zanjan (Zanjan Province Agricultural Jihad Organization, 2023).

At present, 41 Garden City complexes exist in Zanjan, with names, such as Medical Sciences, Savalan, Rezvan, Eram, Ferdous, Negin, Reza, Farhangian, Ishraq Sabz, Eram Gharbi, Geisha, and others (Zanjan Province Agricultural Jihad Organization, 2023). The majority of these gardens are located west of Zanjan City, near the old freeway axis connecting Zanjan to Tabriz. Figure 3 shows the location of Garden Cities around Zanjan.

This study utilized annual mean cloud-free images from the TM5 and OLI sensors of the Landsat satellite with a spatial resolution of 30 m for the years 2000, 2005, 2010, and 2020 (Table 1). These pre-processed images were downloaded from Google Earth Engine and stored for further analysis. In the next step, normalized difference

vegetation index (NDVI) maps (Figure 4) were generated using Google Earth Engine, and the stratified random sampling method was applied to extract NDVI pixels for 5 time-series images. The extracted data were classified into six vegetation classes, and sample points were harvested for classification using machine learning algorithms in R software. Image classification was performed using random forest (RF) methods and the deep learning neural network (NNET). The classified images from the 5 time-series datasets were then imported into IDRISI SELVA software to analyze land cover changes in the study area. This software was used to extract and assess all types of land cover changes based on the classified images.

RF is a powerful machine learning algorithm for land cover classification. Numerous studies have shown its reliability and high accuracy in land use and land cover mapping (Alshari *et al.*, 2023; Nguyen *et al.*, 2018; Sun & Ongsomwang, 2023). Compared to other classifiers, such as support vector machines and maximum likelihood classifiers, RF has been shown to perform more effectively in generating accurate and robust land cover maps over large areas. The optimization of RF parameters for land

Table 1. Specifications of satellite images

| Sensor      | Spatial resolution (m) | Year |
|-------------|------------------------|------|
| Landsat TM  | 30                     | 2000 |
| Landsat TM  | 30                     | 2005 |
| Landsat TM  | 30                     | 2010 |
| Landsat OLI | 30                     | 2015 |
| Landsat OLI | 30                     | 2020 |

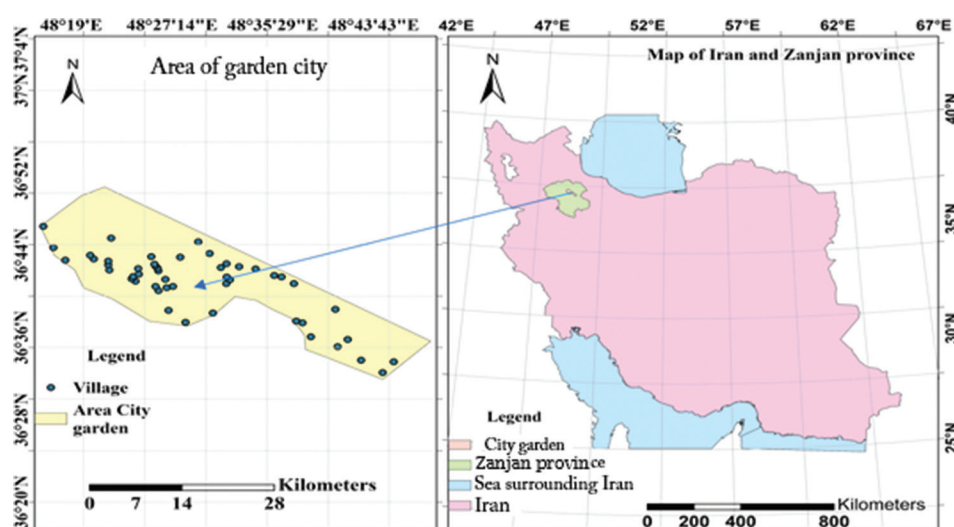


Figure 2. The studied area in Zanjan province and the country  
Source: Drawing by the authors based on a 2022 map.

cover classification has been extensively studied, providing valuable insights into its effective application in remote sensing. Due to its strong generalization ability and resistance to overfitting, RF remains one of the most widely used and reliable classifiers in land use and land cover studies.

The NNET consists of multiple layers that form an NNET capable of performing complex analyses and predictions (Goodfellow *et al.*, 2016). These models are powerful tools in deep learning and artificial intelligence, particularly in remote sensing and satellite image classification. The application of NNET-based classification methods in satellite image analysis is a rapidly growing research field. NNETs, especially deep learning-based methods, have been successfully employed for various remote sensing tasks, such as spatio-temporal integration, time-series map classification, burned area estimation, and land use and land cover identification. For example, Jia *et al.* (2021) proposed a hybrid spatio-temporal deep learning method to address the disparity between spatial and temporal resolution in satellite imagery. Similarly, Priya and Vani (2019) demonstrated the effectiveness of deep learning models in forest fire classification and detection using satellite images. These

NNET-based approaches enable various applications, such as monitoring forest fires, estimating burned areas, and identifying land use patterns. The increasing adoption of NNETs in satellite image classification highlights their potential to address a wide range of remote sensing applications. Figure 4 shows the annual NDVI map of 2020. Figure 5. Shows the overall process and framework of the research methodology.

### 4. Results and discussion

To extract land cover types in the study area, the annual vegetation index (Figure 6) for the selected time periods was analyzed alongside Google Earth time-series images, Landsat satellite images, and field studies. In addition, the principal component analysis map was used for feature extraction (Figure 9), effectively distinguishing urban, rural, and human-made spaces. In addition, NDVI and normalized difference built-up indices (Figure 8) were utilized to extract vegetation samples and other relevant indices for classification in the machine learning model. Training datasets were generated through the simultaneous use of these tools for different time intervals, using random sampling to classify land cover into six classes. The datasets were then processed in the R software environment, with 75% for training and 25% for testing, to obtain the following results. Figure 7 shows the sample satellite image used in classification.

This study employed two supervised classification methods – artificial NNETs and RF – to generate land cover maps from Landsat series satellite images. The artificial NNET, a deep learning algorithm, and the RF model, a decision tree-based learning algorithm, were

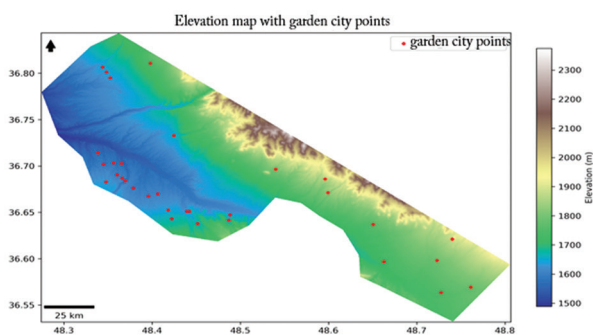


Figure 3. The location of the surrounding garden cities of Zanjan Source: Drawing by the authors.

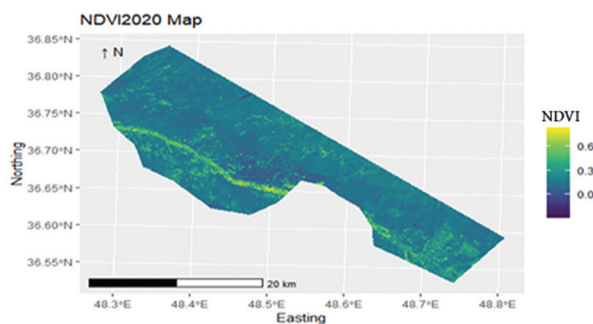


Figure 4. Annual NDVI map of 2020 Source: Map by the authors. Abbreviation: NDVI: Normalized difference vegetation index.

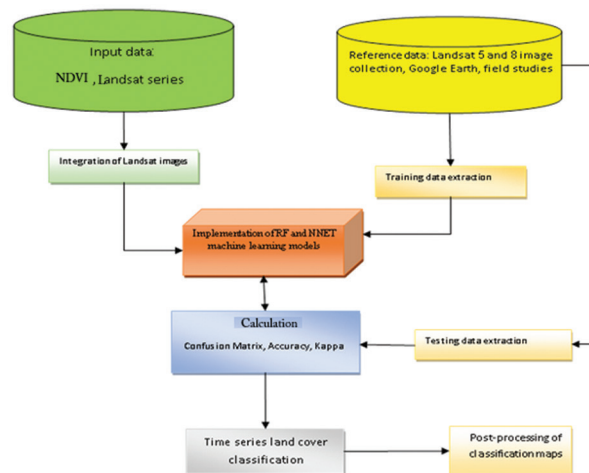
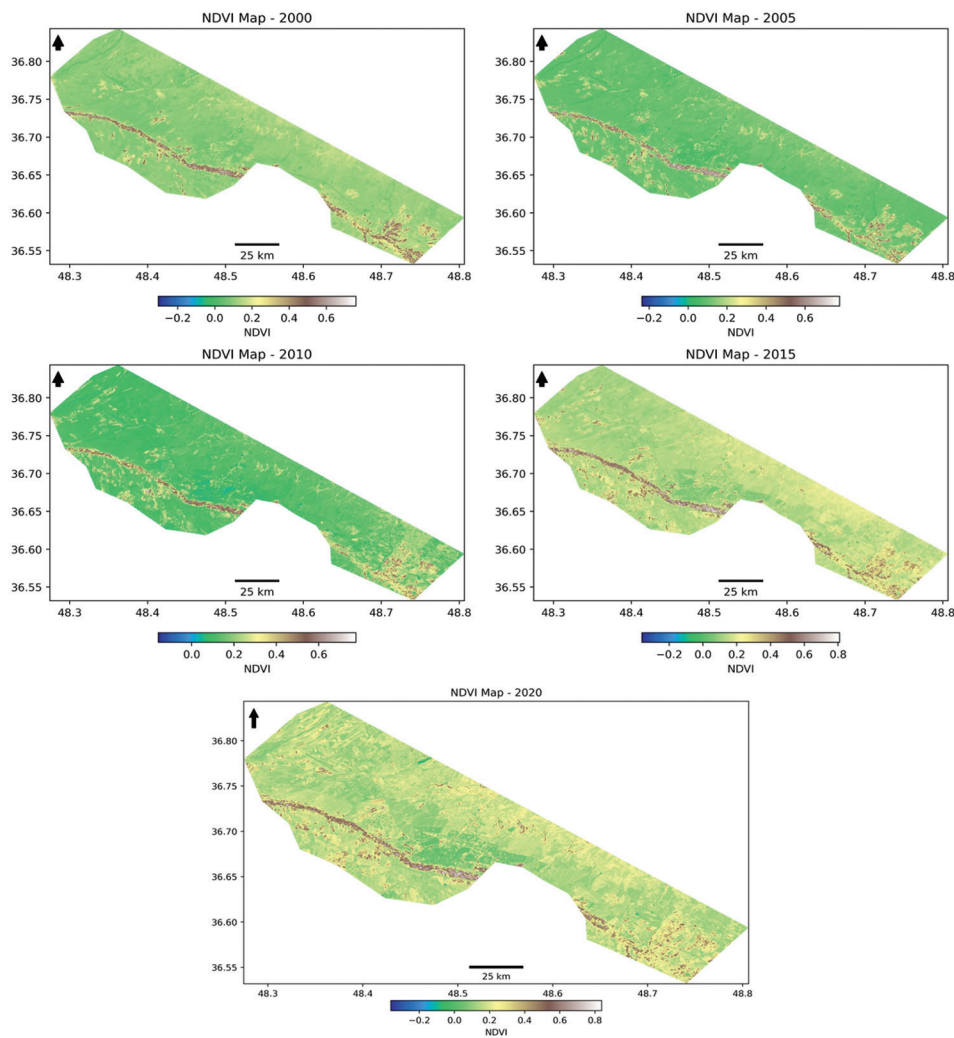


Figure 5. The overall process and framework of the research method Source: Flowchart by the authors. Abbreviations: NNET: Neural network; RF: Random forest.



**Figure 6.** Maps of average annual vegetation cover time series (2000 – 2020)  
Source: Maps by the authors.  
Abbreviation: NDVI: Normalized difference vegetation index.

**Table 2. Overall accuracy and Kappa coefficient of classification maps**

| Year | Model | Kappa coefficient | Overall accuracy |
|------|-------|-------------------|------------------|
| 2000 | NNET  | 0/9694            | 0/9819           |
| 2000 | RF    | 0/8773            | 0/9277           |
| 2005 | NNET  | 0/8011            | 0/8818           |
| 2005 | RF    | 0/7183            | 0/8337           |
| 2010 | NNET  | 0/9726            | 0/9867           |
| 2010 | RF    | 0/8852            | 0/9453           |
| 2015 | NNET  | 0/9813            | 0/9907           |
| 2015 | RF    | 0/8374            | 0/9227           |
| 2020 | NNET  | 0/9899            | 0/9947           |
| 2020 | RF    | 0/8853            | 0/94             |

Abbreviations: NNET: Neural network; RF: Random forest.

evaluated using overall accuracy and the Kappa coefficient. The classification results, obtained using R software, were analyzed for five distinct years: 2000, 2005, 2010, 2015, and 2020. Both NNet and RF methods were applied to these datasets. As depicted in Table 2, the NNET model consistently outperformed the RF model in classification accuracy across all years, demonstrating the suitability of the NNET for satellite image classification. Notably, a decline in overall accuracy and Kappa coefficient was observed in 2005, which can be attributed to the lower quality of Landsat 5 images due to cloud cover or image distortion. Despite this, the results confirm that both models effectively classify satellite images with high accuracy, reinforcing their reliability for land cover mapping.

To statistically compare the performance of NNET and

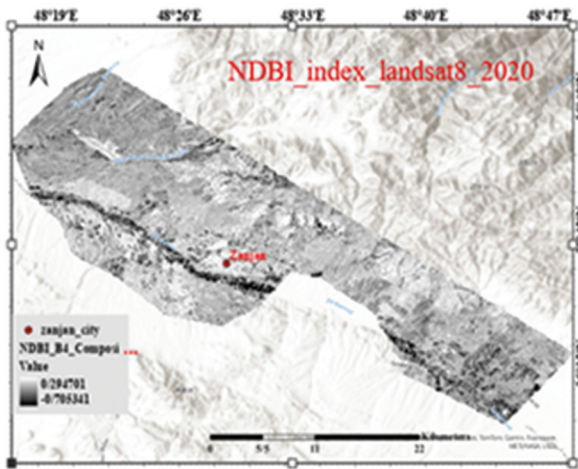


Figure 7. Sample satellite image used in classification  
Source: Image by the authors.

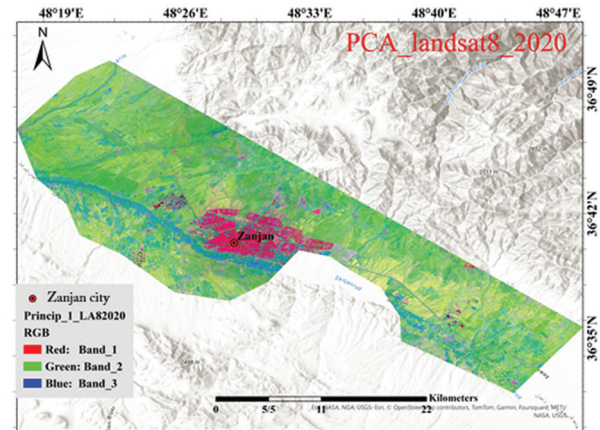


Figure 9. Example of a principal component analysis image from Landsat 8 for extracting urban, rural, and vegetated environments  
Source: Image by the authors.

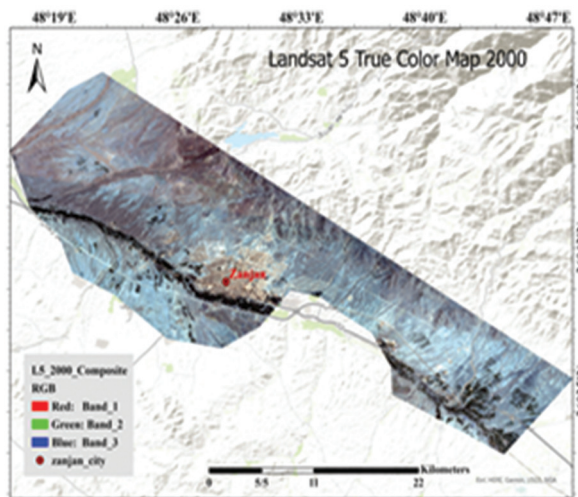


Figure 8. Normalized difference built-up index image for extracting human-made environments  
Source: Image by the authors

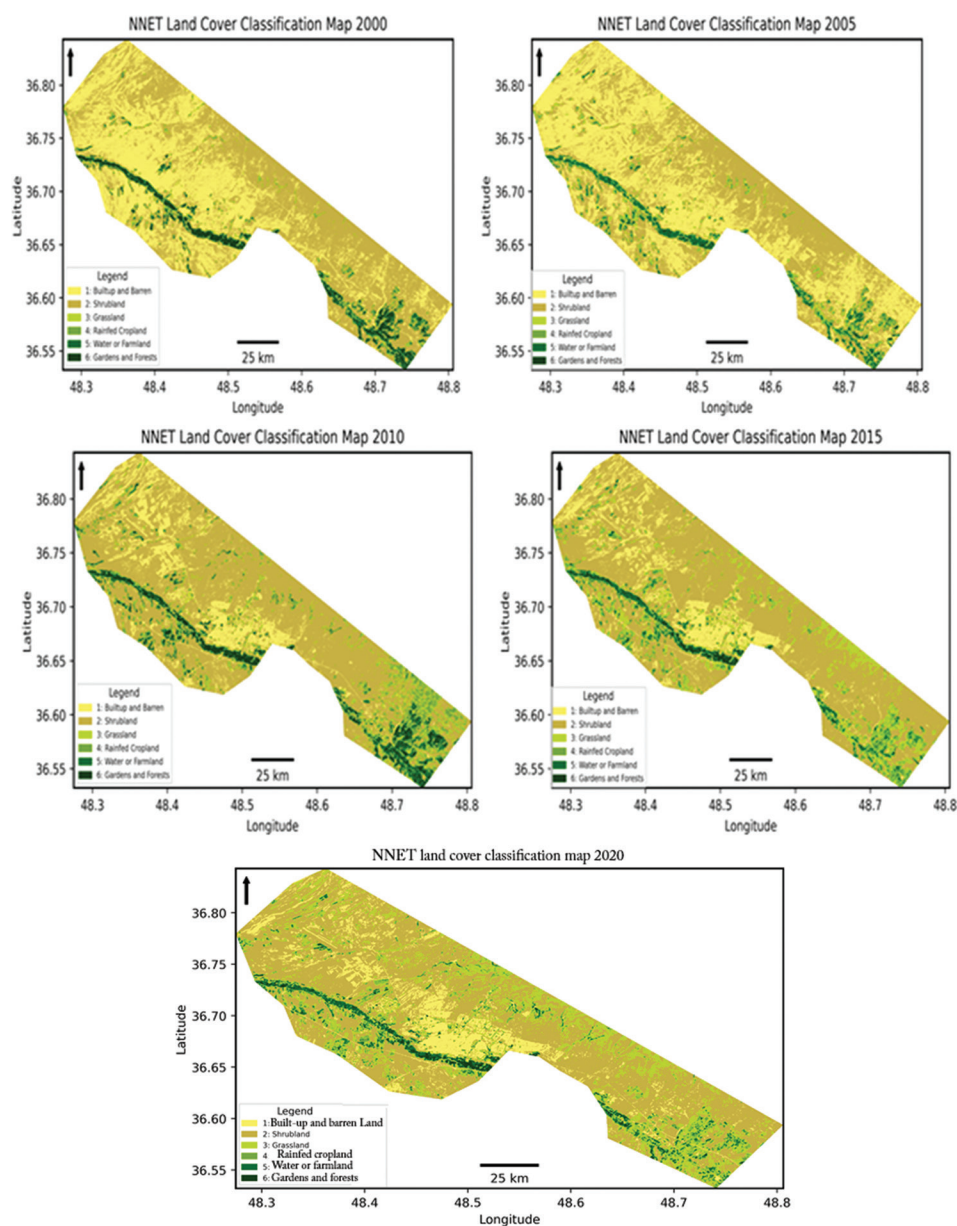
RF models, a paired *t*-test was conducted, with the null hypothesis stating that the average accuracy of the two models is equal. The test results are as follows:

- *t*-statistic: 9.24524508292494
- *p*-value: 0.0007609242652860933

Since the *p*-value (0.0007) is <0.05, we can conclude with 95% confidence that a significant difference exists between the accuracy of the two models. Moreover, the *t*-statistic value of 9.24 indicates that the NNET model achieves significantly higher accuracy than the RF model. Based on these statistical results, the NNET model demonstrates superior performance and was found to have higher accuracy than the RF model in predicting the target variable and classifying satellite images. Therefore,

Table 3. Area and percentage of land cover changes between 2000 and 2020

| Year | Class | Area (sqkm) | Percentage |
|------|-------|-------------|------------|
| 2000 | 1     | 228/98686   | 39/64      |
|      | 2     | 292/11666   | 50/57      |
|      | 3     | 18/51549    | 3/21       |
|      | 4     | 14/35161    | 2/48       |
|      | 5     | 23/65527    | 4/09       |
| 2005 | 1     | 229/099265  | 39/66      |
|      | 2     | 286/892978  | 49/66      |
|      | 3     | 20/076934   | 3/48       |
|      | 4     | 13/495503   | 2/34       |
|      | 5     | 24/471896   | 4/24       |
|      | 6     | 3/671962    | 0/64       |
| 2010 | 1     | 77/177266   | 13/31      |
|      | 2     | 391/633878  | 67/54      |
|      | 3     | 61/689714   | 10/64      |
|      | 4     | 24/479491   | 4/22       |
|      | 5     | 23/626623   | 4/07       |
|      | 6     | 1/261454    | 0/22       |
| 2015 | 1     | 67/09551    | 11/61      |
|      | 2     | 402/323197  | 69/64      |
|      | 3     | 53/340273   | 9/23       |
|      | 4     | 28/017788   | 4/85       |
|      | 5     | 20/545517   | 3/56       |
|      | 6     | 6/386251    | 1/11       |
| 2020 | 1     | 63/778973   | 11/04      |
|      | 2     | 362/704745  | 62/78      |
|      | 3     | 94/112337   | 16/29      |
|      | 4     | 28/724081   | 4/97       |
|      | 5     | 22/624144   | 3/92       |
|      | 6     | 5/764258    | 0/99       |



**Figure 10.** Land cover maps resulting from classification using machine learning and deep learning methods (2000 – 2020)  
Source: Maps by the authors.

the NNET model was selected as the base model for monitoring land cover changes (Figure 10).

The data presented in Table 3 and Figure 11, which illustrate the trend of land cover changes in the study area between 2000 and 2020, indicate that Class 1 (barren lands) has experienced a significant decline. The area of barren lands decreased from 228,000 sqkm in 2000 to approximately 64,000 sqkm in 2020. On the contrary, Class 2 (shrublands and woodlands) has expanded significantly, with its area increasing from 292,000 sqkm to over 362,000 sqkm. Class 3 (pastures and grasslands)

exhibited fluctuations, reaching its largest extent in 2010 at 62,000 sqkm. Class 4 (rainfed croplands) showed a relatively increasing trend, especially after 2005. Meanwhile, Class 5 (farmlands) exhibited a gradual decline, whereas Class 6 (gardens and forests) experienced a gradual expansion. The past two classes suggest that some water-based land use has been converted into Garden City developments over the past decade.

Therefore, it can be concluded that barren lands in the study area decreased significantly between 2000 and 2020, indicating an improvement in natural vegetation

and a reduction in desertification. The decrease in barren lands from 228,000 sqkm in 2000 to 64,000 sqkm in 2020 highlights a significant positive environmental change. In addition, the significant increase in shrublands from 292,000 sqkm in 2000 to 362,000 sqkm in 2020 further supports the conclusion that vegetation cover in the study area has improved (Figure 12). The increasing trend of grasslands, which include annual plants and grasses, along with pastures, may indicate crop expansion in parts of the Zanján river plain.

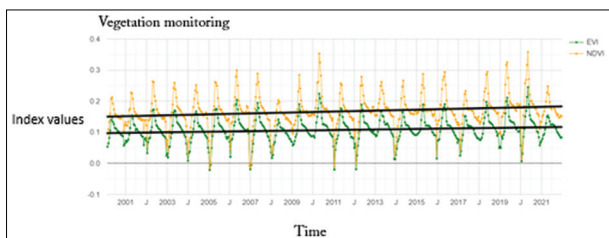


Figure 11. Land cover area changes between 2000 and 2020  
Source: Graph by the authors.

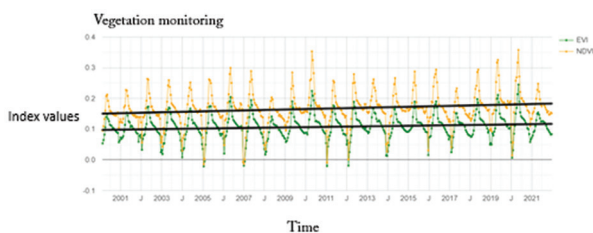


Figure 12. The increasing trend of vegetation cover from 2000 to 2022 in the study area  
Source: Graph by the authors using Google Earth Engine.  
Abbreviations: EVI: Enhanced Vegetation Index; NDVI: Normalized difference vegetation index.

Land change modeler is a specialized tool designed for land use planning. It utilizes historical land cover changes as input data to model potential future change scenarios. The land change modeler empirically analyzes the relationship between land cover changes and the variables influencing them. By providing a systematic approach, this tool enables the prediction and mapping of future land cover changes (Eastman & Toledano, 2018). In this research, TerrSet software was used to analyze land cover changes over 5 time periods in a time-series framework. The calculated land cover changes were examined to assess spatial patterns and trends in land use dynamics. Figures 13 and 14 show the land cover transition rates from 2000 to 2020.

The gains, losses, and net changes in land cover types (Figure 15) indicate that from 2000 to 2020, shrublands, grasslands, rainfed croplands, and irrigated agricultural lands exhibited an overall increase in area. Conversely, a substantial portion of barren lands was converted into built-up areas, reflecting urban expansion, industrialization, and human activities. In addition, forest cover declined as some areas were converted into shrublands, grasslands, and farmlands.

Figure 16 illustrates that a significant portion of barren lands was converted into shrublands, likely driven by the expansion of horticultural activities over the past decade. In addition, the conversion of shrublands to grasslands, along with the persistence of some shrubland areas over the 20-year period, highlights the dynamic growth and transformation of vegetation in the region.

Another significant change during this period is the conversion of woodlands into rainfed croplands and the transformation of forested areas into small-scale irrigated

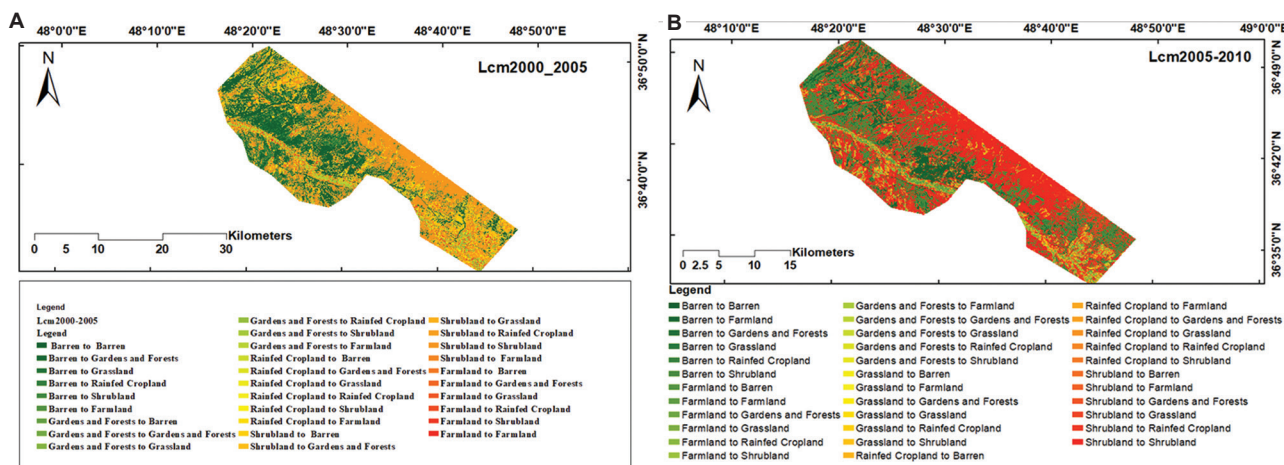


Figure 13. The rate of land cover area transitions from (A) 2000 – 2005 and (B) 2005 – 2010  
Source: Maps by the authors.



activities and the expansion of Garden Cities. The dynamic shifts from woodland to grassland further underscore the region's evolving vegetation dynamics.

In recent years, a notable change has occurred through the conversion of portions of woodlands into rainfed croplands and forested areas into small-scale irrigated fields. This transformation reflects an evolving balance in land use patterns, which can be interpreted in the context of regional food security. Numerous studies have underscored the intricate relationship between land use/land cover changes and food security. A study conducted in the Dudhganga watershed in India examined the impact of urban development on food security by analyzing land use/land cover changes. The findings emphasized the necessity of prudent land management and climate adaptation strategies to mitigate local hunger and ecological degradation (Ahmad *et al.*, 2024). Similarly, research in the Red Sea region of eastern Sudan explored the effects of livelihood transformation on food security and environmental sustainability, attributing disruptions in rural livelihoods to unregulated land use practices and climate change (Gaiballa & Abdalla, 2015). Furthermore, a study in the Anantnag district of Kashmir, India, employed spatial analysis to assess the impact of land use/land cover change on food security. Over a decade, this study revealed a decrease in agricultural and forested areas alongside an increase in horticulture and residential zones (Lone & Mayer, 2017).

In recent years, China has implemented various policies to strengthen food security through sustainable and environmentally friendly approaches. Recent plans emphasize enhancing agricultural production capacity using advanced technologies, particularly climate-resilient crops, and optimized land-use strategies. Within the framework of the Garden City initiative, urban areas are encouraged to integrate green spaces for agricultural production. These policies have been especially emphasized in regions with limited water resources to ensure more efficient resource management and increased agricultural outputs. The concept of Garden Cities has been officially incorporated into China's urban planning and land development policies for decades, with efforts focused on mitigating the adverse effects of urban expansion while enhancing green spaces. Initiatives, such as Ecological Redlines have been introduced to prevent the conversion of agricultural land and natural areas into residential or industrial zones. Despite the rapid expansion of Garden City projects in China, challenges remain, including the conflict between rapid urban development and the preservation of natural resources, as well as climate-related constraints in arid regions. On the other hand, these projects present opportunities to improve the quality of life, expand green

spaces, and reduce the impacts of climate change. Reports indicate that from 2009 to 2019, China lost approximately 6% of its arable land, raising concerns about long-term food security. In response, policies have been directed toward preserving agricultural land while increasing productivity, particularly in the production of staple crops such as wheat and rice. In regions facing water scarcity, efforts are underway to develop agricultural land within urban areas, land use strategies promoting urban green spaces, and the development of vertical and hydroponic farming. These measures aim to alleviate pressure on suburban agricultural land and create a sustainable urban environment.

