

UDC 711.1

DOI: 10.56318/as/1.2024.136

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## **Urban spatial evolution of Guangzhou's Xiguan historic old town: An analysis under the semantics of the Conzen School**

**Abstract.** The analysis of urban morphology using Conzen's methods is relevant in terms of studying the historical transformation of the urban landscape and its interaction with modern urban development processes. Despite numerous studies of the general urbanization process in Guangzhou, specific aspects of the historical development of Xiguan have remained insufficiently covered. The purpose of this study is to substantiate the spatial structure and evolution of Guangzhou's Guangfu Nan District with a detailed identification, analysis of key changes in the urban organization of this historic district, and proposals for effective urban landscape management and cultural integration development. The information and methodological basis of this paper is based on historical maps, archival records, and other primary sources to restore and substantiate the evolution of the urban environment, as well as to develop modern spatial planning strategies for the historic city of Xiguan. The study analyses the key reforms of urban planning and industrialization in the People's Republic of China, determining their impact on urban morphology, economy and social structure, with a special focus on the periodization of the historical development of the Daguan River and the Xiguan Commercial District. A detailed analysis of the development of the street network, land distribution, and architectural layout was conducted using historical cartographic data and changes in land use. The results revealed how historical, cultural and economic factors have jointly influenced the shaping of Xiguan's urban landscape, highlighting its unique contribution to the larger context of Guangzhou's urbanization. This study not only enriched the understanding of the historical urbanization process in Southern China, but also provided valuable empirical data for planning the future development and conservation of historic districts in the region. The practical significance of this work is to develop proposals for strategic directions for the effective management of the urban landscape and preservation of the historical heritage of the old city of Xiguan in Guangzhou

**Keywords:** urban morphology; adaptation of historical areas; transformation of the urban landscape; rational land use; strategic management; protection and preservation of cultural heritage

### **INTRODUCTION**

The problematic issue covered by the study is the identification of the driving forces of morphological evolution, taking into account the factors that contributed to the changes in the Guangzhou Nan District during different historical stages. Another equally important issue is to determine the extent to which historical changes have influenced

contemporary urban planning in the context of historical transformation and current conservation and development strategies. The problem that sums up these issues is finding ways to balance the needs of modern urban development with the need to preserve China's historical and cultural heritage. Urbanization in China was particularly intense in

### **Suggested Citation:**

Li, H. (2024). Urban spatial evolution of Guangzhou's Xiguan historic old town: An analysis under the semantics of the Conzen School. *Architectural Studies*, 10(1), 136-150. doi: 10.56318/as/1.2024.136.

Journal homepage: <https://arch-studies.com.ua/en#>

*Architectural Studies*, 10(1), 136-150

Received: 01.02.2024 Revised: 19.05.2024 Accepted: 20.06.2024

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the 1980s and 1990s, when large numbers of people moved in search of better economic opportunities. Accordingly, from the early 2000s and over the next few decades, this process continued to accelerate, leading to the creation of megacities and a significant increase in infrastructure in urban areas. During these transformations, old buildings were often replaced by modernized high-rise buildings that met the needs of the modern age. However, Guangzhou's historic area has managed to retain its authentic appearance from the Ming and Qing Dynasties (Yang, 2022). In 2005, the Guangzhou Nan District was officially designated as the city's historic area, and its real estate acquired a special status, is under state protection and has a special legal regime of use. Thanks to these changes, the executive authorities and local governments of Guangzhou managed to preserve its unique architectural elements.

During the Tang Dynasty, Guangzhou was known as a leading international trading port. In 1472, the Dagu River, which ran through the centre of the district from West to East, improved logistics, which fostered entrepreneurial development. By 1686, the Thirteen Guangzhou Factories were established South of Langan Road, strengthening the district's trade potential. This made Guangfu Nan a key meeting point between Chinese and Western trade representatives and a location where mutual trade in Eastern and Western goods developed during the late Qing Dynasty (Wang *et al.*, 2023). The study of the urban spatial evolution of the historic old town of Xiguan in Guangzhou using the Conzen school's semantics focuses on the analysis of transformations of the urban landscape and development of the area under the influence of various historical, social and economic factors (Whitehand, 2021). The main problematic of this work is to identify changes in the use of urban space and architectural styles, as well as to understand the interaction between historical heritage and the needs of modern urban development. An important aspect is also to study how different eras have influenced the modern appearance of the district and its socio-economic structure.