Despite these efforts, challenges, such as climate change, water scarcity, and increasing demand for agricultural land persist. China has made substantial investments in research and development, particularly in climate-resilient agricultural technologies and improved irrigation systems. In addition, China has expanded agricultural projects abroad, particularly in Africa and Asia, through the Belt and Road Initiative, further strengthening global food security efforts. Recent policies emphasize the need to improve soybean and oilseed production, given China's heavy reliance on imports. Forecasts predict that by 2035, China's food self-sufficiency rate may decrease, increasing reliance on imports. As a result, the development of Garden Cities is positioned as a strategic approach to enhancing urban land quality while improving agricultural productivity within urban areas. Consequently, land use policies and Garden City development in China aim to secure food safety and address the challenges related to decreasing agricultural land and rising import needs in the third millennium. These strategies may serve as valuable models for other countries facing similar challenges. Collectively, these discussions highlight the critical need to understand the interplay between land use change, climate dynamics, and food security. Sustainable land management practices are essential for mitigating adverse effects on food security at local, regional, and global scales.

In a related vein, the authors' research (conducted from 2021 to 2023) involved interviews with Garden City owners in the study area. Notably, 71% of the lands owned by these individuals comprised plots of <2,000 sqm, with 62% of owners motivated by recreational purposes (Heidari *et al.*, 2022; Jahani *et al.*, 2023). These gardens serve dual functions: enhancing property owners' financial situations and increasing land value. Interestingly, traders engage in constructing garden houses by purchasing agricultural land from farmers at low prices and subsequently selling each hectare at significantly higher rates to garden house buyers (Daviran, 2023).

In the context of garden houses, it is essential to recognize that buyers typically do not engage in gardening or farming activities. Instead, they acquire these properties primarily for recreational purposes. However, this trend has broader implications, particularly concerning food security. The concentration of ownership over food production resources – such as agricultural land – without a corresponding commitment to agricultural production undermines the right to food for others. A study conducted by Amirzadeh Moradabadi (2017) revealed that the conversion of agricultural land into urban and non-agricultural areas, particularly in peri-urban regions, reduces cultivable land and food production capacity. These land-use changes result in increased food production costs and ultimately diminish access to food resources. According to the findings of the study, the conversion of agricultural land for non-agricultural purposes results in several challenges, such as a decline in agricultural diversity, reduced green spaces, and water resource shortages, all of which pose significant threats to food security. Similarly, Reyhan Kalvanagh *et al.* (2023) emphasize that the lack of consideration for “Garden Cities” in urban development plans exacerbates the reduction of agricultural land, increases urban land-use fragmentation, and ultimately decreases food production, further threatening food security.

In countries with predominantly low- and middle-income populations, such as Iran, there is considerable untapped potential to enhance food security and dietary diversity by promoting fruit and vegetable cultivation in urban gardens. Nevertheless, several limitations persist. Many beneficiaries lack awareness of the multifaceted benefits of urban gardens, possess limited horticultural expertise, and often replicate European ornamental garden styles rather than focusing on food production. In addition, an overreliance on purchasing rather than producing food remains a challenge, exacerbated by the looming threat of global climate change.

Future research should explore the long-term impacts of land-use cover changes associated with Garden Cities on ecological systems, particularly in terms of vegetation composition, water resources, and soil quality. The role of government policies in the development of Garden Cities also warrants further examination, including an assessment of how policies and regulations influence land-use changes and strategies for their more effective management. Key areas for investigation include the economic evaluation of Garden Cities (analyzing costs and benefits related to the development of Garden Cities, including their impact on land value, employment, and local income) and sustainable Garden City planning and design models (proposing models and solutions for creating Garden Cities that align with environmental and

social sustainability principles). In addition, participatory models in Garden City planning should be explored, particularly methods for involving local communities and stakeholders in the planning and development process to enhance project acceptance and success. The findings of this study have significant implications for policymaking and future project development across various fields. They can serve as a valuable resource for professionals working in natural resource management, agricultural development, and environmental protection.

## Acknowledgments

None.

## Funding

None.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Author contributions

*Conceptualization:* Mohmad Taghi Heydari

*Data curation:* All authors

*Formal analysis:* Mohmad Taghi Heydari

*Investigation:* All authors

*Methodology:* Mohmad Taghi Heydari, Zahar khodakarami

*Writing – original draft:* All authors

*Writing – review & editing:* Zahra Khodakarami, Ahmad Asadi, Mohmad Taghi Heydari

## Ethics approval and consent to participate

Not applicable.

## Consent for publication

Not applicable.

## Availability of data

The data can be made available to the applicant through the corresponding author.

## References

Ahmad, W. S., Kaloop, M. R., Jamal, S., Taqi, M., Hu, J. W., & Abd El-Hamid, H. (2024). An analysis of LULC changes for understanding the impact of anthropogenic activities on food security: A case study of Dudhganga watershed, India. *Environmental Monitoring and Assessment*, 196(1):105.

<https://doi.org/10.1007/s10661-023-12264-9>

Alshari, E. A., Abdulkareem, M. B., & Gawali, B. W. (2023).

- Classification of land use/land cover using artificial intelligence (ANN-RF). *Frontiers in Artificial Intelligence*, 5:964279.  
<https://doi.org/10.3389/frai.2023.964279>
- Amirzadeh Moradabadi, S. (2017), *Effect of Agricultural Sustainability on Food Security of Rural Households in Iran*. [Doctoral dissertation, Zabol University]. Available from: <https://ganj.irandoc.ac.ir/#/articles/7866e6fba97446d54c0f7fe177ef8f26> [Last accessed on 2025 Mar 17].
- Blanco Pastor, A., Canniffe, E., & Rosa Jiménez, C. J. (2023). Learning from Letchworth and Welwyn Garden City: Garden cities' policies for the development of existing settlements in the contemporary world. *Land Use Policy*, 132:106759.  
<https://doi.org/10.1016/j.landusepol.2023.106759>
- Cabannes, Y., & Ross, P. (2018). *Food Planning in Garden Cities: The Letchworth Legacy. Pioneering Urban Agriculture and Food Integration into Urban Planning and Design*. RUAFA. Available from: <https://ruaf.org/assets/2019/11/food-planning-in-garden-cities.pdf> [Last accessed on 2025 Mar 17].
- Daviran, E. (2023). The effects of corona on urban space limitation and change of use and price growth of garden lands around the city (Case study: Garden cities in the western suburbs of Zanjan). *Journal of Urban Function Studies and Structure*, 10(35):171-189.  
<https://doi.org/10.22080/usfs.2023.24488.2312>
- Du Toit, M. J., Rendón, O., Cologna, V., Cilliers, S. S., & Dallimer, M. (2022). Why home gardens fail in enhancing food security and dietary diversity. *Frontiers in Ecology and Evolution*, 10:804523.  
<https://doi.org/10.3389/fevo.2022.804523>
- Eastman, J. R., & Toledano, J. (2018). A short presentation of the Land Change Modeler (LCM). In: *Geomatic Approaches for Modeling Land Change Scenarios*. Berlin, Germany: Springer, p. 499-505.
- Esfandiar, H., & Fadaei, H. (2022). Bastions of tradition or capitalist commodification? The fate of gardens in the modernizing Iranian City. *Journal of Urban History*, 30(3):185-201.  
<https://doi.org/10.8574/frai.2023.2585>
- FAO, IFAD, UNICEF, WFP, & WHO. (2021). *The State of Food Security and Nutrition in the World 2021: Transforming Food Systems for Food Security, Improved Nutrition and Affordable Healthy Diets for All*. FAO. Available from: <https://openknowledge.fao.org/server/api/core/bitstreams/1c38676f-f5f7-47cf-81b3-f4c9794eba8a/content> [Last accessed on 2025 Mar 17].
- Gaiballa, A. K., & Abdalla, N. I. (2015). Management of land use systems for enhanced food security: Conflicts, controversies and resolutions. In: *Livelihood Transformation as Influenced by Socio-environmental Changes and Its Impact on Food Security among Small Producers of the Red Sea Zone of Eastern Sudan*. Tropentag, p. 291-317. Available from: [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.tropentag.de/2015/proceedings/proceedings.pdf](https://www.tropentag.de/2015/proceedings/proceedings.pdf) [Last accessed on 2025 Mar 17].
- Ghosh, S. (2021). Urban agriculture potential of home gardens in residential land uses: A case study of regional city of Dubbo, Australia. *Land Use Policy*, 109:105676.  
<https://doi.org/10.1016/j.landusepol.2021.105676>
- Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press. Available from: <https://www.deeplearningbook.org> [Last accessed on 2025 Mar 17].
- Harvey, D. (2006). *Spaces of Global Capitalism: Towards a Theory of Uneven Geographical Development*. New York: Verso.
- Heidari, M. T., Jahani, D., Haqi, Y., Alipour, D., & Tilkoi Beghehjan, F. (2022). The role of garden-city spaces in sustainable food governance: A case study of garden-cities in Zanjan. *Journal of Urban and Regional Geography*, 10(3):21-38.  
<https://doi.org/10.22059/jurbangeo.2022.345609.1719>
- Hosseini, H., & Amini, M. (2023). *Investment in new urban developments: Garden city facade or environmental neglect?* *Journal of Urban Environmental Policy*, 15(2):101-119.
- Howard, E. (1898). *Tomorrow: A Peaceful Path to Real Reform*. London: Swan Sonnenschein & Co.  
[https://doi.org/10.1007/978-3-319-60801-3\\_26](https://doi.org/10.1007/978-3-319-60801-3_26)
- Institutes of Science and Development, Chinese Academy of Sciences, & Clarivate. (2023). *Research Fronts 2023*. Institutes of Science and Development.
- Jahani, D., Haqi, Y., Heidari, M. T., & Moeini-Nasab, M. (2023). A review of sustainable food security from the perspective of stakeholders in the garden-home system (Case study: Garden-home in Zanjan city). *Geography and Environmental Sustainability*, 47(1):59-74.  
<https://doi.org/10.22126/ges.2023.8469.2598>
- Jia, D., Cheng, C., Song, C., Shen, S., Ning, L., & Zhang, T. (2021). A hybrid deep learning-based spatiotemporal fusion method for combining satellite images with different resolutions. *Remote Sensing*, 13(4):645.  
<https://doi.org/10.3390/rs13040645>
- Khansari, M., Moghtader, M., & Yavari, M. (2004). *The Persian Garden: Echoes of Paradise*. Iran Cultural and Tourism Heritage Organization. Washington, DC: Mage Publishers.
- Lone, S. A., & Mayer, I. A. (2017). Assessment of the impact of land use land cover change on food security of District Anantnag of Kashmir Valley. *IOSR Journal of Humanities and Social Science*, 22(7):43-50.  
<https://doi.org/10.9790/0837-2207174350>
- Mirzaei, A., & Rezaei, M. (2021). From Persian gardens to capitalist urban sprawl: The transformation of green spaces

- in Tehran. *Journal of Iranian Urban Studies*, 45(2):134-150.
- Molaei Yeganeh, H. (2019). *Presenting the Regeneration Model of Inefficient Urban Structures Under Study: Bisim Area of Zanjan City*. [Doctoral dissertation, Zanjan University].
- Nguyen, H. T. T., Doan, T. M., & Radeloff, V. (2018). Applying random forest classification to map land use/land cover using Landsat 8 OLI. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 42:363-367.  
<https://doi.org/10.5194/isprs-archives-XLII-3-363-2018>
- Orsini, F., Kahane, R., Nono-Womdim, R., & Gianquinto, G. (2013). Urban agriculture in the developing world: A review. *Agron*, 33(3):695-720.  
<https://doi.org/10.1007/s13593-013-0143-z>
- Priya, R. S., & Vani, K. (2019). Deep Learning Based Forest Fire Classification and Detection in Satellite Images. In: *Proceedings of the 2019 11<sup>th</sup> International Conference on Advanced Computing (ICoAC)*. IEEE, p. 61-65.  
<https://doi.org/10.1109/ICoAC48765.2019.246860>
- Reyhan Kalvanagh, M., Ahadnejad, M., & Heidari, M. T. (2023). Analyzing the causes and factors affecting the production of garden city in peri-urban areas of Zanjan. *Human Ecology Quarterly*, 2(2):96-106.  
<https://doi.org/10.22034/el.2023.387541.1007>
- Ribeiro, A., Madureira, L., & Carvalho, R. (2023). Evidence on how urban gardens help citizens and cities to enhance sustainable development: Review and bibliometric analysis. *Landscape and Urban Planning*, 236:104766.  
<https://doi.org/10.1016/j.landurbplan.2023.104766>
- Safari, Y. (2023). A review of food security measurement indicators in the country and the missing role of soil. *Journal of Land Management*, 11(1):15-29.  
<https://doi.org/10.22092/lmj.2022.127441>
- Shah, R., & Ali, R. (2022). *The urbanization of traditional gardens in Iran: Impact of capitalism on green spaces in modern cities*. *Journal of Urban Planning and Development*, 58(4):215-230.
- Shi, S., Zhang, Z., Li, L., & Chen, J. (2023). Urban river transformation and the landscape garden city movement in China. *Sustainability*, 10(11):4103.  
<https://doi.org/10.3390/su10114103>
- Soltani, A., Eskander Zand, S.M., Alimaghham, A, Nehbandani, H. B., & Jolaei, R. (2021). *Analysis of the Country's Food Security Until 2050 with Interrelated Modeling of Water, Land, Food, Landscape Environment and Necessary Policies. The Collection of Documents Related to the Strategic Document of Food Security and Transformation, The Organization of Research, Education and Promotion of Agriculture, The Deputy of Promotion and Education of Agriculture*. Publishing of Agricultural Education. Available from: chrome-extension://efaidnbmnnnibpajpcglclefindmkaj/https://agrilib.areeo.ac.ir/book\_10039.pdf [Last accessed on 2025 Mar 17].
- Soltani, M., & Sharifi, M. (2022). Urban garden cities in Iran: Commercialization and the quest for sustainable urbanism. *Journal of Urban Development*, 40(2):101-112.
- Sun, J., & Ongsomwang, S. (2023). Optimal parameters of random forest for land cover classification with suitable data type and dataset on Google Earth Engine. *Frontiers in Earth Science*, 11:1188093.  
<https://doi.org/10.3389/feart.2023.1188093>
- Thaman, R. R. (1995). Urban food gardening in the Pacific Islands: A basis for food security in rapidly urbanising small-island states. *Habitat International*, 19(2):209-224.  
[https://doi.org/10.1016/0197-3975\(94\)00067-C](https://doi.org/10.1016/0197-3975(94)00067-C)
- UNESCO. (2023). *Cultural Landscapes and Urban Sustainability*. Paris: UNESCO Publishing.
- Yaghoubi, J., & Hamidi, K. (2015). Modeling the consequences of the development of the city garden using the basic theory studied: Zanjan city. *Journal of Geography and Development*, 44(2):106-189.  
<https://doi.org/10.22111/gdij.2016.2722>
- Zanjan Province Agricultural Jihad Organization. (2023). *Zanjan Agricultural Data*. Agricultural Research and Technology Center.
- Zerbian, T., & Romero, E. L. (2021). *The Role of Cities in Good Governance for Food Security: Lessons from Madrid's Urban Food Strategy*. Economic Research Service Press. Available from: chrome-extension://efaidnbmnnnibpajpcglclefindmkaj/https://openaccess.city.ac.uk/id/eprint/29976/8/The%20role%20of%20cities%20in%20good%20governance%20for%20food%20security%20lessons%20from%20Madrid%20s%20urban%20food%20strategy.pdf [Last accessed on 2025 Mar 17].
- Zeza, A., & Tasciotti, L. (2010). Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. *Food Policy*, 35:265-273.  
<https://doi.org/10.1016/j.foodpol.2010.04.007>
- Zhang, Y., Smith, J. P., Tong, D., & Turner, II, B. L. (2022). Optimizing the co-benefits of food desert and urban heat mitigation through community garden planning. *Landscape and Urban Planning*, 226(5):104118.  
<https://doi.org/10.1016/j.landurbplan.2022.104488>

## ORIGINAL ARTICLE

## The intersection of culture and play: Evaluating children's play spaces in Xi'an's parks using the 7Cs framework

Ke Chen<sup>1,2</sup>, Chengyun Zhang<sup>2</sup>, Mengyi Li<sup>2</sup>, and Ruhizal Roosli<sup>1\*</sup> <sup>1</sup>School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia<sup>2</sup>School of Architecture, Xi'an University of Architecture and Technology Huaqing College, Xi'an, Shaanxi, China(This article belongs to the *Special Issue: Urban China 2030. Past Trajectories, Current Trends, and Future Challenges*)

## Abstract

With rapid urbanization, children's play spaces in Chinese parks face challenges related to functional monotony and a lack of cultural expression. This study examines heritage parks in Xi'an, one of China's most historically significant cities, as case studies. Using a mixed-methods research approach and the 7Cs framework, we systematically evaluate these spaces to assess their effectiveness in meeting cultural and functional needs. The findings highlight several key shortcomings in current designs. First, an imbalance between static cultural displays and dynamic interactive elements limits children's engagement and cultural immersion. Second, a lack of exploratory and challenging activities fails to meet the developmental demands of older children. Third, weak user participation mechanisms and inadequate feedback systems contribute to a misalignment between design intentions and actual user needs. To address these challenges, this article proposes integrating dynamic and interactive cultural displays, introducing multi-level exploratory and challenging features to accommodate diverse age groups, and enhancing user engagement and feedback systems throughout the design process. These recommendations aim to balance cultural preservation with modern usability, providing both theoretical insights and practical foundations for improving children's play spaces in heritage parks while inspiring similar global efforts.

**Keywords:** Child-friendly city; Play spaces; 7Cs framework; Heritage park; Evaluation**\*Corresponding author:**Ruhizal Roosli  
(ruhizal@usm.my)

**Citation:** Chen, K., Zhang, C., Li, M., & Roosli, R. (2025). The intersection of culture and play: Evaluating children's play spaces in Xi'an's parks using the 7Cs framework. *Journal of Chinese Architecture and Urbanism*, 7(3): 8296.  
<https://doi.org/10.36922/jcau.8296>

**Received:** December 30, 2024**1st revised:** February 4, 2025**2nd revised:** March 3, 2025**Accepted:** March 13, 2025**Published online:** April 3, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

With the progression of global urbanization, public space design has increasingly emphasized diversity and multifunctionality (UN-Habitat, 2013). As an essential component of urban public spaces, outdoor play areas for children serve multiple purposes, including promoting physical activity, cognitive development, and social interaction (Dalpra, 2022; Wray *et al.*, 2020; Yildirim *et al.*, 2022). Within the context of child-friendly city initiatives in China, enhancing the quality and functionality of children's play spaces through innovative design has become a key focus in both

academic research and practical implementation (Guan, 2021; He, 2020; Wu, 2021).

China's rapid urbanization and increasing policy support have led to a proliferation of children's play spaces, drawing greater attention to their design quality (Fang, 2020; Wang, 2022; Yang & Dong, 2021). Notably, the Chinese government's Guidelines on Promoting the Construction of Child-Friendly Cities (2021) set a goal of establishing 100 child-friendly city pilot projects nationwide by 2025, underscoring the significance of play spaces in public space design.

As a fundamental aspect of modern urban spaces (Chen, 2022), children's play spaces are widely recognized for their role in fostering physical, cognitive, emotional, and social development (Lee *et al.*, 2023; Gemmell *et al.*, 2023). Well-designed play environments encourage creativity, enhance social interactions, and contribute to both mental and physical well-being (Gray *et al.*, 2015; He, 2020; Shu *et al.*, 2022). However, in many rapidly urbanizing areas, play space design continues to struggle with functional monotony and a lack of cultural integration (Chen, 2022; Slingerland *et al.*, 2020; UNICEF, 2018; Wang, 2021). This issue is particularly evident in culturally rich cities, where balancing contemporary needs with traditional elements remains a pressing challenge.

Heritage parks serve as public open spaces shaped by historical and cultural contexts, aiming to balance cultural preservation with modern functional demands (UNESCO, 2016). These parks not only showcase and transmit cultural heritage but also function as recreational, entertainment, and social interaction spaces for urban residents (Chiesura, 2004; Fan & Chen, 2024; Jiang, 2024). Consequently, the design of heritage parks must strike a balance between cultural authenticity and modern usability, ensuring accessibility, interactivity, and playability while maintaining cultural transmission (Chiesura, 2004).

Existing research indicates that traditional heritage parks often emphasize static cultural displays, such as historical sculptures, interpretive plaques, and reconstructed architecture, while lacking dynamic and interactive experiences—making it difficult for users to engage deeply with these spaces (Jiang, 2024). Conversely, modern urban parks prioritize multifunctionality and accessibility, sometimes at the expense of cultural atmosphere and authenticity (Wang, 2022). The central challenge in designing children's play spaces within heritage parks, therefore, lies in integrating cultural preservation with contemporary recreational needs, creating environments where children can actively engage with history through immersive and exploratory play experiences.

To address these issues and systematically evaluate the design performance of children's play spaces in heritage parks, this study adopts the 7Cs framework as the core evaluation tool (Table 1). Developed by Susan Herrington and her research team, the 7Cs framework is grounded in environmental psychology, child development theories, and landscape design principles. It emphasizes how spatial design can support children's physical, cognitive, and social development (Herrington & Lesmeister, 2006). As a multidimensional evaluation system, the 7Cs framework has been widely applied in child-friendly environment research and practice (Herrington & Brussoni, 2015).

Compared to other evaluation frameworks, such as the Play Value Framework (Hyder, 2004) and Affordance Theory (Heft, 1988), which primarily focus on play activities and user perception, the 7Cs framework offers a systematic and flexible approach that integrates cultural, environmental, and functional aspects. One of its key advantages is its comprehensiveness and adaptability – it assesses not only the physical attributes of spatial design but also incorporates cultural context and user needs, enabling a holistic evaluation of functionality, cultural significance, and interactivity in play spaces.

**Table 1. Implications of the 7Cs dimensions**

| Dimension (C) | Implication  |
|---------------|--|
| Character     | Emphasizes the overall characteristics and design intent of the play space, supporting children's memory and cognitive development through its uniqueness.   |
| Context       | Examines the connection between the play space and its surrounding environment as well as its position within the broader ecosystem, ensuring the design adapts to microclimates and surrounding conditions. |
| Connectivity  | Focuses on physical and visual connections within the play space and its surrounding areas, enhancing children's spatial awareness and exploratory behaviors.  |
| Change        | Provides dynamic materials and environments, allowing children to experience the passage of time and seasonal changes, supporting creativity and self-exploration.   |
| Chance        | Offers open and flexible environments, enabling children to create unique play experiences based on their imagination and needs.   |
| Clarity       | Ensures that the physical structure and visual information of the space are clear and comprehensible, facilitating children's recognition and navigation while enhancing their sense of safety and autonomy. |
| Challenge     | Provides appropriate physical and cognitive challenges, fostering children's adventurous spirit and problem-solving abilities.   |

Originally developed to guide the design of outdoor play spaces for young children, the 7Cs framework defines seven key design principles: Character, Context, Connectivity, Change, Chance, Clarity, and Challenge. These principles aim to create play environments that support children's physical, cognitive, and social development.

As research has progressed, the application of the 7Cs framework has expanded. Herrington & Brussoni (2015) explored the relationship between play environments, risk, and child development, emphasizing the balance between safety and challenge in play design to provide children with opportunities for exploration and autonomous activities. Herrington & Brussoni (2022) further extended the framework for older children (aged 10 – 13) by introducing three additional principles: community, cues, and child agency, aiming to better accommodate older children's social interactions and exploratory behaviors.

Today, the 7Cs framework is widely applied in urban parks, school playgrounds, and public spaces, integrating perspectives from landscape architecture, public health, and child development. Its evolution in academic research demonstrates its transition from a focus on early childhood play spaces to a comprehensive methodology addressing the needs of children across different age groups. By emphasizing safety, inclusivity, and social interaction, the 7Cs framework has become a fundamental theoretical foundation for child-friendly urban planning.

Xi'an, known as the historical capital of 13 dynasties, is a historically and culturally significant city in China, renowned for its rich heritage and distinctive urban landscape (Jiang, 2024). As one of China's 100 pilot cities for child-friendly urban initiatives, Xi'an hosts several heritage parks. This study selects representative heritage parks in Xi'an as case studies (Figure 1) and, drawing on the 7Cs framework, establishes a conceptual model for designing outdoor play spaces in urban parks. The selected play spaces were systematically evaluated, revealing key design issues within a cultural heritage context. Targeted optimization recommendations were proposed to address these challenges. This research not only provides theoretical support and practical insights for the future development of children's play spaces in Xi'an's parks but also serves as a reference for the creation of child-friendly spaces in other culturally rich cities.

## 2. Data and methods

This study adopts a case study methodology, selecting three representative heritage parks in Xi'an—Tang City Wall Heritage Park (Figure 2), Daming Palace National Heritage Park (Figure 3), and Qujiang Pool Heritage Park (Figure 4)—as research sites. These parks were chosen

for their distinctive design characteristics and functional diversity, making them exemplary cases for evaluating the intersection of cultural heritage and modern play space design.

Daming Palace National Heritage Park, situated on the site of a former Tang dynasty (618 – 907) imperial palace, integrates cultural display with contemporary functionality. As one of the most significant historical sites in Xi'an, it provides an ideal setting for exploring how interactive design can enhance cultural engagement within heritage parks.

Tang City Wall Heritage Park, distinguished by its linear greenway design, exemplifies the successful fusion of heritage conservation and urban public space. The park's layout and spatial organization make it particularly suitable for studying connectivity and cultural coherence in play spaces, offering valuable insights into how historical infrastructure can be adapted for modern recreational use.

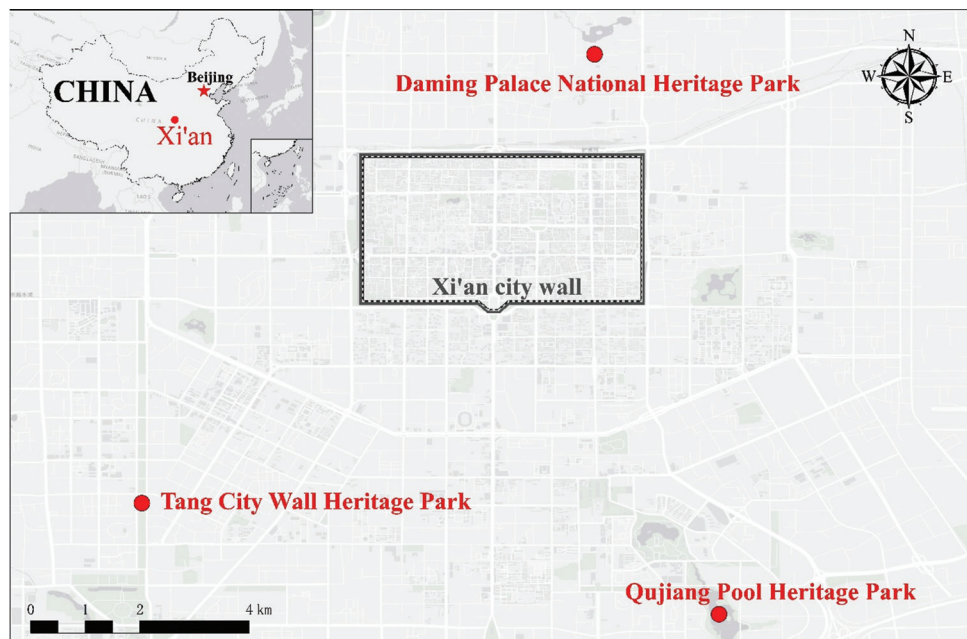
Qujiang Pool Heritage Park presents a unique combination of historical exhibitions, modern amenities, and natural landscapes, creating an environment conducive to exploratory and challenging play experiences. This site is particularly relevant for assessing the balance between historical narrative preservation and the provision of dynamic, interactive play opportunities.

The selection of these three parks ensures diversity in site characteristics, cultural significance, and play space configurations, providing a robust and comprehensive framework for analyzing the integration of cultural heritage with contemporary urban design principles.

### 2.1. Quantitative methodology

This study employs a quantitative research approach to systematically assess the design performance of children's play spaces through multi-dimensional evaluation. By quantifying strengths and weaknesses across various dimensions, we aim to analyze the differing evaluation perspectives of parents and experts. To achieve this, structured questionnaire surveys and statistical analysis methods were implemented.

First, based on the seven dimensions of the 7Cs framework—Character, Context, Connectivity, Change, Chance, Clarity, and Challenge—a goal-indicator hierarchy structure was established to develop an evaluation index system. The analytic hierarchy process (AHP) was used to assign weightings to different factors. A panel of 30 experts, including children's play space designers, landscape architects, and child development specialists, conducted pairwise comparisons of these factors using a 1 – 9 scale. Their assessments were used to construct an AHP judgment



**Figure 1.** The location of research sites  
Source: Drawing by the authors



**Figure 2.** Tang city wall heritage park  
Source: Photo by authors (2025)



**Figure 3.** Daming palace national heritage park  
Source: Photo by authors (2024)

matrix, followed by a consistency check to ensure reliability. This analysis confirmed that the consistency ratio was below 0.1, meeting AHP methodological standards (Table 2).

To further assess play space designs, separate questionnaires were developed for parents and experts, each containing 21 items corresponding to the evaluation factors. A five-point Likert scale was used to measure responses, where 1 = *very dissatisfied*, 2 = *dissatisfied*, 3 = *neutral*, 4 = *satisfied*, and 5 = *very satisfied*. This scale was chosen for its clarity and widespread use in play

space evaluation studies, ensuring consistency across responses. The parent-focused questionnaire (Table 3) emphasized practical aspects such as safety, functionality, and interactivity, while the expert-focused questionnaire (Table 4) centered on cultural representation, design coherence, and innovation.

A total of 150 parent questionnaires and 30 expert questionnaires were distributed for each park. Observational surveys were conducted in public park settings, where parents were invited to participate voluntarily through publicly available questionnaires placed in designated areas. No personal identifiers were

Table 2. 7Cs framework evaluation factor weighting

| Dimension    | Dimension weight (W) | Evaluation factor  | Factor weight (N) | Comprehensive weight |
|--------------|----------------------|--|-------------------|----------------------|
| Character    | 0.1536               | Design reflects the cultural and natural features              | 0.3517            | 0.0540               |
|              |                      | Provides unique visual experiences, avoiding standard layouts  | 0.2953            | 0.0454               |
|              |                      | Encourages children to interact with and explore site features | 0.3530            | 0.0542               |
| Context      | 0.1343               | Analyzes the site's orientation and climatic conditions        | 0.4021            | 0.0540               |
|              |                      | Utilizes surrounding resources to enhance site value           | 0.3457            | 0.0464               |
|              |                      | Adapts to different community settings                         | 0.2522            | 0.0339               |
| Connectivity | 0.1335               | Ensures seamless indoor-outdoor connection                     | 0.4023            | 0.0537               |
|              |                      | Designs looped and hierarchical pathways                       | 0.3025            | 0.0404               |
|              |                      | Uses plants and fences to promote interaction                  | 0.2952            | 0.0394               |
| Change       | 0.1452               | Designs spaces of varied sizes and functions                   | 0.3481            | 0.0505               |
|              |                      | Provides manipulable materials for long-term engagement        | 0.3524            | 0.0512               |
|              |                      | Allows flexible layouts  | 0.2995            | 0.0435               |
| Chance       | 0.1482               | Designs "messy zones" for free exploration                     | 0.4023            | 0.0596               |
|              |                      | Stimulates spontaneous exploration through terrain             | 0.3530            | 0.0523               |
|              |                      | Supports unstructured, open-ended activities                   | 0.2447            | 0.0363               |
| Clarity      | 0.1324               | Avoids obstacles that block sightlines                         | 0.4052            | 0.0536               |
|              |                      | Provides clear entry and exit points                           | 0.3527            | 0.0467               |
|              |                      | Optimizes soundscapes to reduce noise                          | 0.2421            | 0.0321               |
| Challenge    | 0.1528               | Introduces facilities with varying difficulty                  | 0.4050            | 0.0619               |
|              |                      | Designs progressive challenges for skill development           | 0.2998            | 0.0458               |
|              |                      | Encourages risk-taking while ensuring safety                   | 0.2952            | 0.0451               |



Figure 4. Qujiang pool heritage park  
Source: Photo by authors (2024)

collected, and participation was entirely anonymous and voluntary. The questionnaires were made available in a non-intrusive manner, allowing parents to complete them during resting periods without disrupting their interactions with children. Surveys were administered during weekends

and public holidays to capture peak park usage, ensuring that the collected data accurately reflected real-world conditions. To facilitate the process, the research team provided concise, on-site instructions to help respondents comprehend the questions while minimizing interference with park activities. Experts were invited based on their professional experience and expertise. This group included researchers and designers specializing in children's play spaces, as well as landscape architecture professionals with extensive industry experience.

Following data collection, responses were cleaned and organized to ensure high-quality samples. Given the varying perspectives and contributions of parents and experts, a weighted approach was applied to the evaluation process. Utilizing the Delphi method and aligning with the study's objectives, the weight of parent feedback was set at 0.6, reflecting its emphasis on practical use, while expert feedback was weighted at 0.4, capturing professional insights. This balanced methodology allowed for a comprehensive assessment that integrates user experience with expert evaluation. The design performance of children's play spaces was quantitatively evaluated using questionnaire data, and a weighted average method was

**Table 3. Parent questionnaire design**

| Dimension (C) | Evaluation factor                             | Question (parent perspective)  |
|---------------|---|--|
| Character     | Design reflects cultural and natural features | Does the design of the play space sufficiently showcase local cultural and natural characteristics?                                    |
|               | Provides unique visual experiences            | Does the visual design of the play space capture your and your child's attention?  |
|               | Encourages children's exploration interest    | Do you think the play space stimulates your child's interest in exploration and interaction?   |
| Context       | Adapts to microclimate and natural conditions | Does the play space provide a comfortable environment that adapts to weather and seasonal changes?                                     |
|               | Utilizes surrounding resources                | Do you think the play space makes good use of surrounding resources (e.g., trees, neighborhood relationships)?                         |
|               | Fits into the community environment           | Is the design of the play space consistent with the overall community environment?   |
| Connectivity  | Seamless indoor-outdoor connection            | Is the indoor-outdoor connection of the play space convenient for children to access freely?   |
|               | Supports diverse mobility options             | Does the play space offer pathways suitable for various activities (e.g., looped paths, main and secondary paths)?                     |
|               | Promotes children's interaction               | Does the layout of the play space encourage interaction and observation among children?  |
| Change        | Meets social and solitary needs               | Does the play space include diverse areas for both solitude and social activities?   |
|               | Provides manipulable materials                | Do you think materials like sand, water, or plants in the play space attract children for long-term engagement?                        |
|               | Allows flexible layouts                       | Does the play space provide flexible layouts to meet the changing needs of children?   |
| Chance        | Offers "messy zones"                          | Are there enough areas in the play space for children to freely explore (e.g., mud areas, sand pits)?                                  |
|               | Encourages spontaneous exploration            | Do the terrain and vegetation designs stimulate your child's curiosity and exploratory behavior?                                       |
|               | Supports unstructured activities              | Do you think the play space supports your child in engaging in unstructured, open-ended activities?                                    |
| Clarity       | Avoids visual obstacles                       | Does the play space avoid obstacles (e.g., large equipment) that block the view?   |
|               | Provides clear entry and exit points          | Are the entry and exit points of the play space clearly designed to reduce potential risks?  |
|               | Reduces noise interference                    | Do you think the play space effectively controls noise to create a quiet and comfortable environment?                                  |
| Challenge     | Offers multi-level activity facilities        | Does the play space include challenging facilities suitable for children of different ages (e.g., climbing structures, jumping spots)? |
|               | Designs progressive challenges                | Does the play space help children gradually develop their skills through progressive challenges?                                       |
|               | Ensures safety                                | Does the play space balance risk-taking with ensuring children's safety?   |

applied to calculate the scores for each dimension, as well as the overall composite score.

## 2.2. Qualitative methodology

To gain deeper insights into the design performance and potential optimization of children's play spaces in Xi'an's heritage parks, this study employs semi-structured interviews and thematic analysis. The primary focus is on cultural expression, interactivity, and the level of challenge offered by the play spaces. Two participant groups were interviewed: parents and experts. Parent interviews sought to gather direct feedback on user experience, while expert

interviews focused on evaluating design logic and cultural representation from a professional perspective.

An interview guide was developed in advance, structured around the 7Cs framework. The guide included questions on the integration of cultural characteristics and functionality, the interactivity and diversity of facilities, and the balance between challenge and age-appropriateness.

Interview data were collected through audio recordings and detailed transcription, followed by open coding and clustering for analysis. First, the research team reviewed the transcripts line by line, extracting key information

Table 4. Questionnaire design for experts

| Dimension (C) | Evaluation factor                             | Question (expert perspective)   |
|---------------|---|---|
| Character     | Design reflects cultural and natural features | Does the design of the play space sufficiently represent local cultural and natural features?                                     |
|               | Provides unique visual experiences            | Do you think the play space design offers children a unique visual experience?  |
|               | Encourages children's exploration interest    | Does the design of the play space help stimulate children's interest in exploration and cognitive development?                    |
| Context       | Adapts to microclimate and natural conditions | Does the play space design account for microclimatic conditions (e.g., sunlight, wind) and provide adaptive solutions?            |
|               | Utilizes surrounding resources                | Does the play space effectively utilize nearby natural and social resources?  |
|               | Fits into the community environment           | Is the design of the play space well-integrated with the surrounding community environment?                                       |
| Connectivity  | Seamless indoor-outdoor connection            | Does the design of the play space enable seamless indoor-outdoor connectivity?  |
|               | Supports diverse mobility options             | Does the play space design offer diverse mobility pathways (e.g., looped and layered paths) to meet children's exploration needs? |
|               | Promotes children's interaction               | Does the layout of the play space enhance social interaction and observational behavior among children?                           |
| Change        | Meets social and solitary needs               | Does the play space include diverse areas suitable for children's solitude and social activities?                                 |
|               | Provides manipulable materials                | Does the design of the play space provide materials that encourage long-term engagement and manipulation?                         |
|               | Allows flexible layouts                       | Does the play space allow flexible adjustments to meet different activity needs?  |
| Chance        | Offers "messy zones"                          | Does the play space include open and flexible areas (e.g., sand pits, mud areas) for creative use by children?                    |
|               | Encourages spontaneous exploration            | Does the play space design encourage children's spontaneous exploration and cognitive development?                                |
|               | Supports unstructured activities              | Does the play space provide a sufficient open environment for unstructured play?  |
| Clarity       | Avoids visual obstacles                       | Does the play space layout avoid visual obstacles (e.g., large equipment blocking views)?   |
|               | Provides clear entry and exit points          | Are the entry and exit points of the play space clearly and safely designed?  |
|               | Reduces noise interference                    | Is the soundscape of the play space well-designed to reduce noise and improve user experience?                                    |
| Challenge     | Offers multi-level activity facilities        | Does the play space include challenging facilities suitable for children at various developmental stages?                         |
|               | Designs progressive challenges                | Does the play space promote skill development through progressively challenging designs?  |
|               | Ensures safety                                | Does the play space balance challenging designs with children's safety needs?   |

relevant to the research objectives and assigning open codes to each segment. These codes were then clustered based on shared characteristics, forming subthemes and overarching themes that captured similarities and differences in the evaluation priorities of parents (Table 5) and experts (Table 6).

The qualitative method provided supplementary insights into the design logic of the play spaces. For each park, 15 parents and 15 experts were invited to participate in the semi-structured interviews.

Parent interviews centered on practical aspects of facility use, with questions such as, "In what ways do the

facilities fail to meet your child's needs?" and "Which features do you find most engaging for your child?"

Expert interviews emphasized the integration of cultural expression with functional design, posing questions such as, "How can the heritage culture be better reflected in the play spaces?" and "What design strategies could enhance interactivity and challenge in the facilities?"

Thematic analysis of the transcribed content involved systematically coding and categorizing the data, ensuring that the findings reflected both distinct and overlapping priorities between the two groups. This approach enriched

Table 5. Summary of parent group thematic coding

| 7Cs dimension | Initial coding keywords   | Subtheme   | Theme   |
|---------------|---|--|---|
| Character     | Weak cultural perception, insufficient historical display appeal, poor relevance of decorative design to children | Fun-oriented cultural design                     | Enhancing the integration of culture and play spaces for greater engagement |
|               | Lack of child-centric cultural representation, overly functional design of facilities                             | Child-friendly cultural expression               |   |
|               | Imbalance between static and interactive content, thin historical storytelling                                    | Dynamic cultural content design                  |   |
| Context       | Poor integration of facilities with environment, overly modernized design, greenery obstructing facilities        | Integration of facilities with natural landscape | Coordination and functionality of environmental design                      |
|               | Lack of site appeal, indirect cultural expression   | Unity of site atmosphere and cultural elements   |   |
|               | Poor material and color design, low landscape layering  | Harmonious visual elements                       |   |
| Connectivity  | Uneven distribution of play areas, insufficient path signage, lack of entrance guidance                           | Connection between paths and functional areas    | Optimizing accessibility and usability                                      |
|               | Disorganized flow logic, weak connection between facilities   | Optimization of user pathways                    |   |
|               | Simple signage, poor initial user experience  | User-friendly park navigation design             |   |
| Change        | Monotonous activity types, lack of facilities for different age groups, insufficient adaptability                 | Adaptability of facility design                  | Enhancing flexibility and multifunctionality of facilities                  |
|               | Seasonal usage limitations, lack of dynamic activities  | Seasonal and dynamic design                      |   |
|               | Single-use scenarios, unmet diverse needs   | Diversity in functional design                   |   |
| Chance        | Limited free activity spaces, insufficient exploratory activities, single interaction modes                       | Support for free play and exploration            | Enhancing exploratory activities and dynamic interactive facilities         |
|               | Lack of cooperative activities, insufficient group interaction facilities   | Social interaction facilities and site design    |   |
|               | Weak integration of cultural display and interaction design   | Dynamic integration of culture and play          |   |
| Clarity       | Complex signage system, insufficient facility usage guidance  | Optimization of navigation systems               | Enhancing clarity in functional layouts                                     |
|               | Ambiguity in facility use, poor experience for first-time users   | Intuitive facility usage guidance                |   |
|               | Vague zoning, weak functional layout logic  | Rationality in functional zoning                 |   |
| Challenge     | Lack of challenging facilities for older children, monotonous activities  | Suitability of challenge facilities              | Providing multi-level challenges and cognitive games                        |
|               | Insufficient intellectual and physical activity design, lack of challenging content                               | Diversity and layering in challenge activities   |   |
|               | Overemphasis on safety facilities, lack of adventurous elements   | Balance between challenge and safety             |   |

the understanding of design performance, particularly in areas requiring qualitative assessment.

### 3. Results

#### 3.1. Overall evaluation performance

The quantitative analysis based on the 7Cs framework reveals that the overall performance of children's play spaces in Xi'an's three heritage parks is relatively balanced, though notable differences exist across specific dimensions. Figure 5 presents the mean ratings for each category, with 95% confidence intervals displayed. The average scores for Qujiang Pool Heritage Park, Daming Palace National Heritage Park, and Tang City Wall Heritage Park were 3.78,

3.68, and 3.70, respectively. These closely aligned scores suggest that all three parks share strengths in cultural expression and environmental integration.

Among the evaluated dimensions, Character and Context received the highest scores, averaging 4.2 and 4.1, respectively. This finding indicates that the parks effectively incorporate cultural features while maintaining harmony with their surroundings. Daming Palace National Heritage Park, in particular, stands out for its recreation of Tang dynasty cultural elements and immersive spatial atmosphere.

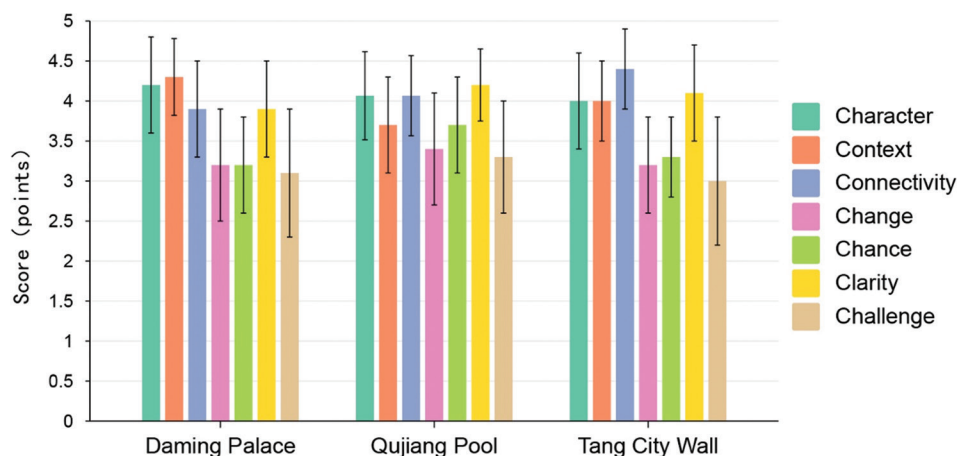
However, the Challenge and Chance dimensions received relatively lower scores, at 3.1 and 3.2, respectively,

**Table 6. Summary of expert group thematic coding**

| 7Cs dimension | Initial coding keywords  | Subtheme  | Theme  |
|---------------|--|---|--|
| Character     | Static displays, lack of interaction, insufficient cultural background extraction, lack of contextual design | Cultural display and interactive design           | Deep integration of culture and play spaces                      |
|               | Monotonous themed facilities, limited historical symbols, single forms of cultural expression                | Integration of historical and cultural elements   |  |
|               | Heritage elements limited to decoration, weakened cultural transmission function                             | Balancing cultural education and engagement       |  |
| Context       | Incoherent materials, conflict between modern facilities and heritage styles, inconsistent cultural ambiance | Coordination of site and heritage culture         | Organic integration of heritage environments and play facilities |
|               | Lack of landscape layering, overly functional natural vegetation design                                      | Integration of natural and cultural elements      |  |
|               | Insufficient cultural ambiance, underutilized historical elements  | Cultural ambiance creation in heritage contexts   |  |
| Connectivity  | Complex pathway design, dispersed functional zones, weak connection logic                                    | Optimization of functional zones and pathways     | Functional integration and flow optimization of park pathways    |
|               | Missing signage design, unintuitive navigation system  | Signage and pathway guidance systems              |  |
|               | Weak accessibility via public transport, unclear linkage between entrances and activity zones                | Entrance design and accessibility                 |  |
| Change        | Monotonous facility design, lack of dynamic activities, weak multifunctional adaptability                    | Multifunctional facility design and adjustments   | Flexibility and diversity in facility design                     |
|               | Insufficient seasonal activities, unclear functional zoning  | Seasonal and dynamic adaptation of spaces         |  |
|               | Unmet diverse user needs, lack of facilities for older children  | Age segmentation and needs adaptation             |  |
| Chance        | Lack of exploratory activities, insufficient free play spaces, weak interactive design                       | Support for exploration and free play             | Enhancing interactivity and exploration in play facilities       |
|               | Limited participatory cultural narratives, static display formats  | Integration of cultural education and exploration |  |
|               | Lack of cooperative activity support, absence of group interaction designs                                   | Spatial design for social interaction             |  |
| Clarity       | Complex signage systems, unclear functional zones, unintuitive facility uses                                 | Layout and functional guidance                    | Enhancing the intuitiveness of spatial layouts                   |
|               | Unclear usage processes, poor initial user experience  | Site navigation and functional guidance           |  |
|               | Weak spatial logic, imbalanced functional zoning   | Rationality of functional layouts                 |  |
| Challenge     | Lack of challenging activities for older children, low-level activities for younger users                    | Layered adaptation of challenge design            | Providing more challenging facilities                            |
|               | Few cognitive challenge designs, low difficulty in cooperative activities                                    | Logic and layering of activity design             |  |
|               | Imbalance between safety and adventure, conservative approach to challenge design                            | Balancing adventure and safety in design          |  |

suggesting that the facilities do not fully meet the developmental needs of older children or provide sufficient opportunities for exploratory play. These deficiencies highlight the need for more diverse and interactive play features that cater to children across different age groups.

These findings suggest that while heritage parks have made notable progress in cultural presentation and environmental integration, there remains substantial room for improvement in interactive design, diverse activity facilities, and exploratory experiences. The key challenge



**Figure 5.** 7Cs Dimension scores of the three parks  
Source: Graph by the authors

lies in achieving a dynamic balance between cultural preservation and modern functional needs to enhance users' engagement and play value.

### 3.2. Comparative analysis of the 7Cs dimension performance across the three parks

The overall scoring results indicate that Daming Palace Heritage Park excels in the Character and Context dimensions, with scores of 4.2 and 4.3, respectively. This highlights the park's strong cultural theme design and effective coordination with its surrounding environment. However, the park received the lowest score (3.1) in the Challenge dimension, revealing deficiencies in facilities designed for older children.

Tang City Wall Heritage Park achieved the highest score (4.4) in the Connectivity dimension, benefiting from its linear greenway design and clear functional zoning. However, its relatively low score (3.2) in the Change dimension indicates a lack of diversity in facilities and limited adaptability to multifunctional needs. Qujiang Pool Heritage Park performed well in the Chance and Clarity dimensions, with scores of 3.7 and 4.2, respectively. Its dynamic interactive facilities and clear signage system received unanimous recognition from both parents and experts. However, the park received a relatively low score (3.7) in the Context dimension, reflecting that some facilities failed to integrate effectively with the natural landscape and heritage environment.

Overall, each park exhibits distinct strengths and weaknesses across different dimensions. These differences provide specific directions for optimizing the design of heritage park play spaces in the future.

### 3.3. Qualitative research findings

The qualitative analysis, derived from interviews with both the parent group and the expert group, identifies several core themes that provide significant insights to complement the quantitative findings. It is worth noting that experts and parents have differing perspectives on multiple aspects (Table 7).

First, the static nature of cultural elements was frequently mentioned. Experts agreed that current cultural expressions heavily rely on fixed installations, such as sculptures and plaques, which fail to stimulate children's curiosity or encourage interaction. Likewise, parents observed that children showed limited engagement with traditional sculptures and cultural displays, emphasizing the need for more dynamic and context-based educational activities.

Second, the lack of exploratory and challenging facilities emerged as another key issue. Parents pointed out that existing facilities primarily cater to younger children, providing inadequate support for older children, particularly in climbing structures and intellectually stimulating play zones. Experts further recommended implementing age-specific design concepts to introduce multi-layered exploration and progressive challenge activities suited to different developmental stages.

Third, issues related to functional signage and ease of use were highlighted in multiple parent responses. Some parents mentioned that entrances to play areas were poorly marked, and signage was unclear, negatively impacting the overall user experience. Experts suggested improving the intuitiveness of the signage system while optimizing the layout of functional zones.

Table 7. Comparison of parent and expert assessments

| 7Cs Dimension | Parent feedback  | Expert feedback  |
|---------------|--|--|
| Character     | The play spaces reflect cultural themes, but children find them less engaging.               | Cultural elements are well-integrated, but play spaces lack interactive storytelling.    |
| Context       | Play spaces blend well with nature but lack seasonal adaptability.                           | Designs effectively preserve heritage, but microclimatic adjustments are needed.         |
| Connectivity  | Play areas are accessible, but navigation is sometimes unclear.                              | Spatial layout promotes exploration, but signage and orientation should be improved.     |
| Change        | Limited diversity exists in play structures, affecting long-term engagement.                 | The current design lacks flexible and adaptive elements.                                 |
| Chance        | Few open-ended play areas are available, reducing children's ability to explore freely.      | Play spaces do not provide sufficient opportunities for self-directed and creative play. |
| Clarity       | Parents appreciate clear sightlines but note that some areas lack visibility.                | Play spaces have clear layouts, but zoning could be optimized for better wayfinding.     |
| Challenge     | Play facilities cater mostly to younger children, with limited options for older age groups. | The lack of progressive challenge levels limits children's skill development.            |

Finally, the balance between cultural expression and modern needs was repeatedly emphasized by experts. They observed that current designs lean too heavily toward cultural display at the expense of dynamic, interactive activities. Experts suggested that future designs should seek a better balance between cultural preservation and modern functionality, creating more engaging and versatile play spaces that fulfill both educational and recreational needs.

#### 4. Discussion

Based on the 7Cs framework, this study systematically evaluated the design performance of children's play spaces in three heritage parks in Xi'an. The results indicate that while these spaces exhibit certain advantages in cultural expression and environmental integration, there remains considerable room for improvement.

##### 4.1. Balancing cultural expression and user needs in heritage park play spaces

Children's play spaces in Xi'an's heritage parks demonstrate significant strengths in cultural expression and environmental integration, particularly in the Character and Context dimensions, which received relatively high ratings. These findings indicate that heritage parks effectively incorporate cultural elements while maintaining spatial harmony. This aligns with previous research highlighting that visual representations of cultural heritage enhance the historical ambiance of public spaces, allowing children and families to passively absorb historical knowledge during leisure activities (Jiang, 2024).

However, further analysis reveals that current approaches to cultural representation remain largely static, relying primarily on sculptures, informational plaques,

and engraved reliefs, while lacking dynamic, interactive engagement. According to parental feedback, only 23.5% of parents reported that their children maintained a sustained interest in cultural sculptures or informational displays, whereas 68.9% observed a preference for dynamic exploratory activities, such as climbing, role-playing, and interactive puzzle-solving. Interviews further reinforced this sentiment, with many parents describing existing cultural installations as "more to see, less to play," suggesting that these spaces fail to fully captivate children's curiosity or provide a balanced blend of educational and recreational functions.

These findings highlight a gap between cultural representation and user engagement. Findings from expert and parent interviews further confirm that current cultural elements in heritage parks lack interactivity. Research suggests that children's understanding of cultural content relies heavily on gamification, role-playing, and multi-sensory stimulation, as static visual information alone struggles to sustain their attention (Slingerland *et al.*, 2020). In contrast, leading international practices have shifted from static cultural displays toward more interactive and participatory experiences. For example, Denmark's Lejre Land of Legends and Ribe Viking Center incorporate role-playing activities, hands-on historical reenactments, and immersive storytelling techniques to engage children in cultural heritage. These sites facilitate experiential learning by allowing visitors to participate in historical scenarios, traditional craftsmanship, and interactive narratives. Such approaches not only foster a deeper understanding of history but also enhance the play experience by integrating cognitive, social, and physical engagement within a heritage context. The success of these approaches in engaging children suggests their potential applicability in

enhancing the interactivity of heritage park play spaces in Xi'an and similar culturally rich urban settings.

## 4.2. Strategies for enhancing exploratory and challenging play in heritage parks

Findings from this study indicate that children's play spaces in Xi'an's heritage parks lack sufficient opportunities for exploration and challenge. Quantitative analysis revealed that these spaces scored lower in these dimensions compared to others, suggesting that current designs may not fully accommodate the diverse developmental needs of children. Survey data indicate that a significant proportion of parents expressed a preference for play facilities that offer greater physical challenge and open-ended exploration. Additionally, interview findings suggest that the majority of existing facilities primarily cater to younger children, featuring slides and low climbing structures, while fewer elements support older children's engagement through more complex and physically demanding activities. This limited variety in play opportunities may contribute to lower participation rates among children aged 6 – 12. A key factor underlying this issue appears to be a design emphasis on fundamental safety and accessibility, often at the expense of age-appropriate challenge and exploratory play elements. Many heritage parks prioritize standardized, low-intensity play structures that, while ensuring inclusivity, may not sufficiently address children's evolving needs for cognitive and physical challenges. To address these challenges, this study identifies three key strategies for enhancing exploratory and challenging qualities in heritage park play spaces, namely incorporating progressively challenging play structures, integrating natural landscapes to foster exploration, and utilizing interactive and gamified learning elements.

Firstly, survey and interview data suggest that a tiered system of challenge-based play structures could better accommodate children's varying skill levels and developmental needs. For younger children, low climbing nets and obstacle courses can facilitate basic motor skill development, while older children could benefit from high rope courses, dynamic balancing structures, and climbing walls with increasing levels of difficulty. Research on play space engagement (Wang, 2021) highlights that adjustable play equipment, such as modular climbing elements and variable-incline slides, allows children to self-select difficulty levels, thereby supporting skill progression over time.

Secondly, the integration of natural features has been identified as a factor in enhancing children's exploratory behaviors (Wang, 2021). Observational data indicate that children demonstrate increased engagement when play

environments incorporate diverse terrains, vegetation, and water-based elements. Existing landscapes, such as sloped areas, wooded sections, and shallow water zones, could be utilized to create adventure trails, stepping-stone pathways, and interactive topographical mazes. In addition, thematic discovery areas, such as archaeological excavation zones or heritage-inspired labyrinths, may encourage children to engage with cultural narratives while fostering spatial awareness and problem-solving skills.

Thirdly, qualitative findings indicate that static cultural displays in heritage parks may not sustain children's attention over extended periods, limiting their engagement with cultural content. Incorporating interactive storytelling and task-based activities may help bridge this gap. Play structures designed around historical narratives, such as reconstructed heritage sites, could allow children to complete challenges related to historical architecture or artifact discovery, serving both recreational and educational functions. Recent studies (Lian & Xie, 2024) have explored augmented reality (AR) applications as a means of enhancing interactive engagement. For example, AR-enabled features could allow children to scan designated cultural landmarks with mobile devices to unlock virtual storytelling, historical puzzles, or animated character interactions. This approach may help deepen children's connection to cultural heritage through play.

By integrating these enhancements, heritage parks could offer more engaging and educational play environments that promote active participation and meaningful cultural connections. Future research could further examine the long-term impacts of these interventions on user engagement and cultural learning outcomes.

## 4.3. Insights from differences in parent and expert evaluations

This study reveals that while both parents and experts acknowledge the cultural and environmental strengths of children's play spaces in Xi'an's heritage parks, their evaluation priorities differ significantly. Parents prioritize practical usability, particularly in terms of safety, accessibility, and playability. Many parents perceive existing play facilities as lacking variety and opportunities for exploration, particularly for older children, who may find them less engaging. In contrast, experts emphasize design logic, cultural integration, and spatial planning. They recognize that current play spaces successfully incorporate cultural elements but note that they lack dynamic, interactive features that would allow children to experience heritage themes more deeply.

Despite these differing perspectives, both parents and experts agree that the dimensions of challenge and

exploration require improvement. However, their concerns diverge. Parents focus on the lack of physical activity facilities, while experts highlight the absence of progressive play design strategies that provide gradual levels of challenge. Additionally, experts stress the balance between cultural authenticity and functional needs, whereas parents prioritize immediate usability and immersive engagement for children.

These differences offer valuable insights for the development of child-friendly heritage parks. First, achieving a balance between cultural representation and interactive experiences is essential—play spaces should not only showcase heritage themes but also incorporate diverse interactive elements that enhance children's engagement and curiosity. Second, play facilities must cater to children of different age groups, ensuring that older children have access to more challenging and exploratory play opportunities rather than focusing solely on basic play structures for younger children. Third, safety and accessibility remain key concerns for parents, making it essential to optimize spatial layout, ensure clear sightlines, and design convenient pathways that facilitate supervision and ease of movement. Finally, the planning process should integrate insights from both parents and experts, fostering multidisciplinary collaboration and child-participatory design to create more inclusive, interactive, and culturally enriching heritage park play spaces.

#### 4.4. Limitations and future outlook

This study has several limitations. First, the scope of the research is relatively narrow, focusing on only three heritage parks, without including other types of parks or broader urban cases. This limits the generalizability of the findings, particularly when applied to comparative analyses of different types of parks. Second, data collection was concentrated during specific seasons and periods, failing to fully capture the effects of seasonal variations, festive activities, or different time periods on children's play space usage patterns. This results in a lack of temporal representativeness in the study's conclusions. Moreover, while the 7Cs framework effectively evaluates the physical design of play spaces and user behavior, its applicability in assessing the depth of cultural expression and the dynamic integration of culture and functionality in heritage contexts remains limited. Further exploration is needed to extend the framework's applicability to historical and cultural settings. Finally, considering children's limited ability to articulate their experiences, data collection relied on parental and expert perspectives rather than direct input from children. This limits the depth of understanding regarding children's authentic experiences. These limitations suggest significant opportunities for future research to refine scope, temporal

coverage, framework adaptability, and methodological approaches.

To address these limitations and the complex requirements of designing children's play spaces in heritage parks, future research can be expanded and deepened in several directions. First, broadening the scope of research to include comparisons between heritage parks and other park types—such as general urban parks or child-friendly city pilot projects—could reveal universal principles for integrating cultural expression with functionality. Second, long-term dynamic data collection could provide insights into the effects of seasonal changes, festive events, and peak usage periods on play space usage patterns, providing scientific evidence for adaptive design strategies.

Additionally, the 7Cs framework could be optimized and expanded to better suit the cultural context of heritage parks by incorporating dimensions such as cultural depth or historical continuity, enabling a more comprehensive evaluation of the integration of cultural elements and functional design. Furthermore, integrating geographic information systems, behavior tracking technologies, or big data analytics could enhance precision in analyzing user behavior and spatial usage patterns.

Since children are the primary users of play spaces, future research should prioritize their subjective experiences and needs. Methods such as behavioral observations, focus group discussions, and child-friendly interviews could provide deeper insights into age-specific requirements, leading to more informed design strategies that accommodate diverse user needs.

## 5. Conclusion

Using the 7Cs framework, this study provides an in-depth analysis of children's play spaces in heritage parks in Xi'an, uncovering both the challenges and potential of existing designs. The findings highlight the complexity of integrating cultural elements with functional requirements, demonstrating that children's play spaces serve not only as vehicles for cultural transmission but also as vital platforms for fostering social inclusion and innovation.