The historical development of the Xiguan District in Guangzhou has become an object of considerable interest due to its extensive cultural and architectural heritage. D. Lisaia & C. Zhang (2022) focus on the morphology and physical attributes of the Xiguan District in Guangzhou, revealing the features of its urban composition, traditional buildings and daily life of the community. The paper also discusses the historical reserve on Enning Road and the micro-renovation project in the Yongqing Fang community. B. Du *et al.* (2021) analyse the spatio-temporal aspects, formation mechanisms and barriers to integration between urban and rural areas in China from 2008 to 2018, using the concept of sustainable development. In conformity with H. Zhang *et al.* (2022), the regeneration of historical centres in Chinese cities usually takes place through the demolition of old buildings for new construction or the development of infrastructure around historical monuments. Using the example of Shanghai's Old Town, the authors applied the theory of sociological institutionalism

through the interaction between the power structure, discourse, and management tools, emphasizing the need for innovative approaches.

In the context of the urban spatial evolution of the historic old town, urban cemeteries play a significant role as physical evidence of the dynamics of the perception of life and death by urban residents, as noted by H. Deng & M. Li (2023). The authors examine different types of morphological evolution of the Nanjing cemetery, highlighting not only general trends but also specific features for China. In the context of the urban spatial evolution of historic old towns, the digital twin has become a key tool for documenting and preserving cultural heritage, as detailed in the studies of X. Dang *et al.* (2023). This technology, which includes the collection, processing, and use of graphic and spatial data, is widely used for the detailed study and digitization of heritage sites in China, providing opportunities for the analysis and restoration of historical sites.

Despite several scientific studies, the issues of a comprehensive interdisciplinary approach that combines geography, history, architecture, and sociology in the context of urban planning remain insufficiently addressed. It is worth analysing in more detail the changes in functional zones in the city's historic areas, such as the transformation of residential areas into commercial or industrial ones, and what impact this had on the use of the city's architectural monuments. The aim of the study was to analyse the evolution of the urban organization of the Guangzhou Nan Historic District using the method of urban morphological analysis of the Conzen School, as well as to formulate proposals for the implementation of strategies for managing the urban landscape and preserving the historical heritage of the district.

## MATERIALS AND METHODS

The basis of the methodological support for this study was the morphological approach of the Conzen school based on a detailed conceptualization of the historical development of urban areas, high terminological accuracy and analytical use of cartographic materials (Conzen, 2021). These aspects of Conzen's approach formed the basis for analysing the urban landscape of the Xiguan District in Guangzhou in terms of urban transformation, as well as structural and functional urban change over time. The methodological basis of the study includes a detailed examination of historical maps, archival documents and other sources to recreate the evolution of the urban environment and substantiate its current state, as well as the spatial planning of the historic city of Xiguan.

The archival research was conducted using government planning reports, literature, and vector map data, which provide detailed information on building types, specific building districts, and street dimensions. Visual documentation was carried out through on-site photography, which allowed to capture building characteristics, entrance locations and other important features of the urban landscape. Satellite imagery from Google Maps was used to validate the visual information, while vector maps were





obtained from the Guangzhou Urban Planning and Design Research Institute. A more detailed visualization of the spatial layout of Guangzhou's Old Town was carried out using the QGIS software of the Quick Map Service search module, Esri World Imagery. In particular, the research was based on historical, economic and environmental theories, as well as categories and concepts. In addition, the principles of architectural composition were included. The social laws and political regularities used made it possible to identify objective and repeatable cause-and-effect relationships between social phenomena and processes that arise as a result of mass or individual actions of people. This approach provided a deep understanding of the relationships between architecture, history, and contemporary social processes in shaping the urban space of Xiguan.