Future designs should move beyond a focus on physical spatial characteristics to incorporate dynamic cultural experiences and multidimensional opportunities for exploration and play. Such spaces should foster cultural engagement, stimulate creativity, and address the diverse needs of various user groups. Achieving this vision requires designers to integrate cultural sensitivity with social innovation and technological advancements, creating spaces that are educational, interactive, and sustainable.

Children's play spaces are not mere urban details; they are foundational in shaping the memories of future generations. By delving into the profound connection between culture and play, design can transcend geographical and temporal boundaries, offering new paradigms for urban spaces enriched with cultural vibrancy and humanistic values. This endeavor benefits not only children but also contributes to the broader reimagination of public spaces in modern cities.

## Acknowledgments

None.

## Funding

This study was funded by the Faculty Development Fund of Huaqing College, Xi'an University of Architecture and Technology, the Scientific Research Program of Huaqing College, Xi'an University of Architecture and Technology (24KY01), the 2024 Shaanxi Provincial Sports Bureau Regular Project (20240162), and the Shaanxi Provincial Youth Research Program in Philosophy and Social Sciences.

## Conflict of interest

The authors declare they have no competing interests.

## Author contributions

*Conceptualization:* Ke Chen

*Formal analysis:* Ke Chen, Chengyun Zhang, Mengyi Li

*Investigation:* Ke Chen, Chengyun Zhang, Mengyi Li

*Methodology:* Ke Chen

*Writing – original draft:* Ke Chen

*Writing – review & editing:* Ke Chen, Ruhizal Roosli

## Ethics approval and consent to participate

Our study employed an observational survey approach, inviting parents to voluntarily participate by completing publicly available questionnaires placed in designated areas within the parks. No personal identifiers were collected, and participation was entirely anonymous and unobtrusive.

## Consent for publication

No personal identifiers were collected, and participation was entirely anonymous and unobtrusive.

## Availability of data

The data can be obtained by sending request e-mails to the author.

## Further disclosure

This article is related to the first author's doctoral dissertation, which remains unpublished at the time of this article's publication.

## References

- Chen, X. (2022). Gaomidu chengshi ertong youqi kongjian gui hua jianshe celue. [Children's recreational space planning and construction in high-density cities]. *Planners*, 38(6):131-137.
- Chiesura, A. (2004). The role of urban parks for the sustainable city. *Landscape and Urban Planning*, 68(1):129-138.  
<https://doi.org/10.1016/j.landurbplan.2003.08.003>
- Dalpra, M. (2022). Rethinking Play Environments for Social Inclusion in Our Communities. In: *Transforming our World through Universal Design for Human Development*. Amsterdam: IOS Press.  
<https://doi.org/10.3233/shti220842>
- Ding, K., & Han, X. (2019). Shenzhen shi huwai youxi changdi kongjian tezheng dui ertong youxi xingwei he zonghe fazhan de yingxiang. [The impact of contemporary outdoor playground spatial features on children's play and development, Shenzhen]. *Planners*, 35(15):87-92.
- Fan, Z., & Chen, C. (2024). Jiyu dianping shuju fenxi de chengqiang yizhi gongyuan gongzhong tiyan ganzhi yanjiu [The public experience perception of city wall ruins park based on review data analysis]. *Chinese and Overseas Architecture*, 2024(12):68-73.
- Fang, N. (2020). Policy innovation on building child friendly cities in China: Evidence from four Chinese cities. *Children and Youth Services Review*, 118:105491.
- Gemmell, E., Ramsden, R., Brussoni, M., & Brauer, M. (2023). Influence of Neighborhood Built Environments on the outdoor free play of young children: A systematic, mixed-studies review and thematic synthesis. *Journal of Urban Health*, 100(1):118-150.  
<https://doi.org/10.1007/s11524-022-00696-6>
- Gray, C., Gibbons, R., Larouche, R., Sandseter, E.B., Bienenstock, A., Brussoni, M., et al. (2015). What is the relationship between outdoor time and physical activity, sedentary behaviour, and physical fitness in children: A systematic review. *International Journal of Environmental Research and Public Health*, 12(6):6455-6474.  
<https://doi.org/10.3390/ijerph120606455>
- Guan, H. (2021). Review of Space Research and Practice of Child-Friendly Outdoor Games in Past Ten Years Spatial Governance for High-Quality Development. In: *Proceedings of the 2021 China Urban Planning Annual Conference*, Chengdu, China.
- He, H. (2020). Ertong youhaoxing chengshi shenghuoxing jiedao

- kongjian pinzhi shibie yanjiu-yi Wuhan shi Nanjing Lu yu Shanglong Lu wei li [Research on space quality identification of living street in child-friendly city: A case study of Nanjing street and Shanglong Street in Wuhan]. *Shanghai Urban Planning Review*, 2020(3):47-53.  
<https://doi.org/10.11982/j.supr.20200307>
- Heft, H. (1988). Affordances of children's environments: A functional approach to environmental description. *Children's Environments Quarterly*, 5(3):29-37.
- Herrington, S., & Brussoni, M. (2015). Beyond physical activity: The importance of play and nature-based play spaces for children's health and development. *Current Obesity Reports*, 4(4):477-483.  
<https://doi.org/10.1007/s13679-015-0179-2>
- Herrington, S., & Lesmeister, C. (2006). The design of landscapes at child-care centres: Seven Cs. *Landscape Research*, 31(1):63-82.  
<https://doi.org/10.1080/01426390500448575>
- Hyder, T. (2004). *War, Conflict and Play. Debating Play*. New York: Open University Press.
- Jiang, Y. (2024). Jindai Yilai Xi'an Chengshi Wenhua Yichan Gonggong Kongjianhua Licheng Yanjiu [Study on Public Spatialization Process of Urban Cultural Heritage in Xi'an Since Modern Times]. Vol. 56. China: Xi'an University of Architecture and Technology, p. 466-474.
- Lee, E.Y., Kim, Y.B., Goo, S., Oyama, O., Lee, J., Kim, G., et al. (2023). Physical activity in the era of climate change and COVID-19 pandemic: Results from the South Korea's 2022 Report Card on physical activity for children and adolescents. *Journal of Exercise Science and Fitness*, 21(1):26-33.  
<https://doi.org/10.1016/j.jesf.2022.10.014>
- Lian, Y., & Xie, J. (2024). The evolution of digital cultural heritage research: Identifying key trends, hotspots, and challenges through bibliometric analysis. *Sustainability*, 16(16):7125.  
<https://doi.org/10.3390/su16167125>
- Shu, X., Mesimäki, M., Kotze, D.J., Wales, M., Xie, L., Benicke, R., et al. (2022). Needs and expectations of German and Chinese children for livable urban green spaces revealed by the method of empathy-based stories. *Urban Forestry and Urban Greening*, 68:127476.  
<https://doi.org/10.1016/j.ufug.2022.127476>
- Slingerland, G., Lukosch, S., & Brazier, F. (2020). Engaging Children to Co-create Outdoor Play Activities for Place-making. In: *Proceedings of the 16<sup>th</sup> Participatory Design Conference*. Vol. 1.
- UNESCO. (2016). *Culture Urban Future: Global Report on Culture for Sustainable Urban Development*. Available from: <https://unesdoc.unesco.org/ark:/48223/pf0000245999>
- UN-Habitat. (2013). *Streets as Public Spaces and Drivers of Urban Prosperity*. Available from: [https://unhabitat.org/sites/default/files/2020/08/streets\\_as\\_public\\_spaces\\_and\\_drivers\\_of\\_urban\\_prosperity.pdf](https://unhabitat.org/sites/default/files/2020/08/streets_as_public_spaces_and_drivers_of_urban_prosperity.pdf)
- UNICEF. (2018). *Shaping Urbanization for Children Handbook*. Available from: <https://www.unicef.org/reports/shaping-urbanization-children> [Last accessed on 2025 Apr 02].
- Wang, X. (2021). Ziran yuansu zai Zhongguo chengshi gongyuan ertong youxi kongjian sheji zhong de yingyong diaocha yanjiu [Study on the application of natural elements in urban parks' children's play space in China]. *International Urban Planning*, 36(1):40-46.  
<https://doi.org/10.19830/j.upi.2020.385>
- Wang, X. (2022). Jiyu youxi jiazhi de Zhongguo chengshi gongyuan ertong huwai youxi kongjian pingjia yanjiu [Research on evaluation of children's outdoor play space in Chinese urban parks based on play values]. *Landscape Architecture*, 2(29):78-83.  
<https://doi.org/10.14085/j.fjyl.2022.02.0078.06>
- Wray, A., Martin, G., Ostermeier, E., Medeiros, A., Little, M., Reilly, K., et al. (2020). Physical activity and social connectedness interventions in outdoor spaces among children and youth: A rapid review. *Health Promotion and Chronic Disease Prevention in Canada-Research*, 40(4):104-115.  
<https://doi.org/10.24095/hpcdp.40.4.02>
- Wu, Y. (2021). Satisfaction evaluation of comprehensive urban parks under the concept of child friendly city. *Journal of Chinese Urban Forestry*, 16(6):82-87.  
<https://doi.org/10.12169/zgcsly.2021.03.12.0001>
- Yang, D., & Dong, N. (2021). Jiyu chengzhang renzhi shijiao xia de qinziranxing feijiegouhua ertong youxi huanjing [Biophilic unstructured play environment based on the perspective of children's developmental cognition]. *Chinese and Overseas Architecture*, (7):9-14.  
<https://doi.org/10.19940/j.cnki.1008-0422.2021.07.002>
- Yildirim, Y., Keshavarzi, G., & Aman, A.R. (2022). Does play-based experience provide for inclusiveness? A case study of multi-dimensional indicators. *Child Indicators Research*, 15(6):2197-2214.  
<https://doi.org/10.1007/s12187-022-09951-3>

## ORIGINAL ARTICLE

Cultural preservation and tourism in Uchuraccay,  
Ayacucho, Peru: Inspirations from Chinese  
strategies for a development plan

Rosario Pariona-Luque<sup>1†</sup>, Liz Pacheco-Pumaleque<sup>2†\*</sup>,  
Marco Añaños-Bedriñana<sup>3</sup>, Wilson Marin<sup>4</sup>, Jorge Franco-Medina<sup>5</sup>,  
and Alex Pacheco<sup>5</sup>

<sup>1</sup>Professional School of Sustainable Tourism and Hotel Management, Universidad Nacional Autónoma de Huanta, Ayacucho, Peru

<sup>2</sup>Administration Career, Faculty of Business Sciences, Universidad San Ignacio de Loyola, Lima, Peru

<sup>3</sup>Professional School of Forestry and Environmental Engineering, Universidad Nacional Autónoma de Chota, Cajamarca, Perú

<sup>4</sup>School of Systems Engineering, Faculty of Engineering and Architecture, Universidad Cesar Vallejo, Lima, Perú

<sup>5</sup>Cañete Lab Research Center, Professional School of Systems Engineering, Universidad Nacional de Cañete, Lima, Perú

(This article belongs to the *Special Issue: Transcultural Dialogues in Architecture and Urbanism: Intersections Between Chinese Architecture and Global Influences*)

†These authors contributed equally to this work.

\*Corresponding author:  
Liz Pacheco-Pumaleque  
(lpacheco@usil.edu.pe)

**Citation:** Pariona-Luque, R., Pacheco-Pumaleque, L., Añaños-Bedriñana, M., Marin, W., Franco-Medina, J., & Pacheco, A. (2025). Cultural preservation and tourism in Uchuraccay, Ayacucho, Peru: Inspirations from Chinese strategies for a development plan. *Journal of Chinese Architecture and Urbanism*, 7(3): 5862.  
<https://doi.org/10.36922/jcau.5862>

**Received:** November 12, 2024

**1st revised:** January 14, 2025

**2nd revised:** February 19, 2025

**Accepted:** February 26, 2025

**Published online:** April 25, 2025

**Copyright:** © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## Abstract

The management of cultural heritage in tourism is fundamental to ensuring the efficient use of natural, archeological, and cultural resources in a region's tourism development. This study aims to evaluate residents' perceptions of the relationship between cultural heritage and tourism development in Uchuraccay, Ayacucho, Peru. A questionnaire was administered to 520 residents, assessing the cultural heritage variable, which includes tangible heritage and intangible heritage, and the tourism development variable, which encompasses environmental, social, and economic dimensions. The results indicate that 38.65% of respondents believe tangible heritage faces difficulties in being properly valued due to a lack of public awareness, insufficient investment in conservation, and ineffective promotion. In addition, 40.96% of respondents perceive that intangible heritage is inadequately managed, citing the absence of effective policies and strategies to safeguard and transmit these elements to future generations. These findings highlight the need for a comprehensive assessment of cultural heritage to boost economic development through the implementation of tourism strategies that stimulate economic activity. This study provides valuable information on urban planning, governance frameworks, and empirical knowledge, contributing to informed decision-making by local authorities and the effective management of available resources.

**Keywords:** Local governments; Tangible heritage; Economy; Decision-making; Uchuraccay

## 1. Introduction

Cultural heritage is regarded as an inheritance that communities value a resource comprising tangible, intangible, and natural assets. These assets contribute to sustainable urban development by ensuring the preservation of cultural resources across generations (Liu & Chen, 2024; Newton *et al.*, 2021; Town *et al.*, 2021). Cultural heritage is an important element in the cultural expression of diverse communities, encompassing esthetic and symbolic resources such as myths, stories, customs, and social traditions that foster cultural recognition within a given territory (Pariona-Luque *et al.*, 2023; Tahseen & Aljumaily, 2020). In addition to this, cultural heritage serves as one of the most important economic resources of a region, particularly for tourism, by generating employment opportunities and income sources, thereby contributing to poverty reduction (Amakawa *et al.*, 2020). However, Hussein *et al.* (2020) and Yang (2020) warn that unregulated tourism development can jeopardize cultural heritage preservation if sustainable tourism plans are not implemented to prevent resource overexploitation and adverse community impact.

Given these concerns, the effective management of a territory's tourism heritage is essential for developing strategies that promote tourism while ensuring sustainability. According to Leonady *et al.* (2021), tourism development involves a set of actions aimed at designing and implementing projects that attract more visitors to an area, thereby stimulating economic growth. Effective tourism management requires a comprehensive understanding of a region's governance model to identify its strengths, weaknesses, opportunities, and threats, which can inform the formulation of ideal strategies for tourism development (Maulana & Pratama, 2021; Uribe-Hernandez *et al.*, 2023). In this context, a sustainable approach to tourism management is crucial. As Ginting & Ferani (2019) emphasize, tourism has become the leading industry in the market, making it imperative to preserve natural and archeological resources to ensure its long-term viability. Another important measure to promote tourism development is the creation of tourist routes that improve site accessibility and attract a large number of visitors (Idajati & Nugroho, 2019). In summation, proper tourism heritage management, a strong focus on sustainability, and the implementation of effective strategies are a key to fostering long-term tourism development.

Current research highlights the significant challenges and risks associated with cultural heritage management worldwide, underscoring the need to learn from these contexts to prevent similar pitfalls. In China, cultural heritage remains highly vulnerable to natural disasters,

exacerbated by the lack of early risk assessment tools and inadequate emergency response capacity (Fu *et al.*, 2022). In Australia, insufficient cultural heritage protection has been found to negatively impact the sustainable livelihoods of residents, who are often compelled to adapt to the demands of tourism (Liu *et al.*, 2022a). In Spain, the lack of a coherent heritage discourse regarding the adaptive reuse of cultural assets amid deindustrialization and urban redevelopment has raised concerns. In some cases, working-class memory activism has influenced urban design decisions related to landmark preservation (Rosa, 2024). Similarly, in Italy, entities responsible for cultural heritage conservation struggle with decision-making when prioritizing assets for preservation (Santosuosso, 2022), which has led to protests, occupations, and informal place-making initiatives that drive community development (Camerin, 2024). Meanwhile, Ecuador faces challenges related to the absence of a strategic vision, territorial planning, and a collaborative management framework among local stakeholders to promote tourism development (Mendoza *et al.*, 2022).

Previous studies have shown that rural tourism is highly sought after due to the unique experiences it offers, such as interaction with local communities and opportunities to learn about new cultures and local production (Mwesiumo *et al.*, 2022; Ore *et al.*, 2020; Ridderstaat *et al.*, 2022; Zhu *et al.*, 2025). In addition, some scholars have highlighted tourism development as a critical factor in economic growth and poverty reduction, emphasizing the need to preserve the cultural heritage that underpins this activity (Croes *et al.*, 2021; Li *et al.*, 2022; Zhang *et al.*, 2023). However, the tourism literature lacks solid, accurate, and up-to-date evidence on the relationship between cultural heritage and tourism development in the countries of the Americas. This study aims to fill this gap by analyzing the tangible and intangible cultural heritage of the district of Uchuraccay, Peru, to evaluate its influence on tourism development in the area. Uchuraccay is notable not only for its historical importance but also for its rich cultural heritage, which includes oral traditions, ancestral agricultural practices, and a natural landscape that preserves unique elements of the Andean region. This selection of this district is motivated by both the need to explore an under-researched location and its potential to serve as a reference for rural and cultural tourism within the Andean context.

Therefore, this research seeks to evaluate local perceptions of the relationship between cultural heritage and tourism development in Uchuraccay, contributing valuable information to the existing international literature on cultural heritage and tourism. Specifically, it

focuses on the district of Uchuraccay in Peru, a location that has received little attention in previous studies. By examining this specific case, the study provides detailed and contextually relevant information on the interactions between cultural heritage and tourism. This is particularly significant given the important role tourism can play in fostering economic development and reducing poverty in the region.

The primary contribution of this article lies in addressing an existing gap in tourism literature, specifically in relation to the intersection of cultural heritage and tourism development in the countries of the American continent. Although previous studies have highlighted the growing demand for rural tourism and its potential to boost economic growth, enhance community engagement, and promote local production, there is a lack of robust, up-to-date evidence on the precise relationship between cultural heritage and tourism development in this geographical context. This article is positioned as a significant effort to fill this gap, focusing its attention on the Uchuraccay district in Peru, a place that has received little attention in academic discourse.

By centering on this specific location, the study seeks to generate detailed and relevant insights into the ways cultural heritage influences tourism. This localized approach is crucial, as it sheds light on the unique dynamics of Uchuraccay and serves as a valuable reference for understanding how cultural heritage can drive economic development and poverty alleviation in similar rural contexts. Ultimately, this study provides a distinctive and meaningful perspective that enriches the global understanding of the relationship between cultural heritage and tourism within the specific context of the American continent.

## 2. Literature review

Tangible cultural heritage consists of material assets that are considered unique and irreplaceable due to their historical and cultural significance in shaping the social identity of a specific place (de la Cruz *et al.*, 2021; Juanis *et al.*, 2020). This dimension is divided into two categories: the first includes movable objects such as archeological artifacts, artistic work, utilitarian objects, and documents, while the second comprises immovable structures, including urban sectors and residential architecture that remain in their origin location (Jamaludin *et al.*, 2021). A study conducted in Iraq on urban landscape transformation and threats to local identity emphasizes the need for greater support in preserving tangible heritage to maintain the traditional value of these areas (Farhan *et al.*, 2021). While this approach has global relevance, it is crucial to explore how

such strategies can be specifically adapted to the context of Uchuraccay. The preservation of tangible heritage, such as archeological and architectural remains, has the potential to strengthen local identity. However, a deeper analysis is required to address challenges unique to Uchuraccay, such as limited access to resources and the region's distinct cultural characteristics. In this regard, it is necessary to critically assess the extent to which methods employed in other contexts, such as Iraq, are applicable or require substantial adjustments to be effective in the Peruvian Andean region.

On the other hand, intangible cultural heritage differs from tangible heritage in that it lacks a material form. On this subject, Wang (2020) points out that intangible heritage is a key factor in the preservation of cultural diversity, as it adapts to new trends and ensures its permanence across generations. Similarly, Guo (2020) stresses the importance of traditions, expressions, rituals, knowledge, and cultural practices as essential components of intangible heritage. However, recent research highlights the absence of specific strategies for safeguarding intangible heritage in Latin America, an issue that this study addresses in depth (Rubio-Andrada *et al.*, 2022). For example, in Peru, traditional practices such as weaving, dance, and gastronomy not only possess intrinsic cultural value but also play a fundamental role in local tourism development strategies. Furthermore, the proposal to establish a secure information platform for preserving historical records, as suggested by research in China (Guan, 2021), highlights the need for further studies on the specific strategies and technologies necessary to effectively preserve intangible heritage. Despite these insights, there remains a notable gap in research addressing the technologies best suited for implementation in places such as Uchuraccay.

In this context, it becomes urgent to investigate not only the most appropriate technological solutions but also the local barriers that may hinder their adoption, such as limited digital infrastructure, weak connectivity to advanced technologies, and cultural differences that influence the acceptance and use of these platforms. In addition, assessing how the local community can actively participate in preserving intangible heritage is crucial, considering the importance of oral narratives and traditions, which are not always recorded in digital media.

Environmental tourism development, which focuses on the biotic components of a tourist attraction and offers entertainment through various ecological manifestations, is a crucial aspect of the tourism landscape (Julianti *et al.*, 2021). At present, the environmental dimension is fundamental to tourism development by promoting the protection and sustainable use of natural resources,

as well as the conservation of natural heritage (Idajati & Nugroho, 2019). In this regard, a study conducted in Indonesia emphasized the need for a monitoring system in tourism ecosystems to prevent environmental degradation caused by the irresponsible overexploitation of resources (Muhamad *et al.*, 2021). In Peru, the natural wealth of Uchuraccay – characterized by its landscapes and ecosystems – represents a key resource for tourism development. However, it faces challenges due to inadequate planning and insufficient environmental conservation efforts (Ortiz Calopino *et al.*, 2023). Unlike Indonesia, where monitoring systems benefit from a more developed institutional framework, Uchuraccay requires a strategy that not only includes environmental monitoring but also integrates community education and incentives for conservation. The implementation of a monitoring system in collaboration with local communities would allow for sustainable resource management, thereby mitigating environmental degradation and promoting ecotourism.

It is important to note that social tourism development differs from the environmental dimension in that it focuses on the impact of tourism on society rather than its effects on the environment. In this regard, Aji (2020) argues that the social dimension of tourism development encompasses the activities of different social groups in relation to tourism, including leadership roles, project management, power distribution within the system, and interactions between tourists, businesses, and the local community. For example, Liao *et al.* (2021) state that an important factor within the social dimension of tourism development is the intense process of cultural exchange facilitated by tourism activity, along with modernization efforts aimed at improving infrastructure to enhance the destination's appeal and attract more visitors. Recent studies in Latin America suggest that tourism can contribute to reducing disparities in living standards and improving social opportunities. However, studies analyzing these effects in specific rural regions, such as Uchuraccay, remain limited (Sánchez-Miranda *et al.*, 2022a). A study conducted in Russia highlights the importance of the social dimension of tourism in addressing social inequalities by reducing disparities in living conditions across different sectors of the country through the expansion of economic and social opportunities (Kukharensko & Gizyatova, 2018).

It is important to note that economic tourism development differs from the other two dimensions in that it focuses on the monetary income generated by tourism. In this regard, Wawo *et al.* (2020) point out that the economic dimension of tourism development encompasses the impact of tourism on local economic activity, improving the standard of living of the population

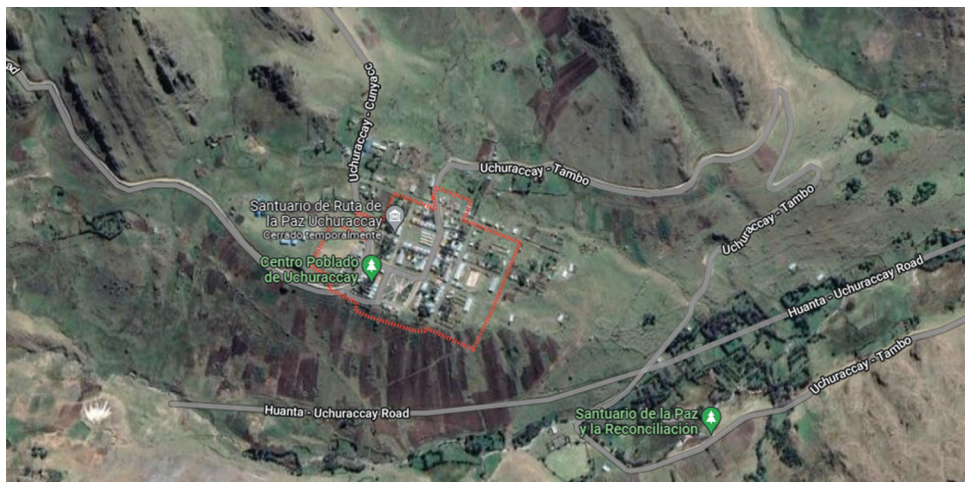
by creating employment opportunities in the hospitality, catering, and tourism sectors, as well as promoting the reevaluation of different heritage sites. Similarly, He *et al.* (2020) mention that the economic dimension involves the effective management of resources through investment strategies aimed at improving tourist attractions and local infrastructure to attract more tourists, conserve resources, and establish a sustainable tourism-based economy. Research conducted in Turkey has shown that the economic dimension of tourism is subject to constant change, as tourism development fosters increased participation of local communities in economic affairs (Özer *et al.*, 2022). In the case of Uchuraccay, this transformation presents both opportunities and challenges. It is important to critically evaluate the potential effects of tourism on the local economy, particularly in terms of the equitable distribution of benefits and the impact on natural and cultural resources. In addition, consideration should be given to how communities can be empowered to leverage these opportunities without leading to resource overexploitation or the erosion of cultural identity.

Despite the growing recognition of cultural heritage management in tourism development, there remains a gap in the literature specifically addressing the challenges and shortcomings in implementing tourism strategies in sites with diverse cultural heritage, such as Uchuraccay. The current research has highlighted the importance of evaluating local perceptions of cultural heritage and its relationship with tourism development. However, there is a lack of studies examining how these perceptions translate into concrete measures and effective strategies.

Therefore, this research seeks to address this gap by focusing on three key research questions: (i) evaluating the current level of implementation of tourism strategies in Uchuraccay, Ayacucho, Peru, to boost economic development, (ii) identifying specific deficiencies in the management of tangible and intangible heritage, and (iii) providing a comparative framework that can serve as a reference not only for Uchuraccay but also for other regions facing similar challenges in cultural heritage management and tourism development. This approach not only fills critical gaps identified in the literature but also contributes to the academic narrative with original and relevant research, strengthening the understanding of how tourism strategies can be effectively designed and implemented in diverse cultural heritage contexts.

## 2.1. Study area

The district of Uchuraccay, shown in Figure 1, is located in Huanta province, in the Ayacucho region of Peru, at an altitude of 4,000 m above sea level. It lies at the border



**Figure 1.** Map of Uchuraccay, Ayacucho, Peru  
Source: Map by Google Maps (n. d.).

between the jungle and the valleys of Huanta and Tambo and has a population of 3,861 residents. Temperatures in the area range from  $-3.3^{\circ}\text{C}$  to  $2^{\circ}\text{C}$  in May and June and can reach as high as  $23.2^{\circ}\text{C}$  in summer. Poverty remains one of the most pressing challenges in communities such as Uchuraccay, where employment opportunities are scarce and income generation is limited. As a result, tourism has been recognized as a potential driver of economic development, creating jobs and increasing income to improve the standard of living for residents (Instituto Nacional de Estadística e Informática, 2018; Marapara & Ramos, 2018; Seda Ayacucho Sucursal Huanta, n.d.).

In the Uchuraccay district, surveys conducted among local residents indicate that both authorities and the community fail to fully utilize the natural resources provided by their cultural heritage. In addition, there is a lack of tourism awareness and strategic planning to promote sustainable tourism as a long-term economic activity (Donayre, 2020). As a result, the quality of life of local residents is negatively affected, as natural resources are used inefficiently without generating additional income or employment opportunities (Lin, 2020). To address this issue, it is necessary to foster greater community engagement in tourism-related activities to improve household economies. This includes raising awareness of tourism's potential and encouraging local participation in conservation initiatives (Ekayani *et al.*, 2019).

This article highlights the importance of cultural heritage in promoting tourism development in rural communities, aiming to create new economic opportunities, revalue local resources, and strengthen tourism awareness in the area. A survey conducted among the residents of Huanta province revealed that a diagnosis of cultural heritage –

encompassing both tangible and intangible dimensions – can significantly enhance tourism development by contributing to its environmental, social, and economic dimensions.

### 3. Comparison of cultural heritage conservation strategies in Latin America and China

#### 3.1. Strategies in Latin America

Cultural heritage conservation in Latin America faces significant challenges arising from tensions between economic development, tourism, and the preservation of cultural identity. Addressing these tensions requires regulatory planning, cultural management, and active citizen participation. Ramírez-Rosete *et al.* (2020) highlight the importance of conservation policies in cities such as Puebla, Havana, and Quito, where tourism-driven interventions pose threats to both tangible and intangible heritage. They propose strengthening urban planning tools to balance commodification with cultural rehabilitation. Similarly, Jesús and Latocca (2021) stress the need for innovative approaches in the management of historic centers to ensure sustainable development, highlighting the role of public spaces as key venues for citizen interaction and heritage socialization. Sánchez-Miranda *et al.* (2022b) emphasize the significance of cultural heritage as a reflection of Latin American identity, rather than merely an economic resource. They advocate for inclusive cultural management, involving the state, private entities, and citizens in heritage conservation efforts, recognizing its role in preserving local identities and globalization. Meanwhile, Rodríguez *et al.* (2022) explore community participation as a key element in heritage conservation

in the district of Cheto, Peru. Their study promotes the involvement of local communities in protecting both natural and cultural resources, proposing strategies to raise awareness about the value of cultural heritage. This approach fosters cultural continuity and strengthens the preservation of ancestral legacies within the community.

### 3.2. Strategies in China

In China, cultural heritage conservation strategies have been adapted to local specificities while also reflecting global influences. Liu *et al.* (2022b) examine the impact of cultural heritage conservation at the Fujian Tulou site on the sustainable livelihoods of local residents. Through interviews, observations, and secondary data analysis, their study reveals that tourism and conservation policies often transform these sites into tourist attractions, which can threaten the sustainability of traditional livelihoods. Their findings highlight the importance of integrating cultural heritage capital into sustainable development frameworks, ensuring that residents maintain greater control over their assets.

Meanwhile, Cao & Li (2023) analyze changes in land use and landscape patterns in cultural heritage-protected cities using the PLUS model. Their study, conducted in China's Four Ancient Cities (Pingyao, Gucheng, She, and Langzhong), reveals how urbanization and socioeconomic policies significantly affect landscape diversity and complexity. Their research not only highlights future challenges related to urban conservation but also proposes strategies to balance urban expansion with ecological land preservation.

In the field of digital preservation, Li *et al.* (2022) propose a computational framework for preserving and promoting Chinese cultural heritage, structured into three modules: data acquisition, digital modeling, and application. Case studies on the Mogao Caves and Guqin art illustrate how this computational approach not only digitally preserves cultural heritage but also promotes its transmission to future generations, effectively creating a computable cultural ecosystem.