The paper summarizes the key reforms of urban planning and industrialization in the People's Republic of China and substantiates their impact on urban morphology, economy and social structure with a detailed periodization of the historical development of the Daguan River and the Xiguan commercial district. The graphic materials that form the basis of this study reflect: the relationship between the Xiguan Guangfu South Historic District and Guangzhou Old Town using remote sensing tools; the geographical relationship between the study area of Guangzhou Old Town and the Xiguan and Daguan Rivers; the original texture of the Daguan River; the architectural texture reflecting the riverway lifestyle; the transformation of the Pearl River shoreline within the study area; the relationship between architecture and the original morphology of the river shoreline; typification of historic architecture; types of bamboo tube houses; geographical and functional characteristics of the designated riverside area along the Pearl River. A systematic analysis of the historical stages of commercial development of the Xiguan District and their impact on the formation of the district's street structure is carried out. The study provides a justification for a multifaceted approach to the main components of strategic urban landscape management in the historic Xiguan Old Town, Guangzhou.

## RESULTS

The Conzen School, founded by the German geographer M.R.G. Conzen (2021), focuses on the analysis of the urban landscape through the study of its form, structure, and processes over time. This method includes a comprehensive approach that focuses on understanding the physical appearance of the city, its historical development and changes that have occurred in the urban environment over a certain historical period. The key features of the analysis of historic cities according to the Conzen School methodology are (Arat, 2023):

1. Morphological approach – the Conzen school pays special attention to the morphology of the city, understanding

it as a structure formed by street networks, buildings, land parceling and building typology. This approach helps to identify patterns and trends in the development of urban structures.

2. Temporal depth – Conzen's methodology incorporates a historical perspective, looking at urban development as a process that unfolds over time. This includes analysing changes in the street network, land use and architectural style over different historical periods.

3. Land and land parcelisation – the study of the history of land parcelisation is central to Conzen's methodology, as it helps to understand how urban space has been organized and used by different social groups. This includes analysing the boundaries of plots, their owners, and changes in ownership.

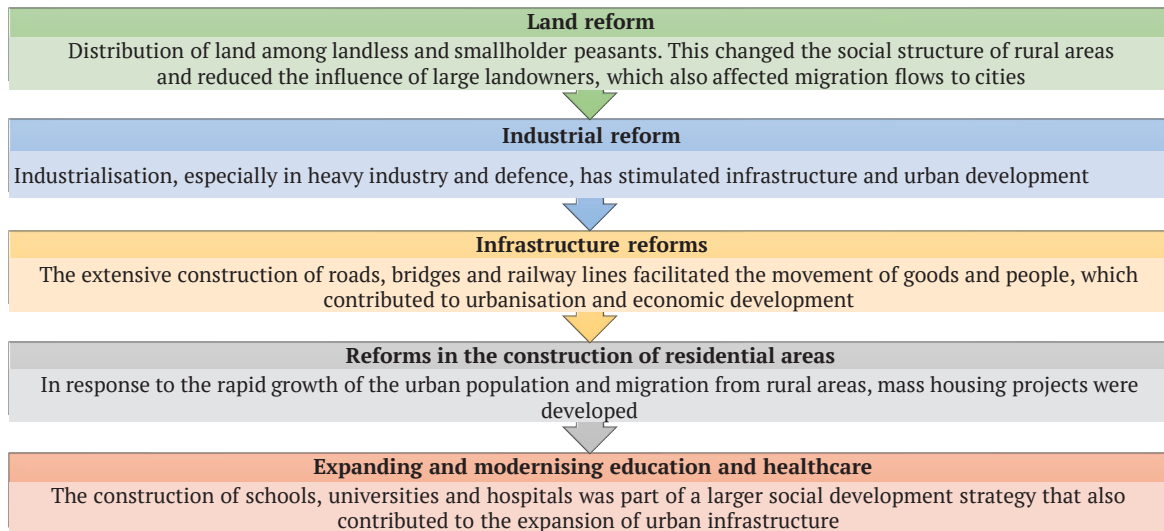
4. Street system – a detailed analysis of the city's street system helps to understand how traffic and accessibility were organized in different periods. This allows to assess the extent to which the street network has influenced the development of urban planning and development.

5. Land use – analysis of land use provides an insight into how the functionality of different parts of the city has changed. This includes the study of commercial, residential and industrial areas and their development.

6. Data integration – Conzen's methodology includes the integration of various data sources, including historical maps, archival records, archaeological data and modern geographic information systems for a comprehensive analysis of urban development.

7. The evolution of the historic old town of Xiguan in Guangzhou, analysed through the semantics of the Conzen school, reveals interesting insights into the morphology of urban space and its historical transformations.