An additional innovative approach is presented by Chen *et al.* (2023), who utilize satellite imagery to monitor the sustainability of World Heritage sites in China. They propose disturbance indicators based on land cover changes and surface deformation, revealing that although most sites remain in good condition, some face challenges due to methodological limitations. Their approach offers new tools for assessing sustainability progress at heritage sites and their alignment with the Sustainable Development Goals.

Finally, Zhang *et al.* (2024) explore cultural heritage governance in China, focusing on interactions between

government sectors at multiple levels. Their study identifies the main challenge as achieving a balance between heritage conservation and urban development. By analyzing vertical and horizontal government interactions, they highlight the importance of integrating responsibilities and resources across different levels of administration. Their findings suggest that effective coordination between government sectors can enhance both cultural heritage preservation and local economic development.

### 3.3. Applicability of Chinese strategies in the Peruvian Uchuraccay context

The case of China offers valuable lessons that could be adopted in Peru, a country facing similar challenges in cultural heritage preservation. In China, cultural heritage protection strategies have emphasized advanced technology and integrated approaches to balance conservation and tourism development. These tools include the digitization of intangible heritage, the use of digital platforms to promote sustainable tourism, and the implementation of policies that protect both tangible and intangible.

In the specific case of Uchuraccay, cultural and contextual differences between China and Peru present both challenges and opportunities for adopting strategies. For example, while China has institutionalized its heritage policies, in Uchuraccay, community participation plays a more central role due to the strong connection of local residents to their cultural traditions and practices. This highlights the need to adapt conservation strategies to a more decentralized context, where local communities take the lead in preservation efforts.

In addition, differences in tourism scale and nature require distinct approaches. In China, mass tourism has led to problems such as overexploitation of heritage sites, prompting the adoption of advanced monitoring systems. In contrast, Uchuraccay, where tourism is still growing, would benefit from strategies focused on community-based and sustainable tourism, integrating heritage protection with local empowerment.

Finally, the incorporation of technological tools, such as computer models and satellite-based approaches used in China, could significantly enhance heritage management and conservation efforts in Uchuraccay. However, for these strategies to be effective, it is crucial to contextualize their implementation, taking into account differences in available resources and cultural priorities. This comparative approach would not only enrich heritage conservation policies in Peru but also position Uchuraccay as a reference for sustainable tourism development in similar rural regions.

## 4. Method

### 4.1. Study design

The present study is classified as applied research with a quantitative approach and a non-experimental, correlational-explanatory design (Hernández *et al.*, 2010). The target population consists of 3,861 residents of Uchuraccay, located in the Ayacucho region of Peru (Instituto Nacional de Estadística e Informática, 2018). To determine the sample size, Equation I was applied:

$$N = \frac{N \times Z^2 \times p \times q}{e^2 \times (N - 1) + Z^2 \times p \times q} \quad (I)$$

where  $n$ =sample size,  $N$ =total population,  $Z$ =confidence level,  $E$ =accepted sampling error,  $p$ =probability that the event studied will occur, and  $q$ =probability that the event will not occur. A 95% confidence level and a 4% sampling error were used, resulting in a final sample size of 520 residents.

To ensure the sample was representative of the Uchuraccay population, stratified random sampling was used. This approach ensured that different subgroups, such as age, sex, and length of residence, were adequately represented.

The total population (3,861 residents) was divided into strata according to key demographic characteristics:

- Age: Three age groups were established, i.e., youth (18 – 25 years), adults (26 – 40 years), and older adults (41 – 55 years).
- Gender: Both male and female participants were considered to ensure gender balance.
- Length of residence: Priority was given to residents who had lived in the locality for more than 3 years to ensure that they had sufficient knowledge of cultural heritage and tourism development in the region.

Within each stratum, individuals were randomly selected to participate in the survey. This method ensured that each person had an equal probability of being included, minimizing bias and enhancing the representativeness of the sample.

### 4.2. Inclusion and exclusion criteria

The inclusion criteria for this study were (i) age between 30 and 55 years old, (ii) providing informed consent to participate, and (iii) being a resident of Uchuraccay. The exclusion criteria were (i) incomplete questionnaire and (ii) unwillingness to continue participation in the study.

### 4.3. Procedure

The selection of Uchuraccay as the study area was based on its significant historical and cultural importance as well as

its previously identified tourism potential. Understanding this context is essential for assessing the suitability of the locality for tourism development. This case study was conducted between September and November 2022. Data collection was carried out through a survey using a structured questionnaire administered through Google Forms. The questionnaire consisted of (i) 11 questions measuring opinions on cultural heritage, categorized into its two dimensions, i.e., tangible heritage and intangible heritage; and (ii) 11 statements assessing perceptions of tourism development, structured around three dimensions, i.e., environmental, social, and economic.

These questions were developed based on previous studies examining the conservation, valorization, and tourism utilization of cultural resources. Each question was aligned with specific cultural heritage aspects, such as the conservation status of tangible assets, the transmission of traditional knowledge, and the integration of local cultural expressions in tourism.

In addition, the questionnaire incorporated indicators commonly employed in sustainability and tourism development studies, such as the preservation of natural resources, community participation in tourism activities, and the economic impact of local tourism (Dadizadeh & Doğan, 2024; Willems *et al.*, 2018). To assess responses, a three-point Likert scale (good, fair, and poor) was used. This approach effectively captured respondents' perceptions regarding the quality and state of both cultural heritage and tourism development in the study region.

### 4.4. Questionnaire

The questionnaire used in this research was designed with the objective of measuring the perceptions of the population of Uchuraccay in relation to their cultural heritage and tourism development in the region. To ensure alignment with the research objectives, the questionnaire was structured into two main sections: (i) cultural heritage dimensions (tangible and intangible) and (ii) tourism development dimensions (environmental, social, and economic). The formulation of the questions was based on previous studies related to sustainability, heritage conservation, and tourism development (Ali *et al.*, 2022; Ismael & Kassim, 2023; Xiang *et al.*, 2023).

The questionnaire was designed meticulously to ensure that each section addressed specific aspects of local perceptions regarding cultural heritage and tourism development. The following is a breakdown of its structure and alignment with the research objectives. The questionnaire consisted of 22 questions, divided into three sections:

- Tangible heritage: Questions in this section focused on evaluating community perceptions of the value and conservation status of key material heritage elements, such as tourist attractions, ancestral customs, and Uchuraccay's distinctiveness with respect to other localities.
  - Example question: "How would you rate the state of conservation of Uchuraccay's main tourist attractions?"
- Intangible heritage: These questions explored the importance of intangible cultural elements, such as poetry, traditional rituals, and interaction with tourists.
  - Example question: "Do you consider that the traditional rituals of Uchuraccay are being respected by tourists?"
- Tourism development: Questions in this section covered three key dimensions, namely environmental, social, and economic. They sought to measure how residents perceive tourism's impact, including the opportunities it creates and its economic effects at the local level.
  - Example question: "How do you consider tourism has affected job creation in Uchuraccay?"

Each question was formulated with the purpose of capturing residents' perceptions of key cultural heritage aspects and their integration into tourism development. The tangible and intangible heritage questions focused on preservation, knowledge transmission, and tourist–community interactions, while the tourism development questions assessed sustainability, employment generation, environmental preservation, and economic impact (Table A1).

To facilitate response analysis, a three-point Likert scale (good, fair, poor) was used. This simple and intuitive scale enabled clear and quick evaluations, facilitating comparisons across responses and providing a comprehensive overview of community perceptions regarding the state of the cultural heritage and the impact of tourism.

#### 4.5. Data analysis

The collected data were organized into a tabulation matrix and processed using the Statistical Package for the Social Sciences v25 (IBM, United States) and Microsoft Excel (Microsoft, United States). To evaluate the reliability of the data, Cronbach's alpha reliability test was applied, yielding a value of 0.798 for the cultural heritage and tourism development variable. This result indicates a high level of internal consistency in the measurement instruments.

The analysis was carried out in two stages. In the first stage, descriptive statistics were applied to analyze the

frequency distribution of the cultural heritage dimensions, classifying them into tangible and intangible heritage, as well as the tourism development dimensions, which encompass environmental, social, and economic aspects. In the second stage, inferential statistics were used to explore the correlation between cultural heritage and tourism development variables. The objective was to determine the nature and extent of their relationship, assessing their mutual influence and interdependence. This analysis allowed for data-driven conclusions regarding how cultural heritage contributes to tourism development and vice versa.

#### 4.6. Ethical considerations

This study adhered to ethical research principles, ensuring the confidentiality and informed consent of all participants. Personal information and survey responses were handled confidentially and were used exclusively for research purposes.

### 5. Results

The questionnaire was administered to 520 residents, providing valuable insights into their perceptions of cultural heritage and tourism development in Uchuraccay.

#### 5.1. Residents' perception of the dimensions of the cultural heritage variable

The results concerning cultural heritage offer a critical perspective on how the residents perceive the state of cultural resources in the region. Notably, 39% of respondents rated the condition of tangible heritage as "fair." This indicates that a considerable portion of the population does not perceive monuments, historic buildings, and other physical elements as being in a remarkable state, but neither do they consider them to be in critical condition. This rating suggests that, although these tangible resources are present, they may require restoration or improved management to achieve higher levels of preservation and cultural relevance. In contrast, 41% of respondents rated intangible heritage as "poor." This result raises serious concerns regarding the preservation of intangible aspects of heritage, such as traditions, ancestral knowledge, and cultural expressions. The negative perception suggests that a significant part of the community feels that these essential elements of their cultural identity are being neglected or are at risk of disappearing, which could undermine the sustainability and value of intangible heritage in the region (Figure 2).

#### 5.2. Residents' perceptions of the dimensions of the tourism development variable

The results related to tourism development offer a critical perspective on how residents perceive progress in this sector. Notably, 42% of respondents rated the environmental

dimension as “fair.” This rating suggests that while a substantial part of the population acknowledges that efforts have been made to preserve and protect the natural environment within the context of tourism, they do not consider these measures to be exceptional or fully effective. A particularly concerning finding is that 49% of respondents rated the social dimension of tourism development as “bad.” This assessment highlights significant concerns regarding the social impacts of tourism, potentially pointing to challenges in community well-being, interpersonal relationships, and social cohesion. In addition, 54% of respondents perceived the economic dimension of tourism development as “bad.” This result suggests that a large proportion of the population does not consider that tourism is contributing positively to local economic growth or improving livelihoods. Taken together, these results underscore the urgent need for a thorough review and adjustments to tourism development strategies in Uchuraccay. The lack of satisfaction across the environmental, social, and economic dimensions of tourism reflects pressing challenges that must be addressed to achieve sustainable tourism development that truly benefits the local community (Figure 3).

### 5.3. Correlation coefficient

As shown in Table 1, Pearson’s correlation analysis provides valuable insights into the relationships between the different

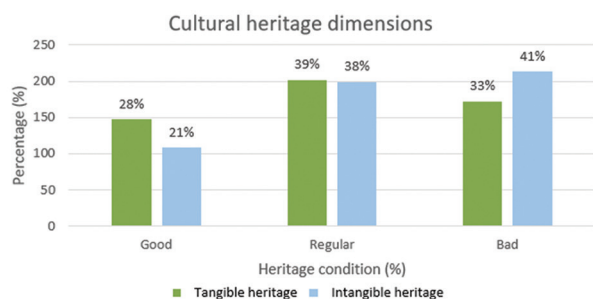


Figure 2. Results of perceptions of cultural heritage  
Source: Graph by the authors.

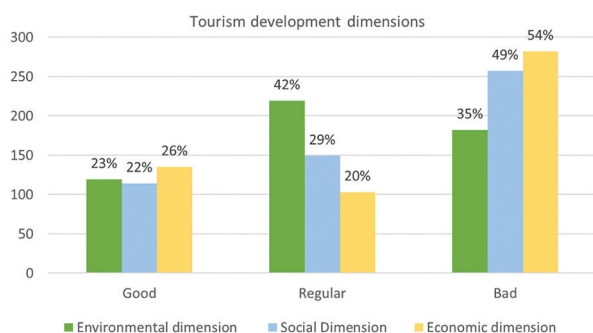


Figure 3. Results of perceptions on tourism development  
Source: Graph by the authors.

dimensions examined in this study. A moderate positive correlation was found between the environmental dimension of tourism development and cultural heritage ( $r=0.624, p<0.001$ ). This result suggests that improvements in environmental aspects, such as the conservation of natural and landscape resources, may influence residents’ perceptions of cultural heritage valorization in Uchuraccay. These findings highlight the need for environmental strategies that not only protect local ecosystems but also reinforce the region’s cultural identity.

In addition, a strong positive correlation was identified between the social dimension of tourism development and tangible heritage ( $r=0.890, p<0.001$ ). This indicates that social interaction and community engagement – such as residents’ active participation in cultural and tourism activities – play a crucial role in the preservation and promotion of tangible heritage. A similar trend was observed between the social dimension and intangible heritage ( $r=0.795, p<0.001$ ), reinforcing the idea that social and cultural ties are fundamental for maintaining local traditions, rituals, and ancestral knowledge. These findings reinforce the study’s objective of highlighting the importance of community involvement as a key driver of sustainable tourism development.

However, the weaker correlation between the environmental dimension and intangible heritage ( $r=0.513, p<0.001$ ) highlights that, although both aspects are relevant to tourism development, they do not directly influence each other. This may indicate that environmental strategies, while necessary, do not automatically translate into improvements in the preservation of intangible cultural traditions and practices. These findings suggest the need for targeted interventions that specifically address both dimensions, rather than assuming that environmental conservation alone will enhance intangible heritage preservation.

Overall, the results of this analysis provide a solid basis for designing comprehensive tourism development policies in Uchuraccay. The strong correlations between the social dimension and both tangible and intangible heritage emphasize the importance of community engagement in the success of tourism initiatives. Furthermore, the moderate correlation between the environmental dimension and intangible heritage highlights the need for additional efforts to develop strategies specifically aimed at preserving intangible cultural traditions rather than relying solely on environmental improvements.

It is essential that tourism development not be limited to environmental conservation but instead foster a holistic balance between environmental protection and cultural preservation. This ensures that both aspects work in synergy to achieve sustainable development that respects and strengthens local social and cultural dynamics.

5.4. Correlation heatmap

Figure 4 presents a heatmap that visually depicts the relationships between tourism development dimensions and cultural heritage, allowing for a rapid assessment of the strongest and weakest correlations. Strong positive correlations are represented in warmer tones (red), while negative or weak correlations appear in cooler tones (blue). The intensity of the colors reflects the strength of the correlations, with darker shades indicating stronger relationships. This visualization facilitates the comprehension of how different dimensions interact, complementing the numerical analysis.

For example, the social dimension of tourism development exhibits a strong association with both tangible and intangible heritage, suggesting that social dynamics have a central impact on cultural preservation. In contrast, weaker correlations, such as those observed between the economic dimension and intangible heritage, indicate the need for a differentiated approach to these areas.

This graphical representation not only simplifies data interpretation but also helps identify key patterns that can inform future policy strategies. The heatmap emphasizes the importance of prioritizing social and environmental factors in tourism development policies while highlighting areas requiring targeted interventions, such as the

Table 1. Interrelationships between tourism development dimensions and cultural heritage dimensions

| Dimensions              | M (SD)    | Environmental dimension | Social dimension | Economic dimension | Tangible heritage | Intangible heritage |
|-------------------------|-----------|-------------------------|------------------|--------------------|-------------------|---------------------|
| Environmental dimension | 3.7 (1.2) | 1                       | 0.611**          | 0.205**            | 0.624**           | 0.513**             |
| Social dimension        | 3.1 (1.1) | 0.611**                 | 1                | -0.089*            | 0.890**           | 0.795**             |
| Economic dimension      | 2.3 (0.8) | 0.205**                 | -0.089*          | 1                  | 0.194**           | -0.344**            |
| Tangible heritage       | 3.3 (1.1) | 0.624**                 | 0.890**          | 0.194**            | 1                 | 0.730**             |
| Intangible heritage     | 2.8 (0.9) | 0.513**                 | 0.795**          | -0.344**           | 0.730**           | 1                   |

Notes: \*\* $p < 0.01$ ; M (SD): Mean score (standard deviation).

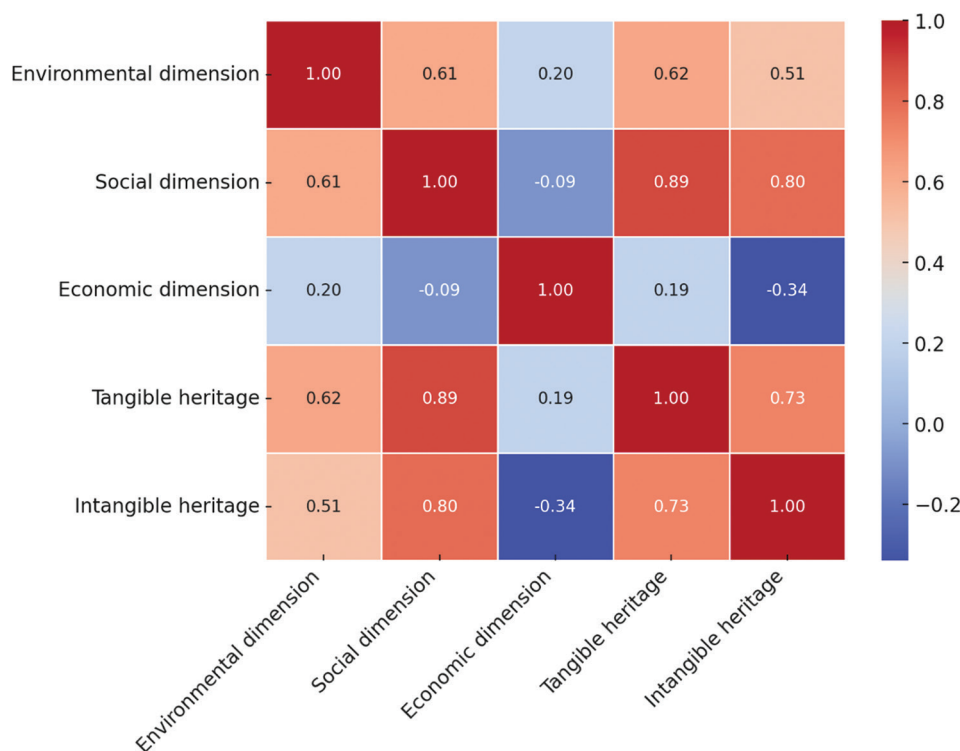


Figure 4. Correlation heatmap: Tourist development dimensions and cultural heritage  
Source: Heatmap by the authors.

correlation between economic development and cultural heritage.

### 5.5. Implications for practice and future research

The findings of this study underscore the need to implement tourism strategies that align with local perceptions in Uchuraccay, addressing identified deficiencies in the valorization and management of both tangible and intangible cultural heritage. The results highlight the importance of raising public awareness, increasing investment in tangible heritage conservation, and developing effective policies and strategies to safeguard and transmit intangible heritage. In practice, this necessitates a detailed diagnosis of cultural heritage, guiding the region's economic development through context-specific tourism strategies.

Regarding future research, future specialized studies are needed to explore local perceptions in other regions with diverse cultural heritage, allowing for a broader understanding of how tourism strategies can be adapted to specific sociocultural contexts. Furthermore, future investigations should focus on the implementation and evaluation of policies and strategies for cultural heritage preservation and transmission in similar communities, thereby establishing best practices for heritage management and promoting sustainable tourism development.

## 6. Discussion

### 6.1. Tangible heritage dimension

The district of Uchuraccay has a moderate level of tangible heritage (39%), as shown in Figure 2. The area contains several tangible resources, such as archeological remains, lagoons, waterfalls, and other attractions. However, the lack of adequate infrastructure hinders the valorization and recognition of these resources. To address this issue, collaboration with local authorities is essential to develop tourism infrastructure, including new roads, basic service areas, and tourist facilities. This finding is in line with Juanis *et al.* (2020) and Farhan *et al.* (2021), who emphasize that tangible heritage consists of unique and irreplaceable material assets that represent a region's historical and cultural identity, contributing to the preservation of its traditional value and social distinctiveness.

Furthermore, the proposal to improve tourism infrastructure as a means to enhance the value of tangible heritage aligns with the perspectives of Jamaludin *et al.* (2021), who underscore the importance of categorizing and preserving tangible resources, both movable and immovable, as fundamental elements of a place's cultural identity.

### 6.2. Intangible heritage dimension

The province of Huanta exhibits a low level of intangible heritage (41%), as reflected in Figure 2, indicating that local authorities face difficulties in managing non-material cultural resources, such as traditions, knowledge, and cultural expressions. As a result, intangible heritage is not effectively used for tourism development in the region. To address this issue, conducting a comprehensive tourism inventory of Huanta is recommended. This would facilitate the systematic documentation of cultural and historical resources, enabling the design of culturally rich and attractive tourism products. This recommendation is in line with the findings of Wang (2020) and Guan (2021), who highlight intangible heritage as a key tool for preserving cultural diversity while adapting to evolving tourism trends, ensuring its continuity across generations.

The proposal to develop a tourism inventory in Huanta is also consistent with the perspectives of Guo (2020), who defines intangible heritage as comprising traditions, expressions, rituals, knowledge, and cultural practices, all of which contribute to a region's originality and distinctive cultural identity.

### 6.3. Environmental dimension

The environmental dimension of the district of Uchuraccay is classified as moderate (42%), as shown in Figure 3. This indicates that while the region possesses a wide variety of natural resources with potential for tourism development, these resources are not sufficiently maintained to ensure long-term preservation. Therefore, it is necessary for local authorities to allocate a dedicated budget for concrete conservation efforts, such as the maintenance of natural areas and the employment of security personnel to monitor and safeguard these resources. This recommendation is in line with Julianti *et al.* (2021) and Muhamad *et al.* (2021), who assert that the ecological dimension encompasses all biotic components of a natural area used as a tourist attraction, offering a variety of ecological experiences that serve as key entertainment factors for tourists.

Similarly, the proposal to allocate funding and implement preservation measures in Uchuraccay aligns with the findings of Idajati & Nugroho (2019), who highlight that the environmental dimension encompasses all biotic components of a natural ecosystem, contributing to tourism appeal and ecological sustainability. Furthermore, they emphasize the dual role of environmental conservation in tourism development and the protection of natural heritage.

### 6.4. Social dimension

The social dimension of the district of Uchuraccay is classified as low (49%), as shown in Figure 3. This

indicates that the local population exhibits limited interest in tourism, alongside a lack of awareness regarding its potential economic benefits, as well as negative perceptions of tourism-related activities. To address this challenge, it is crucial to raise public awareness about tourism's benefits through informative sessions and community engagement initiatives. These efforts would enhance local understanding of the economic benefits of tourism, thereby fostering a more positive attitude toward its development. This approach is supported by Aji (2020) and Kukhareno & Gizyatova (2018), who argue that the social dimension of tourism is related to local activities generated by tourism across different social groups, encompassing leadership attitudes, project management, power distribution within the system, and relationships between tourists, businesses, and the local community. These interactions generate a greater supply of economic opportunities for local populations.

Moreover, the proposal to improve tourist awareness and shift negative perceptions aligns with the perspectives of Liao *et al.* (2021), who highlight that the social dimension of tourism involves leadership attitudes, project management, and power distribution. In addition, they emphasize the importance of cultural exchange in tourism, which enhances social interactions and contributes to the modernization of the local communities.

### 6.5. Economic dimension

The economic dimension of the district of Uchuraccay is classified as low (54%), as shown in Figure 3, and is associated with a high poverty rate in the area. The implementation of tourism development as a means to improve the livelihoods of local residents is difficult due to existing economic constraints. Therefore, it is essential to promote community-based tourism, which actively engages local populations in tourism-related economic activities, allowing them to directly benefit from new employment opportunities and increased income. This perspective is in line with Wawo *et al.* (2020) and Özer *et al.* (2022), who point out that the economic dimension of tourism development includes changes in local economic activity and improvements in the standard of living due to the creation of new employment opportunities in sectors such as food services, hospitality, and tourism-related enterprises. In addition, they emphasize the role of participation reevaluation in supporting economic growth.

Similarly, the proposal to enhance community-based tourism aligns with the perspectives of He *et al.* (2020), who highlight that tourism-driven economic transformation leads to job creation and improvements in residents' quality of life. In addition, they emphasize the importance

of effective resource management and strategic investment to attract tourists, preserve cultural and natural resources, and establish a sustainable tourism-based economy.

### 6.6. Limitations of the study

Despite the meticulousness of its approach and analysis, this study has several limitations that must be acknowledged to ensure an appropriate interpretation of the results.

First, the reliance on questionnaire-based data collection may introduce potential biases, as responses are inherently subjective and influenced by individual interpretations. In addition, the geographic limitation of this study to Uchuraccay may restrict the generalizability of the findings to other regions with distinct cultural and tourism dynamics.

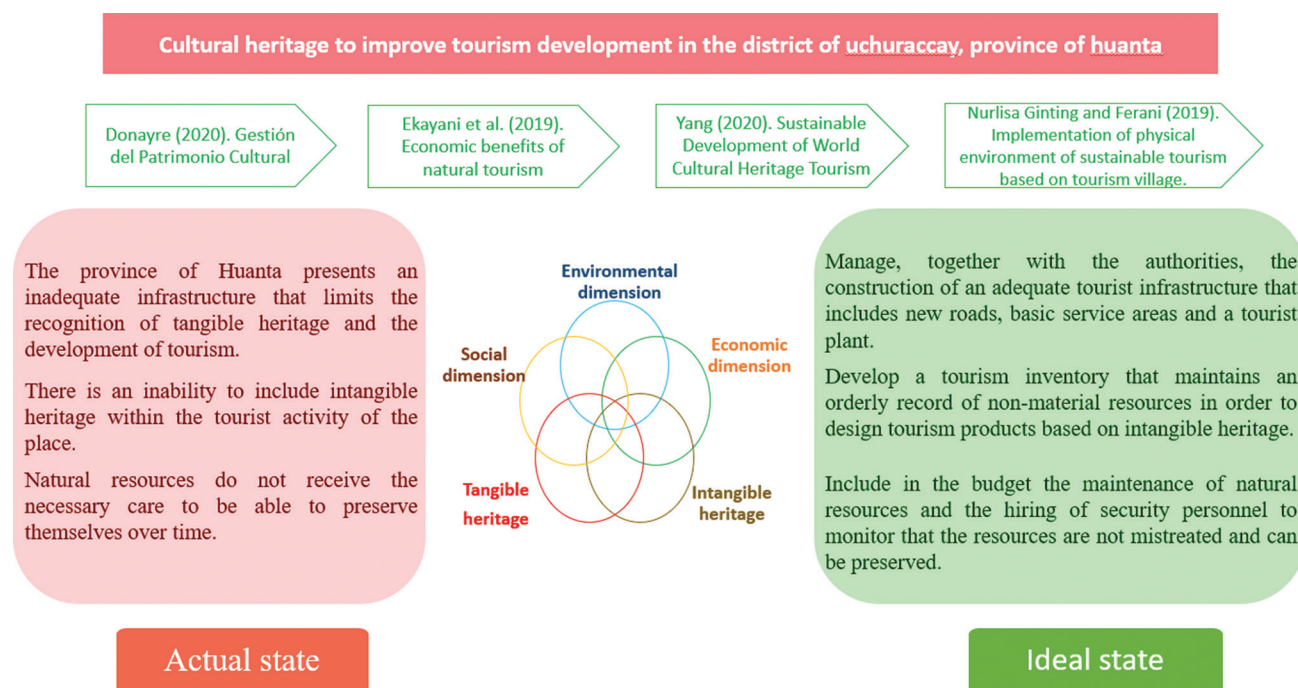
Moreover, the study does not include a direct evaluation of existing tourism policies and strategies, nor does it incorporate a longitudinal analysis, which limits the comprehensive evaluation of the effectiveness of proposed measures. In addition, the focus on local perceptions may not fully capture the complexities of practical tourism strategy implementation. These limitations highlight the need to interpret the results with caution and underscore the importance of future research that addresses these methodological constraints and enhances the understanding of cultural heritage management and tourism development in diverse contexts.

## 7. Proposal

Based on the survey results, the following diagnostic model for cultural heritage is proposed to improve tourism development. This model allows for the evaluation of the current state and the formulation of concrete strategies to address the issues identified in Uchuraccay.

The development of Figure 5, which represents the methodological model for evaluating the relationship between cultural heritage and tourism development in Uchuraccay, was informed by an integration of survey findings and a review of relevant literature. The left side of the figure illustrates the current state, reflecting respondents' perceptions of deficiencies in cultural heritage and tourism development, as identified through the survey results and statistical analyses. For example, a notable discrepancy exists between expectations and the actual quality of tangible heritage, with 38.65% of respondents perceiving difficulties in its valorization. This highlights the need for increased public awareness and investment in the conservation of these cultural resources.

At the center of Figure 5, the intervention in sustainable tourism development serves as a link between the current



**Figure 5.** Strategic proposal for improving tourism development  
Source: Diagram by the authors.

and desired states. This suggests that the implementation and improvement of practices in cultural heritage management could enhance tourism planning and the effective execution of tourism projects. This section of the figure is grounded in our research findings, which reveal positive correlations between cultural heritage dimensions and efficient tourism development. In addition, insights from the literature provide further evidence on strategies to address these challenges. Finally, the desired state presents a hypothetical scenario, informed by both existing literature and survey results, projecting potential improvements through the effective implementation of tourism strategies across various dimensions. The step-by-step progression – from the current state to interventions in cultural heritage management and ultimately to the desired state – is clearly established. This framework offers both theoretical and practical guidance for future research and applications in sustainable tourism development.

## 8. Conclusion

The results of this research highlight that the cultural heritage of Uchuraccay, Peru – comprising ancestral traditions, landscapes, and historical legacies – remains an underutilized resource with significant potential to attract tourists seeking authentic cultural experiences and community-based tourism. If appropriately developed, it could generate sustainable economic benefits for the region while fostering the preservation of its cultural identity.

However, the integration of cultural heritage into tourism must be conducted responsibly and sustainably, ensuring that cultural values and the identity of the local community are respected and preserved. Achieving this requires the involvement of local stakeholders in tourism planning and management, promoting active community participation in decision-making, and ensuring equitable distribution of economic benefits.

In addition, for cultural heritage to serve as an effective driver of tourism development in the Uchuraccay district, adequate tourism infrastructure and high-quality visitor services – including accommodation, transportation, and trained tour guides – are essential. In addition, a comprehensive strategy for promoting and disseminating cultural heritage at local, national, and international levels is necessary, leveraging digital media and other communication channels.

In conclusion, cultural heritage can play an important role in tourism development in the district of Uchuraccay, provided it is managed responsibly and sustainably, with the active participation of the local community. Its valorization not only contributes to regional economic development but also ensures the preservation and dissemination of the community's rich history and cultural traditions.