Located in the historic Xiguan District of Guangzhou, Guangfu Nan has a long history dating back to the Tang Dynasty and was originally zoned as a residential area. With the development of the economy and population concentration during the Ming Dynasty (1368-1644), the area developed into a densely populated commercial and residential community. The highest point of economic prosperity in the area was during the Qing Dynasty (1636-1912). During the republican period and early years of the People's Republic of China, several key urban planning and industrialization reforms had a major impact on urban morphology, economy and social structure, among other things (Fig. 1). These reforms have changed not only the physical landscape of cities, but also the lifestyles and social dynamics of their inhabitants, contributing to the transition to a more urbanized and industrialized society. Table 1 shows the characteristics of the boundary of the Guangfu Nan District with the justification of spatial planning and historical significance of roads. A more detailed visualization of the spatial layout of Guangzhou's Old Town is shown in Figure 2.



**Figure 1.** Key reforms of urban planning and industrialization in the People’s Republic of China

**Source:** compiled by the author according to the B. Du *et al.* (2021)

**Table 1.** Characteristics of the boundary of the Guangfu Nan Historic District and its spatial layout

Boundary in terms of horizon	Name of the road	Rationale
North	Shanzhu Road	One of the few surviving ancient shopping streets from the Eighteen Piers, still an active shopping centre
South	Heping East Road	A historic transport artery that connected Xiguan to the city centre during the Ming and Qing Dynasties
East	Guanfu South Road	It was known as Datong Street during the Qing Dynasty
West	Yangxiang Road	There is no mention of this object in historical sources

**Source:** compiled by the author

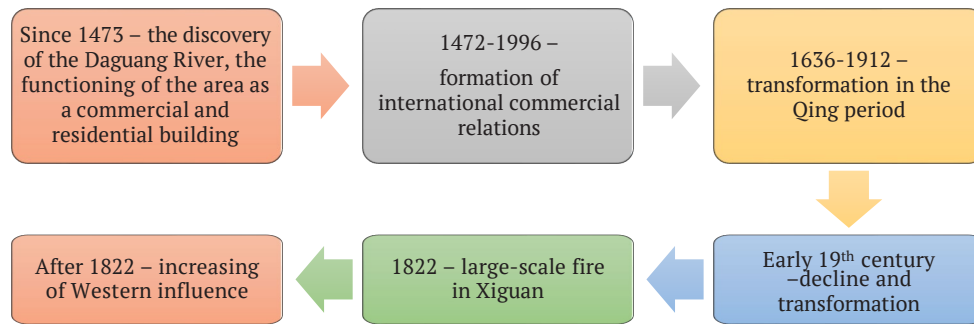


**Figure 2.** Mapping the connection between Xiguan Guangfu South Historic District and Guangzhou Old Town using remote sensing

**Source:** compiled by the author using the QGIS software of the Quick Map Service search module, Esri World Imagery

The historical development of the Daguang River and the 18 Fu commercial district of Xiguan during the Ming Dynasty marked significant changes in urban morphology

and cultural exchange (Fig. 3). The Daguang River facilitated not only local trade but also international economic ties, reinforcing Xiguan's role as a central hub in Guangzhou.



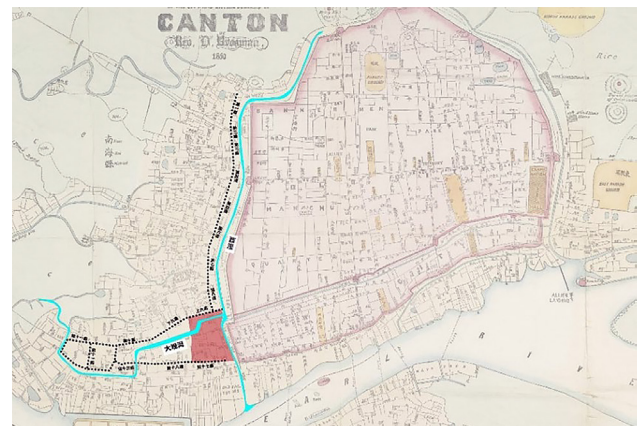
**Figure 3.** Periodization of the historical development of the Daguang River Valley and Xiguan Commercial District  
**Source:** compiled by the author

The founding of the Daguang River allowed the development of a commercial district known as Xiguan 18 Fu (the name of the district's quarters). This area was built along the river banks near the West Canal and was an extension downstream of the Xiguan River. Its strategic location favoured commercial growth and connectivity. The commercial street that developed from the Sui Dynasty workshops flourished during this period. The area from the 9<sup>th</sup> to the 16<sup>th</sup> Fu around the Daguang River was particularly known for significant commercial and residential developments. The waterways around the Daguang River strengthened international trade links with more than 50 countries, making it a vital centre for trade, intercultural communication and exchange, which was key in this era.

By the middle of the Qing Dynasty, due to its proximity to the Thirteen Factories and convenient transport network, the area became a convergence point for East-West trade, increasing its economic and cultural importance. However, already in the early 19<sup>th</sup> century, the river began to dry up, which led to the filling of its channel and subsequent replacement with residential buildings. This physical and functional transformation reflects the ability to adapt to the changing conditions of the surrounding natural ecosystems in the context of rapid urbanization. In 1822, a large-scale, devastating fire struck Xiguan, destroying a significant number of residential buildings in the 15<sup>th</sup> and 16<sup>th</sup> Fu, with land in the reclaimed areas being reclassified as residential development land. This event marks a period of significant urban renewal and architectural evolution. Notably, the renovated buildings retained traditional architectural layouts but incorporated Western neo-classical styles on their facades, indicating the penetration of Western cultural influences in Guangzhou, especially in the South of Guangzhou. For example, the Guangzhou Nan District can be divided into the following urban types: riverbeds, former waterfronts, commercial streets and traditional residential areas.

Given the analysis of data from the 1860 historical map, it is shown that the Daguang River was about 15 metres

wide. This river started from the West Moat at Taiping Gate, flowed through Liubo Chong and into the Xiguan, Qinyun and Deyun Li Districts, which defined its boundaries. According to historical records, the Daguang River began to silt up during the Ming Dynasty, and local people gradually began to develop the former riverbed. By 1810, the areas around Qinyun Bridge, Taosha Dang and Wanzhong Li had become significantly silted up. Historically, Guangzhou Nan was located upstream of the Daguang River. Maps from the early 19<sup>th</sup> century confirm that the Daguang River was almost completely silted up at that time (Fig. 4). This led to changes in the use of the former waterways, which were gradually replaced by buildings (Lisai & Zhang, 2022).



**Figure 4.** Geographical relationship between the study area of Guangzhou Old Town and the Xiguan and Daguang Rivers

**Source:** compiled by the author

As the riverbed was narrowed and filled in, new street-village developments emerged, shaped in accordance with the former direction of the river's flow. The morphology of the blocks of the 18 Fu Commercial District followed this direction, with streets organized perpendicular to the former riverbed, creating a fishbone-like structure (Fig. 5).



**Figure 5.** Cadastral visualization of blocks of the commercial district, 18 Fu

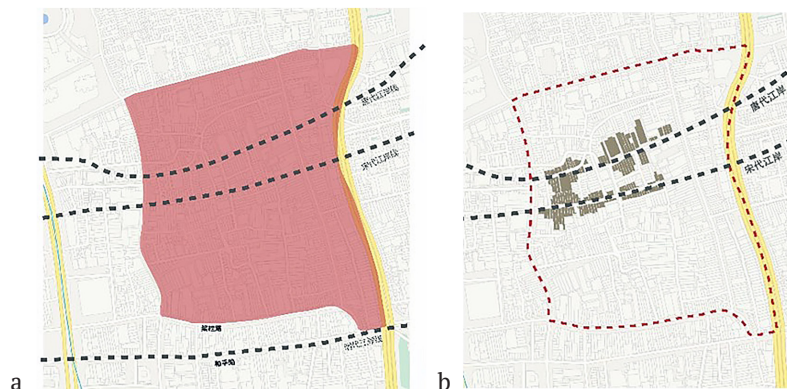
**Notes:** a – Google Maps presentation of the original texture of the Daguang River; b – architectural texture that reflects the lifestyle of the riverway

**Source:** compiled by the author

Over time, when the river became completely silted up, the silted-up areas were developed, including small courtyards or extensions to existing houses. The structures that occupied the former channel expanded both horizontally and vertically to adapt to the new land ownership boundaries. Modern maps still reflect the morphology of the Grand Canal, where buildings along the former channel retain narrow facades and deep layouts that reflect the historic grid of streets and alleys along the river. This type of layout, with its narrow facades and deep buildings, is characteristic of large buildings in Guangzhou’s Xiguan, where the

width-to-depth ratio of buildings ranges from 1:1 to 1:2, with internal layout comprising rooms and corridors.