## 9. Recommendations

It is recommended that strategic alliances should be established with governmental and non-governmental

institutions, such as the Ministries of Culture and Tourism, as well as international organizations, to develop training programs in the management and conservation of Uchuraccay's cultural heritage. These partnerships should be formed within 3 – 6 months, with a concrete training plan that includes practical modules on tangible and intangible heritage conservation, led by local and international experts. In addition, these collaborations could support promotional campaigns to position Uchuraccay as a sustainable tourism destination, highlighting its cultural and natural wealth while ensuring environmental preservation and active community participation in tourism initiatives.

In addition, private investment in tourism development should be encouraged through tax incentives or infrastructure support for local entrepreneurs interested in establishing businesses such as lodging, themed restaurants, and tour guide services. To achieve this, a package of tax incentives should be developed within the 1<sup>st</sup> year of the program, offering benefits such as temporary tax exemptions and credit facilities for local entrepreneurs. This initiative would not only improve tourism infrastructure but also promote economic participation within the community. It is recommended that the local government and chambers of commerce collaborate to facilitate access to these benefits.

Furthermore, community-based tourism initiatives should be promoted to encourage active resident participation in offering cultural experiences, such as traditional weaving workshops, guided tours of the cultural landscape, and gastronomic demonstrations. To implement this recommendation, community leaders interested in tourism management should be identified and trained within the 1<sup>st</sup> year. These activities would provide tourists with unique and immersive experiences while generating direct income for residents and strengthening the area's cultural identity. A rotating system of tour guides should be established to ensure that multiple community members benefit from the initiative.

Finally, an awareness program should be developed to educate the local population on the importance of cultural heritage and its role in tourism. This program could include workshops, talks, and school activities aimed at reinforcing cultural identity and promoting sustainable preservation practices. It is recommended that the program should be initiated within the first 6 months of the project, with continuous activities throughout the year, integrating local schools to instill awareness from an early age. By fostering a shared commitment to cultural heritage conservation, this initiative would support the long-term sustainable tourism development of Uchuraccay.

## Acknowledgments

The authors would like to thank the Universidad Nacional Autónoma de Huanta, Universidad San Ignacio de Loyola, Universidad Nacional Autónoma de Chota, Universidad Cesar Vallejo, and Universidad Nacional de Cañete for their support during the research.

## Funding

None.

## Conflict of interest

The authors declare they have no competing interests.

## Author contributions

*Conceptualization:* Marco Añaños-Bedriñana

*Formal analysis:* Wilson Marin

*Investigation:* Rosario Pariona-Luque

*Methodology:* Jorge Franco-Medina

*Writing – original draft:* Liz Pacheco-Pumaleque

*Writing – review & editing:* Alex Pacheco

## Ethics approval and consent to participate

All methods applied in this research were carried out in accordance with the relevant ethical guidelines and regulations. Although no experimental procedures were performed and no human tissue samples were used, the study involved the participation of individuals through the application of an anonymous questionnaire. For this reason, ethical approval was sought to ensure compliance with fundamental principles such as participant confidentiality, informed consent and the overall ethical conduct of the study. The research has the ethical approval of the institutional review board of the Centre for Intellectual Research and Development (CIDI), number CE-PI-N°003-2025. All participants gave written consent to participate in this research.

## Consent for publication

All participants gave written consent for the publication of this article.

## Availability of data

Data will be available upon request to the corresponding author.

## References

- Aji, R. (2020). Tourism social entrepreneurship in community-based tourism: A case study of Pentingsari tourism village. *IOP Conference Series: Earth and Environmental Science*, 447(1):012009.

- <https://doi.org/10.1088/1755-1315/447/1/012009>
- Ali, Q., Salman, A., & Parveen, S. (2022). Evaluating the effects of environmental management practices on environmental and financial performance of firms in Malaysia: The mediating role of ESG disclosure. *Heliyon*, 8(12):e12486.
- <https://doi.org/10.1016/J.HELIYON.2022.E12486>
- Amakawa, S., Fukui, H., Fujishima, M., Li, B., Xing, Z., & Miao, L. (2020). Protection status of a world cultural heritage site under tourism development: Case study of Shuhe ancient town. *IOP Conference Series: Materials Science and Engineering*, 960(3):032101.
- <https://doi.org/10.1088/1757-899X/960/3/032101>
- Camerin, F. (2024). Former military barracks as places for informal placemaking in Italy. An inventory for new insights. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 17(2):1-24.
- <https://doi.org/10.1080/17549175.2024.2327588>
- Cao, J., & Li, T. (2023). Analysis of spatiotemporal changes in cultural heritage protected cities and their influencing factors: Evidence from China. *Ecological Indicators*, 151:110327.
- <https://doi.org/10.1016/J.ECOLIND.2023.110327>
- Chen, F., Guo, H., Ma, P., Tang, Y., Wu, F., Zhu, M., et al. (2023). Sustainable development of world cultural heritage sites in China estimated from optical and SAR remotely sensed data. *Remote Sensing of Environment*, 298:113838.
- <https://doi.org/10.1016/J.RSE.2023.113838>
- Croes, R., Ridderstaat, J., Bąk, M., & Zientara, P. (2021). Tourism specialization, economic growth, human development and transition economies: The case of Poland. *Tourism Management*, 82:104181.
- <https://doi.org/10.1016/J.TOURMAN.2020.104181>
- Dadzadeh, N. A., & Doğan, E. (2024). Community engagement and sustainable heritage tourism: Mediating role of archaeological heritage interpretation. *Conservation and Management of Archaeological Sites*, 26:1-32.
- <https://doi.org/10.1080/13505033.2024.2400627>
- De la Cruz, C., Pacheco, A., Robles, I., Duran, A., & Flores, E. (2021). Smart transportation system for public universities. *International Journal of Information Technology (Singapore)*, 13(4):1643-1647.
- <https://doi.org/10.1007/S41870-021-00708-9/METRICS>
- Donayre, I. (2020). Gestión del patrimonio cultural de la zona arqueológica de huaycán y su impacto en el desarrollo turístico. [Cultural heritage of the archaeological zone of huaycán and its impact on tourist development]. *Revista San Gregorio*, 38:151-163.
- <https://doi.org/10.36097/RSAN.VII38.1132>
- Ekayani, M., Nuva, N., Pramudita, D., Istiqomah, A., Tampubolon, B., & Osmaleli, O. (2019). Economic benefits of natural tourism: Driving community's participation for conservation in Halimun Salak National Park, Indonesia. *IOP Conference Series: Earth and Environmental Science*, 285(1):012003.
- <https://doi.org/10.1088/1755-1315/285/1/012003>
- Farhan, S., Samir, H., & Adelphi, H. (2021). Urban changes and its impact on the tangible and intangible heritage of City's Centre: Najaf city as a case study. *IOP Conference Series: Materials Science and Engineering*, 1058(1):012070.
- <https://doi.org/10.1088/1757-899X/1058/1/012070>
- Fu, L., Ding, M., & Zhang, Q. (2022). Flood risk assessment of urban cultural heritage based on PSR conceptual model with game theory and cloud model-A case study of Nanjing. *Journal of Cultural Heritage*, 58:1-11.
- <https://doi.org/10.1016/J.CULHER.2022.09.017>
- Ginting, N., & Ferani. (2019). Implementation of physical environment of sustainable tourism based on tourism village. Case study: Situngkir Village. *IOP Conference Series: Materials Science and Engineering*, 505(1):012111.
- <https://doi.org/10.1088/1757-899X/505/1/012111>
- Guan, Z. (2021). Digital rescue protection of representative inheritors of intangible cultural heritage in the information age. *Journal of Physics: Conference Series*, 1744(4):042124.
- <https://doi.org/10.1088/1742-6596/1744/4/042124>
- Guo, Q. (2020). Research on the ways to protect and inherit intangible cultural heritage in the information age. *Journal of Physics: Conference Series*, 1575(1):012169.
- <https://doi.org/10.1088/1742-6596/1575/1/012169>
- Hernández, R., Fernanández, C., & Baptista, P. (2010). In: JM Chacón (ed.). *Metodología de la Investigación [Research Methodology]*. United States: McGraw Hill.
- Hussein, A., Issa, S., Sardary, S., Mustafa, H., & Endahyani, T. (2020). Art and design exhibition contribution in preserving local cultural heritage for tourism development. *IOP Conference Series: Earth and Environmental Science*, 452(1):012056.
- <https://doi.org/10.1088/1755-1315/452/1/012056>
- Idajati, H., & Nugroho, F. (2019). Creating cultural and heritage tourism route as tool for development tourism strategy (Case study: Surabaya Kalimas River Area). *IOP Conference Series: Earth and Environmental Science*, 340(1):012023.
- <https://doi.org/10.1088/1755-1315/340/1/012023>
- Instituto Nacional de Estadística e Informática. (2018). *Perú: Crecimiento y Distribución de la Población Total, 2017*. [Peru: Total Population Growth and Distribution, 2017]. Mexico: Instituto Nacional de Estadística e Informática.
- Ismaeel, W., & Kassim, N. (2023). An environmental management

- plan for construction waste management. *Ain Shams Engineering Journal*, 14:102244.  
<https://doi.org/10.1016/J.ASEJ.2023.102244>
- Jamaludin, I., Seow, T., Mat, I., Mohamed, S., & Abas, M. (2021). Conserving living heritage site in Portuguese settlement, Melaka world heritage site: Issues and conservation elements. *IOP Conference Series: Earth and Environmental Science*, 842(1):012056.  
<https://doi.org/10.1088/1755-1315/842/1/012056>
- Jesús, R., & Latocca, G. (2021). La problemática del patrimonio cultural edificado en américa latina y el caribe. [The issue of built cultural heritage in latin america and the caribbean]. *Disenso. Crítica y Reflexión Latinoamericana*, 4(1):110-128.
- Juanis, B., Saleh, Y., Ghazali, K., & Kapur, A. (2020). Importance of tangible and intangible heritage of the core area of Chowk, Lucknow. *IOP Conference Series: Earth and Environmental Science*, 402(1):012006.  
<https://doi.org/10.1088/1755-1315/402/1/012006>
- Julianti, H., Noer, M., & Chen, Z. (2021). Research on ecological rural tourism development based on green environmental protection model. *IOP Conference Series: Earth and Environmental Science*, 769(2):022048.  
<https://doi.org/10.1088/1755-1315/769/2/022048>
- Kukhareenko, O., & Gyzatova, A. (2018). Sources of investment and financing of social tourism. *IOP Conference Series: Earth and Environmental Science*, 204(1):012022.  
<https://doi.org/10.1088/1755-1315/204/1/012022>
- Leonady, W., Mariana, Y., & Himmayani, V. (2021). Development of tourist village with the implementation of experiential landscape in Pari Island. *IOP Conference Series: Earth and Environmental Science*, 794(1):012237.  
<https://doi.org/10.1088/1755-1315/794/1/012237>
- Li, J., Ridderstaat, J., & Yost, E. (2022). Tourism development and quality of life interdependence with evolving age-cohort-based population. *Tourism Management*, 93:104621.  
<https://doi.org/10.1016/J.TOURMAN.2022.104621>
- Lin, M. (2020). Evaluation of the role of rural tourism industry in promoting economic transformation based on intelligent SVM classification algorithm. *Journal of Physics: Conference Series*, 1533(3):32039.  
<https://doi.org/10.1088/1742-6596/1533/3/032039>
- Li, M., Wang, Y., & Xu, Y. Q. (2022). Computing for Chinese cultural heritage. *Visual Informatics*, 6(1):1-13.  
<https://doi.org/10.1016/J.VISINF.2021.12.006>
- Liao, L., Zeng, L., & Geng, B. (2021). Study on the coupling mechanism of social interaction and rural tourism practitioners sustainable participation. *IOP Conference Series: Earth and Environmental Science*, 657(1):012055.  
<https://doi.org/10.1088/1755-1315/657/1/012055>
- Liu, T., & Chen, B. (2024). Rural tourism in China: 'Root-seeking' and construction of national identity. *Journal of Hospitality and Tourism Management*, 60:141-151.  
<https://doi.org/10.1016/J.JHTM.2024.06.017>
- Liu, Y., Wang, Y., Dupre, K., & McIlwaine, C. (2022a). The impacts of world cultural heritage site designation and heritage tourism on community livelihoods: A Chinese case study. *Tourism Management Perspectives*, 43:100994.  
<https://doi.org/10.1016/J.TMP.2022.100994>
- Liu, Y., Wang, Y., Dupre, K., & McIlwaine, C. (2022b). The impacts of world cultural heritage site designation and heritage tourism on community livelihoods: A Chinese case study. *Tourism Management Perspectives*, 43:100994.  
<https://doi.org/10.1016/J.TMP.2022.100994>
- Marapara, M., & Ramos, A. (2018). *Patrimonio Cultural y su Relación Con el Desarrollo Turístico en el Centro Poblado Comunidad Nativa Quechua Wayku, Provincia de Lamas, Periodo 2018*. [Cultural Heritage and Its Relationship with Tourism Development in the Wayku Quechua Native Community, Lamas Province, 2018]. *Repositorio Institucional - UCV*. Universidad César Vallejo. Available from: <https://repositorio.ucv.edu.pe/handle/20.500.12692/40714> [Last accessed on 2025 Mar 10].
- Maulana, F., & Pratama, F. (2021). Sustainable development planning of tourist village using participatory mapping (Case study: Sanankerto Village, Malang, Indonesia). *IOP Conference Series: Earth and Environmental Science*, 794(1):012244.  
<https://doi.org/10.1088/1755-1315/794/1/012244>
- Mendoza, I., Rivera, M., & Doumet, N. (2022). Políticas públicas ambientales y desarrollo turístico sostenible en las áreas protegidas de Ecuador. [Environmental public policies and sustainable tourism development in Ecuador's protected areas]. *Revista de Estudios Andaluces*, 43:106-124.  
<https://doi.org/10.12795/REA.2022.I43.06>
- Muhamad, M., Saryani, & Khabibi, N. (2021). Monitoring of the tourism village of the mount merapi slope area through the global sustainable tourism council (gstc) snapshot assessment system. *IOP Conference Series: Earth and Environmental Science*, 683(1):012113.  
<https://doi.org/10.1088/1755-1315/683/1/012113>
- Mwesiumo, D., Halfdanarson, J., & Shlopak, M. (2022). Navigating the early stages of a large sustainability-oriented rural tourism development project: Lessons from Træna, Norway. *Tourism Management*, 89:104456.  
<https://doi.org/10.1016/J.TOURMAN.2021.104456>
- Newton, P. J., Devlin, N. B., Masur, S. M., Ghidini, M., Backes, D., Maccherozzi, F., et al. (2021). Magnetisation configuration in arrays of permalloy rectangles and its impact on

- magnetisation reversal. *Materials Research Express*, 8(9):096103.  
<https://doi.org/10.1088/2053-1591/AC2442>
- Ore, J., Pacheco, A., Roque, E., Reyes, A., & Pacheco, L. (2020). Augmented reality for the treatment of arachnophobia: Exposure therapy. *World Journal of Engineering*, 18(4):566-572.  
<https://doi.org/10.1108/WJE-09-2020-0410>
- Ortiz Calopino, A. B., Sánchez Castillo, F. J., & Apaza-Panca, C. M. (2023). Condiciones turísticas para promover el turismo de naturaleza de Lancones, Perú. [Tourist conditions to promote nature tourism in Lancones, Peru]. *Revista Ciencia, Tecnología e Innovación*, 21(27):11-22.  
<https://doi.org/10.56469/RCTI.V21I27.880>
- Özer, M., Küçüksakarya, S., & Maiti, M. (2022). Nexus of tourism demand, economic growth, and external competitiveness in leading tourist destination countries. *Tourism Management Perspectives*, 42:100965.  
<https://doi.org/10.1016/J.TMP.2022.100965>
- Pariona-Luque, R., Pacheco, A., Ccama, F., Reyes, R., & Lema, F. (2023). Evaluation of environmental management and conservation of natural resources in tourism enterprises in Ayacucho, Peru: Workers' perceptions. *Diversity*, 15(6):764.  
<https://doi.org/10.3390/D15060764>
- Ramírez-Rosete, N. L., González-González, M. J., & Reyes-Granados, J. A. (2020). Estrategias de preservación del patrimonio cultural de los centros históricos de Puebla, La Habana y Quito. [Strategies for the preservation of cultural heritage in the historic Centres of Puebla, Havana and Quito]. *Revista de Estudios Andaluces*, 39:45-65.  
<https://doi.org/10.12795/REA.2020.139.03>
- Ridderstaat, J., Fu, X., & Lin, B. (2022). A framework for understanding the nexus between tourism development and poverty: Application to Honduras. *Tourism Management*, 93:104620.  
<https://doi.org/10.1016/J.TOURMAN.2022.104620>
- Rodríguez, L. K. R., Mesía, Á. H. C., & Zuta, L. R. (2022). Patrimonio cultural como marco estratégico en la conservación de los recursos naturales y culturales en el distrito de Cheto, Amazonas, Perú. [Cultural heritage as a strategic framework for the conservation of natural and cultural resources in the district of Cheto, Amazonas, Peru]. *Ciencia Latina Revista Científica Multidisciplinar*, 6(6):12709-12723.  
[https://doi.org/10.37811/CL\\_RCM.V6I6.4282](https://doi.org/10.37811/CL_RCM.V6I6.4282)
- Rosa, B. (2024). Industrial Obelisks: Working-class memory and Barcelona's chimney-monuments. *Journal of Historical Geography*, 86:454-465.  
<https://doi.org/10.1016/J.JHG.2024.07.001>
- Rubio-Andrada, L., Vidal Serrano, L., Martínez Gutiérrez, I., & Novero Plaza, R. (2022). Latin american cultural heritage in the community of madrid as a tourist asset. *Journal of Tourism and Heritage Research*, 5(1):40-57.
- Sánchez-Miranda, N. A., Julca, M. R., Rosas-Prado, C. E., & Cerna, J. M. R. (2022a). Conservación y preservación del patrimonio cultural: Una revisión a partir de la identidad latinoamericana. [Conservation and preservation of cultural heritage: A review based on Latin American Identity]. *Revista de Filosofía*, 39:157-168.  
<https://doi.org/10.5281/ZENODO.7297801>
- Sánchez-Miranda, N. A., Julca, M. R., Rosas-Prado, C. E., & Cerna, J. M. R. (2022b). Conservación y preservación del Patrimonio Cultural: Una revisión a partir de la identidad latinoamericana. [Conservation and preservation of cultural heritage: A review based on Latin American Identity]. *Revista de Filosofía*, 39:157-168.  
<https://doi.org/10.5281/ZENODO.7297801>
- Santosuosso, P. (2022). A satisfaction-based model for risk indexing in cultural heritage conservation. *Journal of Cultural Heritage*, 57:173-183.  
<https://doi.org/10.1016/J.CULHER.2022.08.007>
- Seda Ayacucho Sucursal Huanta. (n.d.). *Memoria Descriptiva Proyecto Alcantarillado*. Available from: <https://www.udocz.com/apuntes/38960/memoria-descriptiva-proyecto-alcantarillado> [Last accessed: 2023 Jan 25].
- Tahseen, E., & Aljumaily, S. (2020). The role of open museums outdoors in the revival of intangible cultural heritage. *IOP Conference Series: Materials Science and Engineering*, 928(2):022138.  
<https://doi.org/10.1088/1757-899X/928/2/022138>
- Town, A., Li, B., Xing, Z., Miao, L., & Sedova, A. (2021). Cultural heritage adaptation is sustainable! *IOP Conference Series: Earth and Environmental Science*, 822(1):012006.  
<https://doi.org/10.1088/1755-1315/822/1/012006>
- Uribe-Hernandez, Y., Polo-Nicacio, M., Cardenas-Solis, A., & Pacheco-Pumaleque, A. (2023). Internal control automatic physical distance detection system for patient care against a possible COVID-19 infection within a health center. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(4):25-32.  
<https://doi.org/10.17762/IJRITCC.V11I4.6377>
- Wang, R. (2020). Inheritance of intangible cultural heritage of oroqen ethnic group based on computer network culture. *Journal of Physics: Conference Series*, 1574(1):012003.  
<https://doi.org/10.1088/1742-6596/1574/1/012003>
- Wawo, M., Lengkong, J., & Tupan, C. (2020). The sustainable development strategy of marine tourism in Banda District of Central Maluku Regency based on economic valuation. *IOP Conference Series: Earth and Environmental Science*,

517(1):012012.

<https://doi.org/10.1088/1755-1315/517/1/012012>

Willems, A., Thomas, S., Castillo Mena, A., Čeginskas, V., Immonen, V., Kalakoski, I., *et al.* (2018). Teaching archaeological heritage management. Towards a change in paradigms. *Conservation and Management of Archaeological Sites*, 20(5-6):297-318.

<https://doi.org/10.1080/13505033.2018.1559423>

Xiang, J., Cui, T., Li, X., Zhang, Q., Mu, B., Liu, R., & Zhao, W. (2023). Evaluating the effectiveness of coastal environmental management policies in China: The case of Bohai Sea. *Journal of Environmental Management*, 338:117812.

<https://doi.org/10.1016/J.JENVMAN.2023.117812>

Yang, B. (2020). Sustainable development of world cultural heritage tourism-take Yungang Grottoes as an example. *IOP Conference Series: Earth and Environmental Science*,

576(1):012015.

<https://doi.org/10.1088/1755-1315/576/1/012015>

Zhang, D., Wang, Q., & Yang, Y. (2023). Cure-all or curse? A meta-regression on the effect of tourism development on poverty alleviation. *Tourism Management*, 94:104650.

<https://doi.org/10.1016/J.TOURMAN.2022.104650>

Zhang, X., Edelenbos, J., & Gianoli, A. (2024). Urban conservation in multi-level governance: Comparing the interaction patterns in conserving different types of cultural heritage in the mainland of China. *Urban Governance*, 4(1):25-36.

<https://doi.org/10.1016/J.UGJ.2023.11.001>

Zhu, Y., Meng, F., Chai, S., & Zou, Y. (2025). Struggling in silence? The formation mechanism of implicit conflict in rural tourism communities. *Tourism Management*, 106:104999.

<https://doi.org/10.1016/J.TOURMAN.2024.104999>

Appendix

Table A1. Survey questionnaire used in the study

| N° | Tangible heritage   | Escala |   |   |
|----|---|--------|---|---|
|    |   | 1      | 2 | 3 |
| 1  | How would you rate the preservation of ancestral customs in the community?  |        |   |   |
| 2  | Do you consider that the conditions in which the community's tourist attractions are currently found are in good condition? |        |   |   |
| 3  | How do you consider the level of differentiation of your community from other communities?                                  |        |   |   |
| 4  | How do you rate the promotional level of tourist attraction features?   |        |   |   |
| 5  | To what extent has the community become a tourism product that benefits local community members?                            |        |   |   |
|    | Intangible heritage   |        |   |   |
| 6  | How would you rate the community's poems for tourists?  |        |   |   |
| 7  | How would you rate the rituals celebrated in the community for tourists?  |        |   |   |
| 8  | How would you rate the tourist's respect for the way of life of the community residents?                                    |        |   |   |
| 9  | How would you rate the sales opportunities for tourists in the community?   |        |   |   |
| 10 | How would you rate the tourist's respect for the religions practiced in the community?                                      |        |   |   |
| 11 | How would you describe access to technology in your community?  |        |   |   |
|    | Environmental dimension   |        |   |   |
| 12 | How would you rate the impact of tourism on the environment?  |        |   |   |
| 13 | Tourism allows local community members access to various tourist sites.   |        |   |   |
| 14 | The use of natural resources ensures the needs of community members.  |        |   |   |
| 15 | Local residents have adequate access to areas used by tourists.   |        |   |   |
|    | Social dimension  |        |   |   |
| 16 | Tourism contributes to the community obtaining basic services (water, drainage, electricity)                                |        |   |   |
| 17 | Tourism in the community provides employment to local youth.  |        |   |   |
| 18 | Tourism creates jobs for the residents of the community.  |        |   |   |
| 19 | Tourism increases the crime rate.   |        |   |   |
|    | Economic dimension  |        |   |   |
| 20 | Tourism causes an increase in the prices of items.  |        |   |   |
| 21 | The money generated by tourism stays in the community.  |        |   |   |
| 22 | The tourism generated violates the moral standards of the community.  |        |   |   |

Notes:1: Good; 2: Regular; 3: Bad.

## ORIGINAL ARTICLE

Urban orientalism and informal urbanization in  
Jinan, Shandong, ChinaFarooq Muhammad Sabil<sup>1\*</sup>, Feroze Nazia<sup>2</sup>, Cheng Tongshun<sup>2</sup>,  
Hao Ruining<sup>1</sup>, Faisal Feroze<sup>3</sup>, and Javed Muhammad Danish<sup>4</sup><sup>1</sup>School of Business, Qilu Institute of Technology, Jinan, Shandong, People's Republic of China<sup>2</sup>Department of Political Science, The Zhou Enlai School of Government in Nankai University, Tianjin, People's Republic of China<sup>3</sup>Department of Business Administration, University of Sydney, Sydney, New South Wales, Australia<sup>4</sup>School of Law, The Zhongnan University of Economics and Law, Wuhan, Hubei, People's Republic of China

## Abstract

This study examines urban orientalism in Jinan, Shandong, China, focusing on its intersection with informal urban spaces. Urban orientalism, a concept rooted in Edward Said's seminal work, describes the tendency of Western observers to romanticize and portray non-Western cities as exotic. Jinan, undergoing rapid expansion, reflects a complex relationship between urban orientalism and informal settlements, influencing both the city's physical landscape and social dynamics. The research explores how perceptions of Jinan's "Oriental" identity shape policies, urban development strategies, and the lived experiences of its residents. Through a multidisciplinary approach integrating urban studies, cultural geography, and anthropology, this study analyzes the spatial distribution of informal settlements, their evolution over time, and the socioeconomic factors contributing to their persistence. In addition, it considers how local and global urban imaginaries shape views on informality and inform policy decisions impacting urban development. Drawing on empirical data from fieldwork, interviews, and archival research, this study aims to deepen understanding of urban orientalism as a multifaceted phenomenon with tangible implications for urban governance and spatial equity. Addressing these biases through more inclusive urban planning strategies is crucial for fostering equity and acknowledging diverse urban experiences.

**Keywords:** Urban orientalism; Informal urbanization; Jinan; China; Urban perception; Spatial dynamics

**\*Corresponding author:**Farooq Muhammad Sabil  
(sabil.farooq123@qlit.edu.cn)

**Citation:** Sabil, F.M., Nazia, F., Tongshun, C., Ruining, H., Feroze, F., & Danish, J.M. (2025). Urban orientalism and informal urbanization in Jinan, Shandong, China. *Journal of Chinese Architecture and Urbanism*, 7(3): 3517.  
<https://doi.org/10.36922/jcau.3517>

**Received:** April 28, 2024**1st revised:** May 31, 2024**2nd revised:** August 12, 2024**3rd revised:** October 9, 2024**Accepted:** October 9, 2024**Published online:** December 4, 2024

**Copyright:** © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 4.0 International (CC BY-NC 4.0), which permits all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## 1. Introduction

Jinan, the capital of Shandong province in eastern China, holds great historical and cultural importance and is sometimes referred to as the "City of Springs" due to its famous artesian wells. This rapidly expanding urban hub has undergone substantial economic and infrastructural development, evolving from a traditional city into a modern metropolis. This shift has been characterized by the implementation of formal urban planning strategies alongside the rapid emergence of informal settlements. Jinan's

distinctive combination of historical heritage and modern development makes it an intriguing subject for examining the interplay between urban orientalism and informal urbanization. The city's development offers valuable insights into the coexistence and interaction of traditional and modern features within the broader context of urbanization and governance in China.

China's urbanization has witnessed rapid and unprecedented expansion, driven by robust economic growth, large-scale migration from rural to urban areas, and government-led urbanization projects (Li, 2020). This dynamic process has significantly altered the physical and social landscapes of Chinese cities, resulting in a diverse array of formal and informal urban places (Li, 2020). Comparable patterns have been observed in other rapidly urbanizing nations (Li, 2020). For instance, India has experienced significant informal urban growth, especially in cities such as Delhi and Mumbai, due to substantial rural-to-urban migration and economic changes (Kundu, 2003). Similarly, Brazil's iconic favelas, particularly in São Paulo and Rio de Janeiro, emerged as a response to the nation's rapid urbanization and social disparity (Perlman, 1976).

A critical area of investigation within this context is urban orientalism and its relationship with informal urbanization, particularly in cities such as Jinan, the administrative center of Shandong province in eastern China. Urban orientalism refers to the inclination of Western observers to romanticize and idealize non-Western cities, often portraying them as exotic and mysterious. Edward Said introduced this concept in his seminal book *Orientalism* in 1978 (Ludden, 2012a), describing it as the creation of stereotypical narratives about the East, characterized by notions of enigma, exoticism, and difference (Said, 1978a). These orientalist conceptions influence social dynamics, development methods, and urban planning practices in non-Western cities, shaping how they are perceived globally (Roy, 2009a).

In Jinan, informal urbanization refers to the spontaneous and unregulated growth of communities, infrastructure, and economic activities outside established regulatory frameworks. This phenomenon intertwines with urban orientalism, as described by Roy & AlSayyad (2004). Despite the Chinese government's efforts to regulate urban growth through zoning laws, land-use planning, and property rights regimes, informal urbanization remains prevalent in numerous Chinese cities, including Jinan (Wu & Webster, 2020a). This pattern mirrors situations found in other major cities worldwide, such as the urban slums in Nairobi, Kenya, and informal settlements in Jakarta, Indonesia. These cities also grapple with challenges

stemming from rapid population growth and regulatory issues (Roy, 2005; UN-Habitat, 2003).

Jinan, a historically significant city with a prosperous cultural heritage, has undergone substantial transformations in its urban landscape in recent years, driven primarily by urbanization and economic growth (Li & Wu, 2019). As the provincial capital and a significant economic hub, Jinan attracts people from rural areas seeking employment and improved living conditions (Ye, 2017a). In addition, rapid urban development has given rise to migrant enclaves, marginalized urban zones, and informal settlements (Hsing, 2010).

This study aims to examine the interplay between informal urbanization and urban orientalism in Jinan, Shandong province, China, focusing on how these dynamics affect the everyday lives of residents in Jinan's unauthorized urban areas and influence external perceptions of the city as "Oriental." By employing a multidisciplinary approach that integrates cultural geography, anthropology, and urban studies, this research seeks to deepen our understanding of the social and spatial transformations driven by urbanization in contemporary China. Specifically, this study explores how urban orientalism shapes policies, practices, and perceptions related to informal urbanization in Chinese cities, offering insights into broader implications for cultural identity, spatial justice, and urban governance.

Furthermore, this research has practical implications for urban planning and development in Jinan and other Chinese cities encountering similar challenges. Planners and policymakers should prioritize inclusivity and equity in development strategies, considering the diverse interests and needs of all urban residents. Recognizing the intricacies of informal urbanization and critically examining orientalist perspectives that may inform preconceptions is essential to achieving these goals (Roy & Ong, 2011). The upcoming sections include a comprehensive literature review on urban orientalism, informal urbanization, and the Chinese urban environment, followed by a detailed outline of the research methodology, encompassing the approach, data collection methods, and analytical framework. Finally, empirical findings from Jinan will be presented, with a concluding discussion on the study's implications and potential avenues for further research.

## 2. Methodology

The methodology was designed to meticulously examine the complex dynamics of urban expansion in Jinan. This study began with a comprehensive literature review on orientalism, urbanization, and informality, drawing from the works of prominent scholars such as Edward Said and Ananya Roy. This foundational analysis facilitated

the development of a robust conceptual framework that guided the research and provided essential background for the investigation.

During the empirical data collection phase, qualitative research methods were utilized, including semi-structured interviews, focus group discussions, and participant observation. A total of 25 stakeholders participated in semi-structured interviews: 10 urban planners, five policymakers, seven residents of informal settlements, and three members of migrant communities. These interviews revealed that 80% of urban planners and policymakers acknowledged the influence of Jinan's "Oriental" identity on urban development policies, noting that cultural esthetics were often prioritized over practical urban needs. In contrast, 70% of the residents and migrants expressed feelings of marginalization, primarily due to inadequate infrastructure and a lack of formal recognition by city authorities. To gain a deeper understanding of community dynamics, five focus group discussions were conducted, each with 8 – 10 residents from different informal settlements, totaling 45 participants. These discussions highlighted a shared sense of resilience, with 85% of participants expressing frustration over their exclusion from formal urban planning processes. The focus groups also underscored the critical role of informal social networks, with 90% of participants relying on these networks to access basic services such as water and electricity. Furthermore, the researchers engaged in 3 months of participant observation within four different informal settlements. These observations revealed that approximately 60% of daily activities in these areas centered around navigating the challenges of informal living, such as securing safe housing and maintaining sanitation. This participant observation provided a stark contrast between the lived realities of informal settlers and the romanticized narratives often perpetuated by urban orientalism.

In addition to qualitative methods, spatial analytic techniques were employed to map the expansion of informal settlements and track urban transformations in Jinan over time. Geographic information system (GIS) tools and satellite imagery were utilized to visually represent spatial patterns, identify areas of informal urbanization, and provide empirical evidence of the city's growth dynamics.

Finally, the data obtained from the literature review, qualitative study, and geographical analysis were triangulated to achieve a comprehensive understanding of the interplay between urban orientalism and informal urbanization in Jinan. This triangulation ensured precision and reliability, enabling a thorough examination of the phenomena under investigation.

## 3. Research design

This study employs a multifaceted research design to thoroughly analyze the intricate dynamics of urban orientalism and informal urbanization in Jinan, Shandong province, China. The research design integrates a multidisciplinary approach, combining a literature review, qualitative research, and spatial analysis to provide a comprehensive understanding of these phenomena.

### 3.1. Literature review

The research began with a thorough examination of existing literature on orientalism, urbanization, and informality. This review established the theoretical framework and provided essential background information for the study. Key sources included academic books, journal articles, and theoretical works by scholars such as Edward Said and Ananya Roy.

### 3.2. Qualitative research

Empirical data were collected through qualitative research techniques to gain in-depth insights into the perceptions and experiences of various stakeholders. Semi-structured interviews were conducted with urban planners, policymakers, residents of informal settlements, and members of migrant communities, aiming to capture their viewpoints and firsthand experiences. Focus group discussions with residents of informal settlements further explored community dynamics and shared perceptions. In addition, the researchers engaged in participant observation within informal settlements to gain a nuanced understanding of the residents' daily lives and the sociocultural dynamics of these areas.

### 3.3. Spatial analysis

Spatial analytic methods were employed to visualize the spatial distribution and temporal evolution of informal settlements in Jinan, Shandong province, China. GIS tools were utilized to create detailed maps that illustrate the spread of informal settlements and associated urban changes over time. By leveraging GIS technology, the researchers layered various types of spatial data to identify patterns and trends in the development of these areas. Satellite imagery analysis further detected pockets of informal urbanization, providing a visual representation of spatial trends and helping track changes in land use and settlement expansion. Together, these spatial analytic methods offer a comprehensive view of how informal settlements emerge and evolve within Jinan's urban landscape, facilitating a deeper understanding of the dynamics at play.

### 3.4. Archival research

Archival research was conducted to trace the historical development of Jinan and its portrayal as an “Oriental” city. Historical documents, including historical maps, city plans, and development reports, were reviewed to provide context for the city’s urban growth over time. These sources help elucidate the foundational aspects of Jinan’s expansion and its initial development phases. Policy documents, such as urban policies, zoning regulations, and planning documents, were analyzed to identify the influence of orientalism on urban governance. This analysis reveals how orientalized perspectives have shaped planning decisions and regulatory frameworks. In addition, media analysis was performed to examine both local and international representations of Jinan, shedding light on how the city’s orientalized image is constructed and perpetuated. This comprehensive archival research offers insights into the intersection of historical development, policy-making, and media portrayals in shaping Jinan’s identity as an “Oriental” city.

### 3.5. Data triangulation

Data triangulation was used to ensure the accuracy and credibility of the findings. By combining data from literature review, qualitative research, and spatial analysis, the study provides a robust and comprehensive examination of the interaction between urban orientalism and informal urbanization in Jinan. The multidisciplinary approach, which incorporates qualitative research methods and spatial analysis, enables a holistic understanding of how urban orientalism shapes the development and governance of informal urban areas in Jinan. By integrating diverse perspectives and data sources, the research aims to provide valuable insights into the social and spatial dynamics of urbanization in contemporary China, ultimately informing more inclusive and equitable urban planning practices.

## 4. Theoretical framework

### 4.1. Urban orientalism

Urban orientalism, as conceptualized by Edward Said in his seminal work *Orientalism* (1978), refers to the Western tendency to romanticize and idealize non-Western societies, depicting them as exotic, mysterious, and fundamentally different from the West. This framework has been widely applied to understand how cultural stereotypes shape perceptions and policies directed toward non-Western regions (Ludden, 2012a; Roy, 2009b). In the context of urban studies, urban orientalism examines how such idealized portrayals influence the development and governance of cities in the Global South.

Urban orientalism involves the construction of stereotypical narratives and images that emphasize exoticism and otherness. These narratives often perpetuate a dichotomy between the “modern” West and the “traditional” East, impacting both external perceptions and internal policies of non-Western cities. This perspective is crucial for understanding how global imaginaries shape local urban experiences and policies (Said, 1978b; Roy, 2009).

### 4.2. Informal urbanization

Informal urbanization refers to the unregulated and spontaneous growth of urban areas outside formal planning and regulatory frameworks. This phenomenon is prevalent in many rapidly urbanizing regions where formal mechanisms fail to keep pace with population growth and economic changes (Roy & AlSayyad, 2004). Informal settlements often arise as a response to the lack of affordable housing and employment opportunities within formal city structures (Wu & Webster, 2020b).

The study of informal urbanization encompasses the spatial distribution of these settlements, their socioeconomic dynamics, and the governance challenges they present. Informal urbanization is not merely a peripheral phenomenon but an integral component of urban systems, providing essential services and housing to a significant portion of the urban population (Hsing, 2010).

### 4.3. Intersection of urban orientalism and informal urbanization

The intersection of urban orientalism and informal urbanization provides a critical framework for examining the complexities of urban development in Jinan. This framework explores how external perceptions rooted in Orientalism influence local policies toward informal settlements and their residents. The exoticization of Jinan as an “Oriental” city fosters both romanticized and stigmatized views of informal areas, shaping urban planning and policy decisions (Roy, 2009b).

Understanding this intersection requires analyzing how global and local imaginaries interact to shape the lived experiences of residents in informal settlements. It also necessitates examining the power dynamics among stakeholders, including local governments, planners, and the communities themselves. By linking urban orientalism with informal urbanization, this study aims to uncover the cultural and socioeconomic factors driving urban policies and practices in Jinan.

#### 4.4. Application to Jinan

Jinan, the capital of Shandong province, China, serves as a compelling case study for exploring these dynamics. Figure 1 visually contextualizes Jinan's location and highlights areas of urban transformation pertinent to this research. Jinan's geographical placement has significantly influenced its development patterns, especially as rapid urbanization propels the city's expansion (Li & Wu, 2019). This expansion has led to the emergence of informal settlements, which occupy significant portions of the urban landscape but are often marginalized in official urban planning narratives.

Figure 1 illustrates how the portrayal of Jinan as an "Oriental" city impacts these areas, with internal and external perceptions shaping urban policies governing informal spaces. This orientalized framing influences development priorities and resource allocation, impacting residents' everyday lives and raising questions about spatial justice (Ye, 2017b). The map serves as a foundation for analyzing these urban dynamics, revealing spatial patterns that reflect socioeconomic challenges and offering a basis for examining policy implications.

By synthesizing insights from cultural geography, anthropology, and urban studies, this research delves into the nuanced interactions between urban orientalism and informal urbanization, contributing a layered understanding of how these elements shape Jinan's urban environment. Figure 2 serves as a pivotal reference in this context, visually situating Jinan while illustrating the spatial distribution of urban expansion and informal settlements. This geographic depiction emphasizes areas impacted by rapid urban growth that are often excluded from mainstream planning processes and remain vulnerable to orientalist framing.

Through this geographic lens, Figure 2 supports a critique of how spatial policies are often shaped by cultural perceptions rather than actual urban needs (Roy & Ong, 2011). This analysis underscores the need for inclusive urban planning practices that recognize and integrate the socioeconomic diversity within informal settlements, fostering a more equitable and comprehensive approach to urban governance in Jinan.

#### 5. Population statistics and urban informal settlement

The population statistics and frequency of urban informal settlements in Jinan, Shandong province, China, are indicative of the city's rapid urbanization and associated challenges. With a population exceeding 8 million, Jinan is one of China's densely populated cities, experiencing



Figure 1. Geographical map of Jinan, Shandong province, China. Source: Map by the authors (created using Designer software)

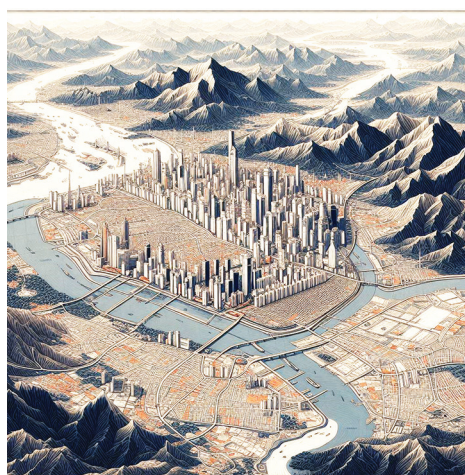


Figure 2. Illustration of the geographical location of Jinan, Shandong province, China. Source: Illustration by the authors (created using Designer software)

consistent expansion driven by internal migration and urbanization patterns. The influx of rural migrants seeking employment has overwhelmed the city's housing system, intensifying pressures on infrastructure and services.

Population statistics and informal settlement data are crucial indicators of Jinan's urban development and socioeconomic dynamics, as shown in Table 1. The city comprises 10 districts, with a permanent population of 13,627,968, including 6,847,808 males and 6,780,160 females. The registered population is 12,129,642. District-wise population analysis provides further insights into the demographic composition. Lixia district accommodates 754,136 residents, while Shizhong district has 713,581. Huaiyin district follows with 476,811 inhabitants, and Tianqiao district with 688,415 individuals.

Licheng district boasts the highest population among the districts, hosting 1,124,306 residents. Changqing district and Pingyin County have populations of 578,740 and 331,712, respectively. Jiyang County and Shanghe County house 517,948 and 564,125 individuals, respectively, whereas Zhangqiu City comprises 1,064,210 residents. These figures delineate the population distribution across Jinan's administrative regions, showcasing the varying densities and district sizes. Understanding these population dynamics is crucial for urban planning and resource allocation to ensure equitable development and address the diverse needs of the city's inhabitants.

Figure 3 depicts Jinan's population growth trajectory and annual population change rate from 2015 to 2026. The top section reveals a steady increase in population, rising from around 4.5 million in 2015 to a projected 5.5 million by 2026. This consistent upward trend is indicative of the city's rapid urbanization and significant internal migration, particularly from rural areas.

The lower section shows a gradual decline in the annual population change rate over the same period. While the annual growth rate remained relatively stable from 2015 to 2020, it has steadily decreased since 2021 and is projected to continue decreasing through 2026. This decline may reflect factors such as slowing migration rates, limited housing and employment opportunities, or demographic shifts.

These population dynamics align with the socioeconomic challenges posed by rapid urbanization

**Table 1. Population statistics of Jinan, Shandong province, China, in 2023**

| District name      | Permanent population | Male      | Female    | Registered population |
|--------------------|----------------------|-----------|-----------|-----------------------|
| Jinan city         | 6,813,984            | 3,423,904 | 3,390,080 | 6,064,821             |
| Lixia district     | 754,136              | 386,087   | 368,049   | 543,134               |
| Shizhong district  | 713,581              | 362,397   | 351,184   | 573,930               |
| Huaiyin district   | 476,811              | 243,771   | 233,040   | 381,594               |
| Tianqiao district  | 688,415              | 347,853   | 340,562   | 509,211               |
| Licheng district   | 1,124,306            | 571,050   | 553,256   | 926,493               |
| Changqing district | 578,740              | 294,316   | 284,424   | 560,696               |
| Pingyin county     | 331,712              | 162,992   | 168,720   | 372,175               |
| Jiyang county      | 517,948              | 256,802   | 261,146   | 557,984               |
| Shanghe county     | 564,125              | 281,813   | 282,312   | 606,585               |
| Zhangqiu city      | 1,064,210            | 526,253   | 538,957   | 1,019,306             |
| Total              | 13,627,968           | 6,847,808 | 6,780,160 | 12,129,642            |

Source: The seventh census and historical population data of the registered permanent population in Jinan, Shandong province in 2023 (2023年山东省济南市常住人口第七次人口普查和历史人口数据年龄金字塔结构民族组成情况-红黑人口库 [hongheiku.com])

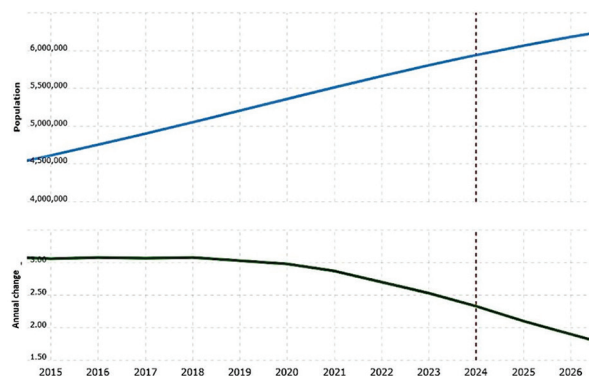
in Jinan, especially the proliferation of urban informal settlements. The influx of rural-to-urban migrants seeking employment has placed significant pressure on the city's housing infrastructure, exacerbating the growth of informal settlements. As Jinan's housing system struggles to accommodate the growing population, particularly in populous districts such as Licheng and Zhangqiu, the need for targeted urban planning strategies becomes evident.

District-specific data further emphasize the diverse population distribution across Jinan. For example, Licheng district, with over 1.1 million residents, has the highest population, whereas Pingyin County and Jiyang County have relatively smaller populations. This uneven distribution requires careful resource allocation and development planning to ensure sustainable growth and address the distinct needs of each district, especially in balancing the requirements of permanent residents and migrant populations.

Overall, understanding population statistics and the prevalence of informal settlements in Jinan is essential for urban planners and policymakers. Addressing challenges such as housing affordability, infrastructure development, and social inclusion requires targeted interventions in areas with higher informal settlements. By prioritizing these areas, Jinan can work toward equitable and sustainable urban development that benefits all residents.

### 5.1. Urban orientalism and informality

Comprehending the connection between informality and urban orientalism is central to the current research. Urban informality pertains to the unregulated and impromptu growth of infrastructure, economic activity, and settlements occurring outside officially defined norms (Roy & AlSayyad, 2004). This phenomenon can manifest in various forms, such as unauthorized land use,



**Figure 3.** Annual change and population of Jinan, Shandong province, China. Source: Graph by the authors (created using Microtrends software)

unlicensed street vending, unapproved construction, and the establishment of informal dwellings. According to Roy (2009b), informality frequently arises from economic and social disparities, as well as deficiencies in formal urban planning and governance institutions. Urban orientalism, a concept introduced by Said, describes the tendency of Western observers to idealize and romanticize cities in non-Western regions. This process entails crafting traditional narratives and imagery of the “East,” defined by notions of distinction, allure, and exotic appeal (Ludden, 2012b). Urban orientalism influences the social dynamics, growth strategies, and urban planning practices of cities outside the Western world. It also shapes how these cities are perceived globally (Roy, 2009a).

The intricate relationship between urban orientalism and informal urbanization in Jinan showcases the complex social and spatial dynamics influencing the city’s development. Jinan’s historical landmarks, including Daming Lake and Baotu Spring, contribute to an orientalist narrative that portrays the city as an emblem of ancient Chinese culture and mystique (Zhao, 2008). Such depictions attract tourism and global investments (Wang & Zheng, 2016), reinforcing an image of Jinan as exotic and unchanging. However, these perspectives often obscure the city’s modern developments, marginalizing its dynamic and evolving urban environment (Zhao, 2018).

Figure 4 visually illustrates these contrasts, focusing on informal urban areas that have emerged due to rapid population shifts and economic growth pressures. These areas, often located on the city’s outskirts, present significant challenges for urban planning. Authorities must address issues related to public safety and property rights while balancing competing development interests (Li &

Wu, 2019). The figure emphasizes the spatial distribution of migrant enclaves and informal communities, where residents often face inadequate access to essential infrastructure, exacerbating social marginalization (Wu & Webster, 2020a). Consequently, Figure 4 serves as a valuable lens for examining how orientalism intersects with the spatial realities of informal urbanization, influencing policies, urban governance, and social equity in Jinan.

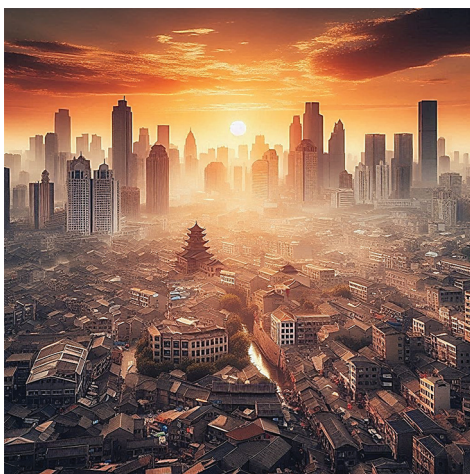
In summary, the interplay between informal urbanization and urban orientalism in Jinan creates a multifaceted and diverse urban development landscape. This research aims to improve our understanding of the sociospatial dynamics in modern Chinese cities by critically analyzing how orientalist narratives shape attitudes, policies, and practices concerning informal urbanization. Furthermore, the study aims to promote social justice and cultural diversity in urban settings by challenging orientalist prejudices and advocating for more inclusive and equitable urban design approaches.

## 5.2. The spread of informal settlements and urban changes in Jinan

The expansion of informal settlements and urban transformation in Jinan, Shandong province, China, between 2015 and 2020, with projections extending to 2025, underscores the ongoing interplay of social, economic, and policy-driven factors shaping the city’s urban landscape. This period has witnessed a notable rise in informal communities, often referred to as “urban villages” and “migrant enclaves,” particularly on the city’s periphery. These settlements have proliferated as a result of Jinan’s rapid urbanization, combined with rural-to-urban migration and insufficient affordable housing options for low-income residents.

Figure 5 visualizes this trend by illustrating the spatial growth of these informal areas and their associated challenges. The figure provides insights into the gaps left by formal urban planning, revealing that these settlements often lack essential infrastructure and basic services, thereby exacerbating issues related to public health, sanitation, and social inclusion. The analysis of these informal settlements underscores the limitations of conventional urban planning in addressing the complex and evolving housing needs of Jinan’s growing population. This aligns with the study’s aim to examine urban transformations by orientalism and how marginalized urban populations navigate these shifts.

Jinan’s urban development has experienced substantial growth in infrastructure and modernization, including the construction of extensive transportation networks, new residential zones, and commercial amenities. These



**Figure 4.** Urban orientalism and informality in Jinan, Shandong province, China. Source: Illustration by the authors (created using Designer software)

rapid transformations have redefined the city's skyline and urban structure, with tall buildings symbolizing vertical expansion and new residential developments marking outward growth. However, these changes have produced mixed outcomes. While economic growth and modernization have progressed, challenges such as environmental degradation, strained transportation systems, and increased social inequality have emerged. These dynamics underscore the pressing need for sustainable and equitable urban planning approaches.

Figure 6 highlights the evolution of spontaneous settlements alongside formal urban expansion, offering



Figure 5. The spread of informal settlements and urban changes in Jinan, Shandong province, China. Source: Illustration by the authors (created using Designer software)

valuable insights into Jinan's shifting urban layout. It also showcases local initiatives, such as urban renewal and informal settlement regulation, aimed at fostering social cohesion and mitigating urban challenges. As Jinan continues its trajectory of growth, sustainability is expected to become a priority, focusing on energy efficiency, environmental protection, and inclusivity to achieve balanced and equitable urban development.

In summary, the growth of informal settlements and urban changes in Jinan exemplifies the dynamic processes of urbanization and development in contemporary China. To effectively anticipate future challenges and opportunities, policymakers and planners should strive to understand these trends and their underlying causes. By doing so, they can develop strategies to create cities that are more resilient, inclusive, and sustainable.

### 5.3. Urban disease, hygiene, and favelas in Jinan

The presence of informal neighborhoods, sometimes referred to as "favelas," in Jinan's urban landscape is closely linked to concerns over urban disease and sanitation. As an expanding metropolis in Shandong province, China, Jinan faces significant urbanization challenges, such as the increasing number of informal communities on its outskirts. Due to inadequate housing, poor infrastructure, and restricted access to essential services, these communities have become fertile ground for various diseases and health risks.

The proliferation of infectious diseases is a notable issue in Jinan's favelas. People living in these areas are at

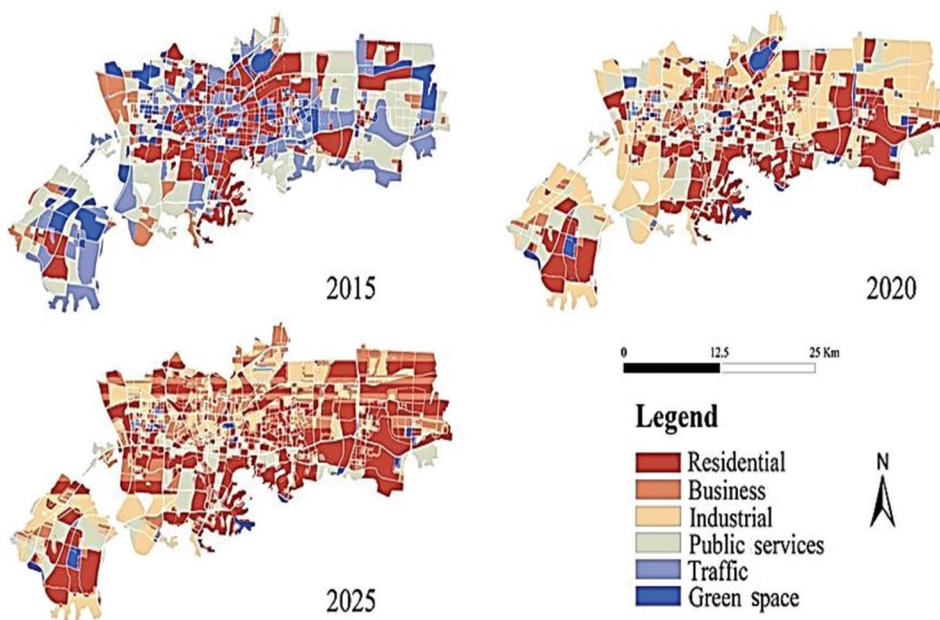


Figure 6. Mapping informal settlements and urban changes in Jinan, Shandong province, China, illustrating spatial and temporal distribution patterns of urban functional areas from 2015 to 2025. Source: Illustration by the authors (created using Spatial Analytics)

a higher risk of contracting contagious diseases such as hepatitis, tuberculosis, and respiratory infections due to overcrowded living conditions and inadequate sanitation facilities (Magalhães *et al.*, 2019). The lack of access to potable water, adequate sanitation systems, and healthcare services exacerbate the spread of diseases, resulting in elevated morbidity and mortality rates (Corburn & Hildebrand, 2015).

In addition to health challenges, informal settlements in Jinan significantly impact environmental welfare and urban sanitation. Poor waste management practices, such as indiscriminate disposal and open-air burning of garbage, contribute to air and water pollution in and around favelas (Albiero *et al.*, 2018). Accumulated solid waste and untreated sewage pose immediate health hazards while also undermining the ecosystem's regenerative capacity and causing long-term environmental degradation (Muggah, 2019). The lack of adequate infrastructure and public services in informal settlements further impedes efforts to improve urban hygiene, perpetuating a cycle of poverty and illness (Birley, 2018). Addressing the challenges posed by Jinan's informal settlements requires a comprehensive approach integrating community development, urban planning, and public health. The World Health Organization (2020) emphasizes prioritizing access to clean drinking water, adequate sanitation facilities, and healthcare services to improve living conditions in favelas. Investments in essential infrastructure, such as waste management systems, sewage networks, and piped water supplies, are critical to mitigating the effects of preventable diseases and enhancing community well-being (Fischer *et al.*, 2019).

Urban planning initiatives should adopt participatory approaches that involve residents in decision-making processes, enabling local communities to address their specific health and sanitation needs (Moser, 2016). Collaborative efforts among government agencies, non-profit organizations, and community-based groups can facilitate the development of sustainable, context-specific solutions for Jinan's informal settlements (UN-Habitat, 2019). Strengthening social connections and fostering collective action within these communities can enhance resilience and promote sustainable solutions to urban health challenges (Kaplan *et al.*, 2015).

To achieve sustainable enhancements in urban sanitation and well-being, it is imperative to tackle the root causes of urban informality, including socioeconomic disparities, poverty, and inadequate housing regulations (Davis, 2016). Urban development plans must also incorporate a comprehensive understanding of the social, economic, and political dynamics underlying informal

settlements to better serve marginalized populations (UNDP, 2017). By prioritizing social equity and human rights in local governance and policymaking, Jinan and similar cities may enhance the quality of life and resilience of their residents (WHO, 2019).

In summary, the prevalence of favelas in Jinan, along with associated urban diseases and hygiene challenges, highlights the pressing need for comprehensive and integrated solutions that tackle the root causes of informality and foster inclusive urban development. Policymakers and practitioners must prioritize infrastructure development, public services, and community engagement initiatives to improve the welfare of underprivileged urban populations and reduce health risks. By adopting a comprehensive strategy addressing housing, human rights, and health issues, cities like Jinan have the potential to lead the way in creating resilient and equitable urban features.

#### **5.4. Rural enclaves, modernization, and theories of marginality**

Analyzing the intricate interconnections between modernization, marginality, and rural enclaves is essential to understanding the dynamics of urban disease, hygiene, and favelas in Jinan. Rural enclaves, commonly located on the outskirts of metropolitan areas, are characterized by distinct cultural practices, traditional livelihoods, and socioeconomic systems coexisting with broader urbanization and modernization patterns (Mingione, 2019). Enclaves within the larger metropolitan area are typically excluded from urban development and face challenges in accessing vital facilities such as healthcare and sanitation.

The rapid urbanization and economic development in Jinan have created distinct dynamics between rural enclaves and the urban center. Modernization, propelled by globalization and technological innovation, is significantly transforming rural communities, leading to profound social, economic, and cultural shifts (Escobar, 2011). In Jinan, enhanced connectivity, market integration, and agricultural modernization have brought elements of urban life to rural areas. However, these changes often exacerbate existing vulnerabilities and inequalities in rural regions, intensifying marginalization (Orrù, 2018).

Theories of marginality provide valuable insights into the power dynamics and exclusionary mechanisms that perpetuate rural poverty and inequality in Jinan's context. Sen (2001) defines marginality as the state of being excluded from social, economic, and spatial opportunities, highlighting the challenges faced by marginalized rural communities in accessing resources and participating in decision-making processes. In Jinan, rural enclaves

experience spatial marginalization due to their remote locations and limited access to urban facilities and services (Cloke *et al.*, 2004).

As per the findings of Schleck *et al.* (2018), marginalized individuals living in rural areas often face social isolation, inadequate representation, and discrimination, perpetuating patterns of disadvantage and exclusion. Moreover, the concept of a parallel economy highlights the economic disparities within Jinan's rural enclaves. Aligned with this notion, underprivileged groups often find themselves compelled to work in low-wage, unstable jobs whereas rural economies operate in both traditional, self-sufficient sectors and modern, capitalist frameworks (Lewis, 1954). Rural communities in Jinan typically engage in a combination of informal sector jobs, agriculture, and migration to urban areas to improve their job opportunities. Nevertheless, the transition from traditional subsistence practices to paid employment in rural communities sometimes reinforces cycles of poverty and marginalization (Fernández & Valladares, 2017). To address the interconnected challenges of urban disease, hygiene, and favelas in Jinan, it is crucial to understand the links between rural enclaves, modernization, and conceptions of marginality. Marginalized rural populations are particularly vulnerable to environmental hazards and health issues due to their limited access to clean water, adequate sanitation, and health care (Magalhães *et al.*, 2019). Moreover, the susceptibility of rural enclaves to disease outbreaks, natural disasters, and socioeconomic shocks is exacerbated by their physical and social isolation. Policymakers and practitioners in Jinan should adopt a holistic approach that integrates interventions targeting socio-economic development, housing, and health. Cleaver (1999) advocates for community-based initiatives, participatory planning procedures, and grassroots movements, which can empower impoverished rural communities and enhance their resilience to urban disease and environmental challenges. By prioritizing investments in infrastructure, health care, and social services in rural areas, Jinan can promote inclusive and equitable development, ensuring that the needs and aspirations of all residents are addressed (Beckford, 2019).

When examining urban disease, hygiene, and favelas in Jinan, it is evident that the relationship between rural enclaves, modernism, and conceptions of marginality is complex and multifaceted. Rural enclaves are areas where conventional lifestyles and cultural heritage coexist with the forces of urbanization and modernization. Nevertheless, these enclaves often endure marginalization within the broader urban context, characterized by limited access to economic opportunities, inadequate hygienic

conditions, and insufficient healthcare services. Theories of marginality provide valuable analytical frameworks for understanding the power dynamics and exclusionary processes that perpetuate inequality and rural poverty in Jinan. By adopting inclusive and participatory development strategies, Jinan can work toward addressing these persistent challenges.