The riparian area along the Pearl River has been designated as a riverside zone. According to the mapping data, the main street arteries of this zone run parallel to Jiang’an Avenue, which runs along the river, while secondary streets and alleys are located perpendicular to the shoreline, demonstrating the historical changes in the location of the Zhujiang River bank. The important transport artery Jianglian, located South of the Northern boundary of the study area and North of Heping Road, also runs East-West (Fig. 6; Table 2).



**Figure 6.** Spatial representation of historical changes in the location of the Zhujiang River bank and the Jianglian transport artery

**Notes:** a – changes in the Pearl River shoreline within the study area; b – relationship between the architecture and the original morphology of the riverbank

**Source:** compiled by the author

**Table 2.** Textual representation of the main geographical and functional characteristics of the designated coastal zone along the Pearl River

Element	Description
Coastal zone	Located along the Pearl River
Main arteries	Run parallel to Jiang’an Avenue
Secondary streets	Located perpendicular to the coastline, demonstrating historical changes in the coastline
An important artery	Jianglian Road – runs from East to West



Table 2. Continued

Element	Description
Jianglian location	South of the Northern boundary of the zone and North of the Heping Road
Historical changes	The northern bank of the river shifted to the South during the Yuan and Ming Dynasties
North shore (up to the Qing)	From Penlai Road to Huaxi Road via Heping Road and others
Jianglian function	A centre for the trade of boat oars, which is reflected in the name "fence for oars"

Source: compiled by the author

The formation of commercial precincts in Guangzhou's historic Xiguan Old Town is an important aspect of its urban spatial evolution, reflecting profound changes in the region's socio-economic life. These changes began during the Ming Dynasty, when the Huaiyuan Postal House was established to accommodate foreign envoys and trade

delegations. This move spurred commercial development in the area, turning Xiguan into a significant trade centre. The periodization of the historical stages of commercial development in Xiguan District and the influence of geographical and historical factors on the street structure of the area is shown in Table 3.

**Table 3.** Historical stages of commercial development in the Xiguan District and their impact on the street structure

Period	Event	Impact	Result
1368-1644 Ming Dynasty	Founding of the Huaiyuan Post Office	Accommodation for foreign envoys and trade delegations	Stimulating the commercial development of Xiguan
1644-1912 Qing Dynasty	Lifting of the naval ban, establishment of thirteen factories. Continuation of the tribute system	Legalization of Western merchants and compradors. Regulation of foreign trade, restriction of access for non-tributary nations	Stimulation of local economy and international trade, important role in East-West trade. Maintaining control over foreign trade, influencing trade policy
1653 – reign of Emperor Shunzhi of the Qing Dynasty	Arrival of Siamese and Dutch ships	Tribute trade, limited maritime trade	Supporting the Ming Dynasty's maritime restriction policy, promoting international trade
1827 – reign of Emperor Daoguang of the Qing Dynasty	Founding of The Canton Register newspaper	Press development, new industry development in Guangzhou	Increased information flow and communications, increased public awareness and commercial activity
1860	Guild of Siamese merchants	The Chinese in Siam (and other parts of South-East Asia) were active participants in the local economy. The merchants' guilds became important institutions to support the interests of the Chinese diaspora, providing them with resources and economic protection	Facilitating trade between China and Siam, especially in the export of Chinese goods such as tea, silk and porcelain, and agricultural products. Increased cultural exchange. The influence of the guild, which was of diplomatic importance, strengthening interstate relations through the stabilization and growth of trade

Source: compiled by the author based on D. Lisaia & C. Zhang (2022)