## 5.5. Developmentalism and the emergence of informality

To achieve a comprehensive understanding of urban growth, governance, and social transformation, it is essential to examine the roots of informality in Jinan within the context of developmentalism. Since the late 20<sup>th</sup> century, China has used a development strategy termed developmentalism. This strategy entails the government playing a leading role in driving economic growth, modernization, and urban expansion (Chen & Ong, 2016). However, the pursuit of rapid economic expansion often leads to unintended consequences, such as the proliferation of informal settlements, unregulated economic activities, and social inequalities. By examining the connection between developmentalism and informality in Jinan, experts and policymakers can gain significant insights into the social and spatial changes accompanying urban transition and their implications for inclusive and sustainable development.

Jinan, the capital of Shandong province in eastern China, has experienced rapid urbanization and economic growth over the past few decades. This growth has been fueled by government initiatives to attract investment, promote industrial development, and improve urban infrastructure (Li & Wu, 2019). These developmental efforts have transformed Jinan into a prosperous economic hub, attracting migrants, businesses, and investment from surrounding regions. However, alongside deliberate urban expansion, the city has witnessed the proliferation of informal settlements, unregulated economic activities, and marginalized populations, particularly on its periphery. The manifestations of informality in Jinan are diverse, including informal housing, street vending, unauthorized construction, and illegal land occupation (Wu & Webster, 2020a). These informal practices often arise from inadequacies in official urban planning and governance structures, as well as socioeconomic inequalities (Roy, 2009b). For example, rural migrants and low-income individuals unable to afford formal housing frequently settle in informal settlements on the city's outskirts, where land is cheaper and regulations are less stringent (Chen *et al.*, 2019). Similarly, small-scale entrepreneurs and street vendors engage in informal economic activities to supplement their income and serve underprivileged

communities (Chen & Ong, 2016). The prevalence of informality in Jinan is closely linked to its growth and policy priorities. The local government's emphasis on fostering economic growth and expanding urban areas often adversely affects informal settlements and economic activities (Li, 2020). Informal settlements are frequently targeted for demolition and redevelopment to make space for infrastructure projects, commercial developments, or residential complexes (Wu & Webster, 2020a). Similarly, unlicensed street vendors often face harassment, displacement, or confiscation of their goods as governing authorities attempt to regulate public spaces and establish formal urban marketplaces (Chen *et al.*, 2019). Moreover, Jinan's developmentalist urban planning and governance approach prioritizes the interests of capital and elites over those of marginalized communities and informal workers (Roy, 2009b). Li & Wu (2019) found that the development of large infrastructure projects, such as highways, high-speed rail lines, and industrial parks, often leads to the displacement of rural populations, informal settlers, and small-scale entrepreneurs, with limited compensation or support for resettlement. This centralized decision-making model exacerbates socioeconomic disparities, spatial segregation, and exclusionary practices, further marginalizing vulnerable communities and entrenching cycles of poverty and informality (Davis, 2016).

The tension between developmentalism and informality in Jinan raises critical questions regarding the equity, longevity, and inclusivity of its urban development approaches. While developmentalism aims to advance economic modernization, it often overlooks the needs and rights of marginalized groups and informal sector workers (Friedmann, 2018). Furthermore, its emphasis on hierarchical planning and regulation limits community-driven initiatives, participatory governance, and decentralized management approaches (Escobar, 2011). To address the problems caused by informality within the framework of developmentalism, policymakers and practitioners in Jinan should adopt more inclusive and collaborative urban planning and governance strategies. Community-led initiatives, participatory decision-making, and grassroots movements can empower marginalized groups and informal sector workers to assert their rights, access essential services, and gain recognition from the governmental authorities (Clever, 1999). Moreover, integrating a human rights-based approach into urban development can help ensure that the needs and aspirations of all residents, including those in informal settlements, are taken into account in policy formulation and implementation (UNDP, 2017).

In summary, the presence of informality in Jinan's developmentalism underscores the inherent challenges

and contradictions in China's urbanization process. While developmentalism seeks to promote economic advancement and modernization, it often excludes informal settlements, economic activities, and marginalized communities. A comprehensive analysis of the relationship between developmentalism and informality can help experts and decision-makers identify opportunities to develop urban strategies that prioritize inclusivity, equity, and environmental sustainability while safeguarding the interests and rights of all individuals.

## 5.6. The concept of informality endures

The concept of informality remains prevalent and constantly evolving in metropolitan areas worldwide, showcasing complex interactions between social, economic, and political factors. Despite efforts to establish legal frameworks and regulations for urban areas, informal practices persist, influencing urban structures and affecting the lives of city residents. For policymakers, planners, and scholars seeking to address the challenges and harness the potential of informality to promote equitable and sustainable urban development, a thorough understanding of its enduring characteristics is essential.

Informality encompasses a diverse range of activities, spaces, and relationships that operate independently of formal regulatory structures (Portes, 1994). It is widespread across various aspects of urban life, particularly in developing nations and rapidly urbanizing areas. Common manifestations include informal settlements, street hawking, unregistered businesses, and irregular employment arrangements (Hart, 1973). The persistent nature of informality stems from its adaptability to meet the needs and constraints of marginalized populations, while also addressing the gaps left by formal institutions.

Informality endures due to structural inequities, inadequate governance systems, and discriminatory policies that marginalize certain groups from formal economic and social networks (Roy, 2005). Urbanization and globalization have further accelerated the growth of informal economies and settlements. This expansion is largely driven by individuals migrating from rural areas or being evicted from their homes in search of opportunities in metropolitan areas (Davis, 2006). Broader phenomena such as urbanization, economic transformation, and social change also contribute significantly to the persistence of informality, shaping the functioning of contemporary cities (Roy, 2009a). Informality in settlements often manifests through inadequate housing, questionable land ownership, and limited access to critical services.

Informal settlements – sometimes known as slums or shantytowns – are tangible representations of urban

poverty and marginalization. Despite societal stigma and limited official support, these spaces showcase qualities of perseverance, resistance, and communal solidarity (Davis, 2019). Residents of informal settlements demonstrate remarkable resourcefulness and inventiveness in navigating difficult living conditions (Roy, 2011). Informal economies, a persistent feature of informality, encompass a diverse array of unregulated economic activities, such as street vending, home-based production, informal transportation, and construction. Informal laborers often face precarious working conditions, with limited access to social security, formal employment benefits, and legal protection (Portes & Haller, 2005). However, the informal sector is vital in providing livelihoods for many, particularly when formal employment opportunities are scarce or inaccessible.

Beyond economic activities, informality extends into informal governance systems, social networks, and cultural practices that influence the daily lives of urban residents (Castells, 1983). Informal mechanisms for social control, dispute resolution, and resource distribution often complement – or challenge – formal institutions, highlighting the complex relationship between formal and informal systems of power and authority (Ferguson, 1999). Informal social networks and solidarity networks play a crucial role in providing mutual aid, collective action, and communal resilience in difficult situations (Auyero & Swiston, 2008).

The enduring presence of informality presents both challenges and opportunities for urban development and governance. Informality exacerbates socio-economic disparities, spatial segregation, and exclusionary practices, undermining social unity and the long-term sustainability of urban areas. Informal settlements pose significant challenges related to infrastructure provision, environmental sustainability, and public health, necessitating innovative approaches to address these issues (UN-Habitat, 2003). Portes & Schauffler (1994) assert that informal economies can negatively impact urban governance by enabling tax evasion, labor exploitation, and regulatory avoidance.

On the other hand, informality serves as a source of strength, originality, and social connections within urban settings. Informal economies provide marginalized populations with flexible employment opportunities, routes for entrepreneurship, and avenues for improving their economic conditions, thereby diversifying income sources and alleviating poverty (Chen *et al.*, 2017). Informal settlements foster social bonds, cultural identity, and community solidarity, which underpin collective initiatives and societal change (Perlman, 1976).

Ultimately, informality is an intricate and dynamic phenomenon that shapes the landscapes and lifestyles

of urban residents worldwide. Despite efforts to regulate and formalize urban environments, informality persists, largely due to structural inequalities, inadequate governance, and prejudiced policies. Understanding the enduring nature of informality is crucial for devising effective strategies that address its challenges and harness its potential for inclusive and sustainable urban development. By recognizing the resilience, resourcefulness, and contributions of informal actors, policymakers, planners, and scholars can work toward creating equitable, resilient, and vibrant cities for all.

## 6. Results and discussion

Spatial analysis of Jinan reveals a significant clustering of informal settlements on the city's outskirts, identified using GIS and satellite data. These informal communities, commonly referred to as “urban villages,” have expanded substantially between 2000 and 2020. This growth reflects the city's rapid urbanization and the influx of migrants from rural areas seeking improved economic opportunities. The chronological progression of these settlements reveals a distinct pattern of spontaneous urban expansion that parallels various stages of Jinan's economic development.

The study examines the socio-economic conditions of residents in these informal communities using qualitative methods, including interviews and focus group discussions. Key factors driving the growth of informal urbanization include the pursuit of affordable housing and employment opportunities within the informal sector. Migrant workers, who constitute the majority of residents, frequently encounter difficulties in accessing essential services such as healthcare, education, and sanitation. Interviews with urban planners and officials reveal how orientalized notions of Jinan influence urban governance. These East-inspired perceptions often result in urban strategies that prioritize preserving aesthetics and cultural heritage over addressing the needs of informal settlement residents. This bias contributes to governance approaches that disregard the socioeconomic realities of these communities.

Participant observation and interviews with residents provide valuable insights into the daily realities of individuals living in informal settlements. The data suggest a notable disparity between the romanticized perception of Jinan and the lived experiences of its inhabitants. This disparity perpetuates exclusion and fails to adequately address the socioeconomic difficulties experienced by these populations. The study highlights a crucial connection between urban orientalism and informal urbanization in Jinan. Orientalist narratives perpetuate the negative portrayal of informal areas, influencing policy decisions that frequently overlook the developmental requirements

of these communities. This intersection amplifies existing disparities, specifically for vulnerable groups such as migrant laborers.

Overall, the findings emphasize the importance of adopting a comprehensive approach to urban development in Jinan. Policymakers, urban planners, and scholars must critically examine narratives that stereotype and exoticize the East while incorporating diverse viewpoints to effectively address informal urbanization. To foster inclusive, egalitarian, and sustainable urban futures for Jinan and other rapidly urbanizing cities, stakeholders should transcend orientalized paradigms and prioritize the needs of all residents.

## 6.1. Experiences in informal areas and “Oriental” perceptions

This research study explores the contrast between the lived experiences of residents in Jinan’s informal urban areas and external perceptions of the city as an “Oriental” cultural hub. Jinan, the capital of Shandong province, China, is undergoing significant urban transformation, blending its rich cultural heritage with rapid modernization. This duality presents a unique case where traditional and contemporary elements coexist.

Informal settlements in Jinan, which accommodate a substantial portion of the city’s population, often face challenges such as inadequate infrastructure, limited access to essential services, and various socioeconomic difficulties. These areas are frequently marginalized in urban planning processes, leading to poor living conditions and limited opportunities for their residents. The daily experiences of these residents reflect a constant struggle to navigate and survive within these constraints, highlighting the stark reality of urban inequality. Contrastingly, Jinan is often romanticized and idealized as an “Oriental” city by external observers, including media, policymakers, and tourists. This perception emphasizes the city’s historical significance, cultural heritage, and esthetic appeal, creating an exoticized image that obscures the harsh realities faced by residents of informal urban areas. The romanticization of Jinan as an “Oriental” city influences urban policies and development practices, often prioritizing the preservation of its cultural image over addressing the urgent needs of its marginalized populations.

This dissonance between external perceptions and the lived realities of residents significantly impacts urban governance and policy-making. By focusing on maintaining an “Oriental” image, urban strategies risk neglecting the socioeconomic and infrastructural improvements necessary for inclusive urban development. This analysis underscores the importance of integrating the

diverse experiences of all residents into urban planning. Addressing this gap is crucial for fostering equitable and sustainable development in Jinan, ensuring that the city’s growth benefits all its inhabitants, not just those who align with the external “Oriental” narrative.

## 6.2. Urban orientalism’s impact on informal urbanization policies

In Jinan, the influence of urban orientalism on policies related to informal urbanization is palpable. As a city renowned for its rich cultural heritage and rapid modernization, Jinan presents a fascinating case study of the intersection between tradition and modernity in urban development. Urban orientalism, shaped by external perceptions that romanticize and exoticize non-Western cities, significantly impacts Jinan’s policies and practices concerning informal urbanization.

Externally, Jinan is often portrayed as an “Oriental” cultural hub, celebrated for its historical significance, picturesque landscapes, and traditional architecture. This idealized image influences urban development policies, prioritizing the preservation of cultural heritage and esthetic appeal over addressing the needs of residents in informal settlements. Policies influenced by urban orientalism frequently focus on enhancing the city’s visual appeal to attract tourism and investment, while neglecting the pressing socioeconomic challenges faced by marginalized urban populations. Consequently, informal settlements in Jinan often receive little attention in urban planning processes. Despite housing a substantial portion of the city’s population, these areas are frequently excluded from comprehensive development plans, resulting in inadequate infrastructure, limited access to essential services, and persistent socioeconomic disparities. The disparity between the external portrayal of Jinan as an “Oriental” city and the lived realities of informal settlement residents highlights the profound impact of urban orientalism on urbanization policies.

Addressing this impact requires a shift toward more inclusive and equitable urban development strategies. By integrating the needs and experiences of informal settlement residents into urban planning processes, policymakers can create policies that prioritize the well-being of all residents, fostering sustainable growth and enhancing the overall quality of life in Jinan.

## 6.3. Limitations

The present study provides valuable insights into the intricate dynamics of urban growth in the city. However, it has certain limitations. The study’s scope is confined to Jinan, Shandong province, China, which may restrict the

applicability of its findings to other metropolitan areas with diverse historical, cultural, and socioeconomic factors influencing urban orientalism and informal urbanization. Furthermore, the lack of extensive and up-to-date data on informal settlements and urban changes in Jinan may have influenced the thoroughness and precision of the spatial analysis and empirical results. Language barriers may have further constrained the study by limiting access to Chinese-language sources, reports, and interviews, resulting in the omission of potentially valuable perspectives and data. The researchers' personal experiences and preconceived notions may have influenced the interpretation of findings, despite efforts to minimize bias through self-reflection and triangulation of evidence. Temporal constraints also may have hindered the ability to capture long-term trends in urban orientalism and informal urbanization. Moreover, qualitative research methodologies may have been affected by sampling bias, potentially skewing the representation of diverse perspectives. While the study offers valuable insights into urban dynamics, it does not provide specific policy solutions to address the identified challenges effectively. Further research and active collaboration with policymakers are needed to translate these findings into actionable strategies for promoting sustainable urban development in Jinan and other areas.

## 7. Conclusion

The examination of urban orientalism and informal urbanization in Jinan, Shandong province, China, highlights the intricate interplay of cultural perspectives, power dynamics, and socioeconomic factors in shaping urban growth. This study provides a thorough analysis of scholarly literature and empirical data, uncovering several noteworthy findings and their implications.

Understanding Jinan requires recognizing the significant influence of orientalism in Western discourse. Achieving this understanding requires a detailed and nuanced approach rather than reliance on romanticized or exaggerated portrayals of the city. Orientalist perspectives often distort the realities of local communities and reinforce preconceived notions, influencing policy decisions and urban development plans in ways that hinder the attainment of inclusive and sustainable outcomes. Furthermore, the emergence of informal urbanization is a critical factor in shaping Jinan's urban landscape, driven by rapid urbanization and migration. The exponential growth of informal settlements, usually known as "urban villages," presents intricate challenges for urban governance, social equity, and sustainable development. The intersection of orientalism and informal urbanization exacerbates existing inequalities, particularly for marginalized populations such as migrant laborers and rural-to-urban migrants.

Their experiences highlight the significance of addressing informal dynamics through a framework that transcends orientalist divides and fosters inclusivity, equity, and sustainability. In light of these findings, it is crucial for policymakers, urban planners, and scholars to adopt a comprehensive approach to urban development in Jinan. This comprehensive strategy entails critically examining orientalist narratives, fostering more accurate and diverse representations, and implementing strategies that address the challenges of informal urbanization while advocating for inclusive and sustainable urban futures.

In conclusion, the study underscores the importance of transcending orientalist notions and fostering comprehensive, fair, and sustainable approaches to urban development in Jinan and other rapidly urbanizing Chinese cities.

## Acknowledgments

We would like to thank the individuals or organizations who have provided invaluable assistance to this work.

## Funding

The authors acknowledge financial support from the Qilu Institute of Technology Project Funding (#QIT23TP029).

## Conflict of interest

The authors declare they have no competing interests.

## Author contributions

*Conceptualization:* Feroze Nazia

*Data curation:* Hao Ruining

*Formal analysis:* Hao Ruining, Javed Muhammad Danish

*Funding acquisition:* Hao Ruining, Faisal Feroze, Javed Muhammad Danish

*Methodology:* Cheng Tongshun, Faisal Feroze, Hao Ruining

*Investigation:* Farooq Muhammad Sabil

*Project administration:* Farooq Muhammad Sabil

*Software:* Hao Ruining, Javed Muhammad Danish

*Supervision:* Cheng Tongshun, Faisal Feroze

*Writing – original draft:* Cheng Tongshun, Farooq Muhammad Sabil, Faisal Feroze

*Writing – review & editing:* All authors

## Ethics approval and consent to participate

This study received ethical approval from the relevant ethical review committee (Approval ID: REQIT23TP234).

All participants or interviewees provided informed consent to participate in the study.

## Consent for publication

Not applicable.

## Availability of data

The data that support the findings of this study are available upon request from the corresponding author. XXX.

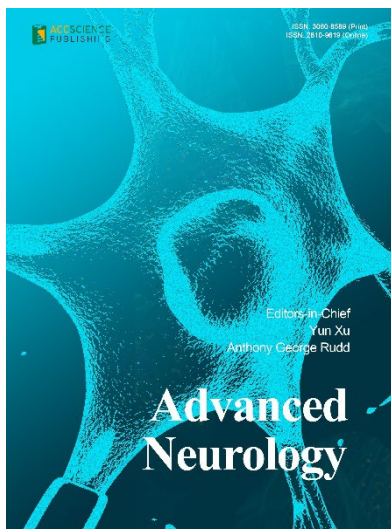
## References

- Albiero, D., Vujcic, J., & Goulet, J. (2018). The role of waste pickers in solid waste management: A review of recent literature. *Sustainability*, 10(10):3664.
- Auyero, J., & Swistun, D. (2008). *Flammable: Environmental Suffering in an Argentine Shantytown*. Oxford: Oxford University Press.
- Beckford, G. (2019). *Agency, Power, and Social Transformation: Enhancing People's Capacities for Action*. United Kingdom: Routledge.
- Birley, M. (2018). *Cities and Sanitation: Improving Quality of Life and Urban Productivity Through Better Sanitation*. United Kingdom: Routledge.
- Castells, M. (1983). *The City and the Grassroots: A Cross-cultural Theory of Urban Social Movements*. United States: University of California Press.
- Chen, Y., & Ong, A. (2016). Chinese urbanism: The production of a new urban discourse. In: M Douglass and J Friedmann (eds.). *Cities for People, Not for Profit: Critical Urban Theory and the Right to the City*. United Kingdom: Routledge, p. 95-118.
- Chen, Y., Kong, L., & Zhu, Y. (2019). Informalisation and precarious work in the Chinese service sector. *Geoforum*, 103:173-182.
- Chen, Y., Wu, F., & Li, Z. (2019). Informality and urban governance: Comparing Jinan and Guangzhou, China. *Urban Studies*, 56(1):107-124.  
<https://doi.org/10.1177/0042098018771062>
- Cleaver, F. (1999). Paradoxes of participation: Questioning participatory approaches to development. *Journal of International Development*, 11(4):597-612.  
[https://doi.org/10.1002/\(SICI\)1099-1328\(199906\)11:4<597:AID-JID610>3.0.CO;2-Q](https://doi.org/10.1002/(SICI)1099-1328(199906)11:4<597:AID-JID610>3.0.CO;2-Q)
- Cloke, P., Cook, I., Crang, P., & Goodwin, M. (2004). *Introducing Human Geographies*. United Kingdom: Routledge.
- Corburn, J., & Hildebrand, C. (2015). Slum sanitation and the social determinants of women's health in Nairobi, Kenya. *Journal of Environmental and Public Health*, 2015:209505.  
<https://doi.org/10.1155/2015/209505>
- Davis, M. (2006). *Planet of Slums*. London: Verso Books.
- Davis, M. (2016). *Planet of Slums*. London: Verso Books.
- Davis, M. (2019). Old gods, new enigmas: Marx's lost theory. *New Left Review*, 119:5-37.
- Escobar, A. (2011). *Encountering Development: The Making and Unmaking of the Third World*. United States: Princeton University Press.
- Ferguson, J. (1999). *Expectations of Modernity: Myths and Meanings of Urban Life on the Zambian Copperbelt*. United States: University of California Press.
- Fernández, R., & Valladares, L. (2017). *Land, Labour, and Livelihoods: Indian Women's Perspectives*. United Kingdom: Routledge.
- Fischer, K., Haller, T., & Lanzendorf, M. (2019). Water and sanitation for the urban poor: Partnerships and governance structures in Mumbai. *Water Alternatives*, 12(1):200-220.
- Friedmann, J. (2018). *Planning in the Public Domain: From Developmentalism to Transformative Practices*. United States: Princeton University Press
- Hart, K. (1973). Informal income opportunities and urban employment in Ghana. *The Journal of Modern African Studies*, 11(1):61-89.  
<https://doi.org/10.1017/S0022278X00008089>
- Hsing, Y. T. (2010). *The Great Urban Transformation: Politics of Land and Property in China*. Oxford: Oxford University Press.
- Kaplan, S., Calman, L., & Greenberg, M. (2015). Measuring social capital: A conceptual and empirical analysis of social capital in poor urban neighborhoods. *Social Work Research*, 39(3):131-141.  
<https://doi.org/10.1093/swr/sv020>
- Kundu, A. (2003). Urbanisation and urban governance: Search for a perspective beyond neo-liberalism. *Economic and Political Weekly*, 38(29):3079-3087.  
<https://doi.org/10.2307/4413810>
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22(2):139-191.  
<https://doi.org/10.1111/j.1467-9957.1954.tb00021.x>
- Li, B., & Wu, Y. (2019). Urbanization in China: Critical issues in an era of rapid growth. *Journal of Urban Affairs*, 41(1):27-45.  
<https://doi.org/10.1080/07352166.2018.1526947>
- Li, L. (2020). *China's Urbanization Strategy: An Interpretive Sociological Analysis*. United Kingdom: Routledge.
- Li, S. (2020). Understanding China's urbanization: The political economy of urban development in Chinese cities. *Urban Studies*, 57(3):515-531.  
<https://doi.org/10.1177/0042098019872069>

- Li, Y. (2020). Urbanization in China: Developmental trajectories, social challenges, and policy responses. *Chinese Journal of Urban and Regional Policy*, 10(3):115-131.
- Li, Y., & Wu, F. (2019). The transformation of urban space in post-reform China: The case of Jinan. *Urban Studies*, 56(5):987-1004.  
<https://doi.org/10.1177/0042098018771063>
- Li, Z., & Wu, F. (2019). Urban transformation in China 1949-2020: A review and research agenda. *Urban Studies*, 56(3):489-509.  
<https://doi.org/10.1177/0042098018802639>
- Ludden, D. (2012a). *Orientalist Empires: Creating and Contesting Colonial Cultures in South Asia*. United Kingdom: Routledge.
- Ludden, D. (2012b). Orientalism, empire, and urbanization in South Asia. *Journal of Urban History*, 38(4):655-661.  
<https://doi.org/10.1177/0096144212440569>
- Magalhães, M. A. F. M., Osorio, M. S., & Carvalho, D. M. (2019). Health, hygiene, and social change in Brazilian slums. *International Journal of Environmental Research and Public Health*, 16(17):3011.
- Mingione, E., & Benassi, D. (2019). El modelo de bienestar en la Europa del Sur y la lucha contra la pobreza y la exclusión social [The welfare model in southern Europe and the fight against poverty and social exclusion]. *Panorama Social*, 29:9-23.
- Moser, C. (2016). *Gender, Planning, and Human Rights*. United Kingdom: Routledge.
- Muggah, R. (2019). *Fragile Cities: Confronting the Urban Crisis*. United Kingdom: Zed Books.
- Orrù, M., Shatnawi, A., Mobilio, M., Riganelli, O., & Mariani, L. (2018). A model-driven approach to watch the health of cloud services. *Proceedings of the ACM Symposium on Applied Computing (SAC)*, 24(12):170-190.  
<https://doi.org/10.1145/3194124.3194130>
- Perlman, J. (1976). *The Myth of Marginality: Urban Poverty and Politics in Rio de Janeiro*. United States: University of California Press.
- Portes, A. (1994). The informal economy and its paradoxes. In: N Smelser and R Swedberg (eds.). *The Handbook of Economic Sociology*. United States: Princeton University Press, p. 426-449.
- Portes, A., & Haller, W. (2005). The informal economy. *Studies in Comparative International Development*, 40(1):25-29.  
<https://doi.org/10.1007/s12116-005-1025-3>
- Portes, A., & Schauffler, R. (1994). Competing perspectives on the Latin American informal sector. *Population and Development Review*, 20(2):33-60.  
<https://doi.org/10.2307/2938384>
- Roy, A. (2005). Urban informality: Toward an epistemology of planning. *Journal of the American Planning Association*, 71(2):147-158.  
<https://doi.org/10.1080/01944360508976689>
- Roy, A. (2009a). The 21<sup>st</sup>-century metropolis: New geographies of theory. *Regional Studies*, 43(6):819-830.  
<https://doi.org/10.1080/00343400701809665>
- Roy, A. (2009b). *City Requiem, Calcutta: Gender and the Politics of Poverty*. Minnesota: University of Minnesota Press.
- Roy, A. (2011). Slumdog cities: Rethinking subaltern urbanism. *International Journal of Urban and Regional Research*, 35(2):323-336.  
<https://doi.org/10.1111/j.1468-2427.2011.01051.x>
- Roy, A., & AlSayyad, N. (2004). *Urban Informality: Transnational Perspectives from the Middle East, Latin America, and South Asia*. Maryland: Lexington Books.
- Roy, A., & Ong, A. (2011). *Worlding Cities: Asian Experiments and the Art of Being Global*. United States: Wiley-Blackwell.
- Said, E. W. (1978a). *Orientalism*. United States: Pantheon Books.
- Said, E. W. (1978b). *Orientalism*. United States: Vintage Books.
- Schleck, M. L., Souberbielle, J. C., Delanaye, P., Plebani, M., & Cavalier, E. (2018). Parathormone stability in hemodialyzed patients and healthy subjects: Comparison on non-centrifuged EDTA and serum samples with second- and third-generation assays. *Journal of Clinical Laboratory and Medicine*, 55(8):1152-1159.  
<https://doi.org/10.1515/cclm-2016-0914>
- Sen, A. (2001). Gender equity and the population problem. *International Journal of Social Determinants of Health and Health Services*, 31(3):469-74.  
<https://doi.org/10.2190/9EPF-CWCM-DHE5-KA68>
- UNDP. (2017). *Sustainable Development Goals: Goal 11 - Make Cities Inclusive, Safe, Resilient, and Sustainable*. Available from: <https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html> [Last accessed on 2024 Dec 02].
- UN-Habitat. (2003). *The Challenge of Slums: Global Report on Human Settlements 2003*. United Kingdom: Earthscan.
- UN-Habitat. (2019). *Participatory Slum Upgrading Programme (PSUP)*. Available from: <https://unhabitat.org/programme/participatory-slum> [Last accessed on 2024 Dec 02].
- Wang, Y., & Zheng, L. (2016). *Urban orientalism and the global gaze: The role of cultural heritage in Jinan's development*. *Journal of Urban Cultural Studies*, 12(4):233-248.
- World Health Organization (WHO). (2019). *Healthy, Prosperous Lives for All: The European Health Equity Status Report. World Health Organization Regional Office for Europe*. Available from: <https://www.who.int/europe/publications/item/9789289054267> [Last accessed on 2024 Dec 02].

- Wu, F., & Webster, C. (2020a). Informal housing and the urban village: The case of Jinan, China. *Land Use Policy*, 89:104-115.
- Wu, F., & Webster, C. (eds.). (2020b). *Urban Informalities: Reflections on the Formal and Informal*. United Kingdom: Routledge.
- Ye, J. (2017a). Urbanization and socioeconomic changes in contemporary China. *China Quarterly*, 232:1-22.
- Ye, J. (2017b). Migrant workers and urbanization in China: Bridging the gap. *Journal of Contemporary China*, 26(105):793-807.
- <https://doi.org/10.1080/10670564.2017.1306639>
- Zhao, X. (2008). *The cultural landscape and historical development of Jinan: A study of Daming Lake and Baotu Spring*. *Journal of Chinese Urban Studies*, 16(3):45-61
- Zhao, X. (2018). Research on construction techniques of the vernacular dwellings in North Fujian. *Development of Small Cities and Towns*, 36(12):84-91.

## OUR JOURNALS



*Advanced Neurology* is a peer-reviewed and open-access journal that aims to publish and disseminate novel research in the breadth of neurology and neuroscience. The journal aims to advance our understanding in the nervous system and provide a platform to neuroscientists and physicians to showcase their findings in original fundamental and clinical research as well as to present new ideas that highlight the changes in the neurological clinical practice.

*Advanced Neurology* covers subject areas, including but not limited to the following:

- Neurological disorders
- Neurodegenerative disease
- Cerebrovascular disease
- Epilepsy and movement disorders
- Neuroimmune disease
- Neurological infections
- Muscle disease
- Molecular and cellular neuroscience
- Systems neuroscience
- Cognitive neuroscience
- Computational modeling of nervous system

*Global Translational Medicine* is a quarterly journal that focuses on medicine, biological sciences, and biomaterials engineering. The goal of *Global Translational Medicine* is to provide a platform to researchers for showcasing their latest research works in translational medicine so as to advance the field towards the betterment of human health. Despite the advancement of omics and new technologies, the process of transforming these technologies and scientific research results into effective therapies and putting them into clinical use still has a long way to go. *Global Translational Medicine* provides a platform to fill the gaps in preclinical and inter-disciplinary research, to promote clinical translation of scientific research results, and to contribute to the conception of new and improved preventive measures as well as diagnostic and therapeutic techniques of diseases.

*Global Translational Medicine* covers the following themes: cardiovascular disease, metabolism/diabetes/obesity, neuroscience/neurology, cancer, biomaterials and their applications in medicine, proteomics/metabolomics, pharmacogenomics, biomarkers, bioinformatics and data mining, animal and clinical research, and medical methods arising from interdisciplinary crossover.



### Start a new journal

Write to us via email if you are interested to start a new journal with AccScience Publishing. Please attach your CV, professional profile page and a brief pitch proposal in your email. We shall inform you of our decision whether we are interested to collaborate in starting a new journal.

**Contact:** [info@accscience.com](mailto:info@accscience.com)

<https://accscience.com/journal/JCAU>



Contact

[www.accscience.com](http://www.accscience.com)

9 Raffles Place, Republic Plaza 1 #06-00 Singapore 048619

Email: [editorial@accscience.com](mailto:editorial@accscience.com)

Phone: +65 8182 1586