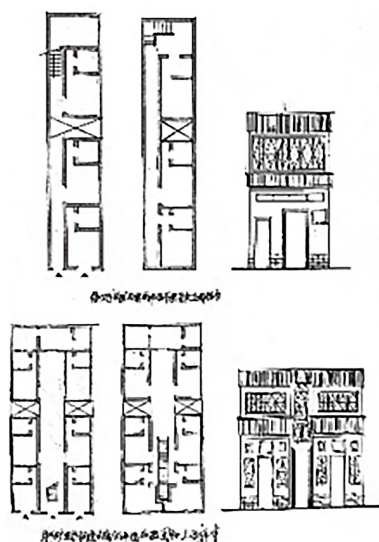
The imposition of maritime restrictions that allowed trade only with foreign powers under the tribute system concentrated international trade in the area, giving Xiguan a crucial role in China's foreign economic relations. In subsequent periods, especially during the Qing Dynasty, the continuation of the tribute system underscored the importance of Xiguan as a key international trade hub. The development of the city was also closely linked to hydrographic changes, in particular, the siltation of the Daguan River, which led to the redesign of the street network and the use of former waterways for development. This created new commercial spaces and contributed to the concentration of commercial and industrial activities in the area (Yang *et al.*, 2019). The lifting of maritime restrictions during the reign of Emperor Kangxi (Qing Dynasty) and the establishment of thirteen factories in Guangzhou played a crucial role in legalizing trade with Western merchants, leading to further commercial expansion. These policies not only fostered local economic growth, but also ensured that Xiguan was central to international trade by the mid-19<sup>th</sup> century.

The founding of The Canton Register in 1827 reflected the growth of the information and communications industry in Guangzhou, which also signalled the significant development of commercial infrastructure in the region. The streets and alleys perpendicular to the river and the morphology of the neighbourhoods, which reflect the structure of the dense river network of past eras, are evidence of the unique history and character of the commercial development of the old city of Xiguan (Wang *et al.*, 2022). With the economic prosperity of the Guangzhou Nan District during the Ming and Qing Dynasties, there was a significant increase in the sustainable population. With limited space, where every centimetre of land was at a premium, architectural solutions that optimize the use of space became extremely important. The traditional bamboo pipe buildings in Xiguan met the functional requirements, as their narrow frontage and deep layout allowed for efficient placement of commercial spaces in the front and residential areas in the back. Narrow alleys simplified pedestrian access and facilitated ease of movement (Zhao *et al.*, 2023).

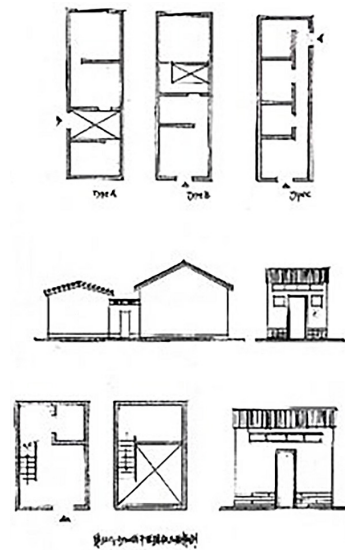
To maximize the use of space, alongside the main shopping arteries, the secondary streets in the area were extremely narrow, usually less than three metres wide, often zigzagging. Some streets were only 1-2 metres wide, and the narrowest, usually dead-end streets, allowed only pedestrian and cyclist access, being less than one metre wide. The original architectural form for housing in the area was bamboo tube houses, which were arranged back-to-back linearly. Each block of the house was measured in “bays”, usually 4 metres wide and with a depth that had a ratio of 1:1 or 2:1 to the width, including patios. Over time, it became a practice to combine two or more bamboo tube houses during renovation work (Fig. 7-9).



**Figure 7.**Typification of historical architecture  
**Source:** compiled by the author according to H. Deng & M. Li (2023)



**Figure 8.**Double house made of bamboo pipes  
**Source:** compiled by the author



**Figure 9.**Types of houses made of bamboo pipes  
**Source:** compiled by the author

Ming-style houses and large Xiguan houses also appeared in the area, which were integrated with bamboo buildings. The Ming style house was characterized by a two-tiered planning structure, symbolizing the Ming symbol from which its name was derived. Such buildings were sometimes called “second Ming houses”. Large Xiguan houses usually had a three-tiered front. Many residential buildings along the streets were adapted for commercial use. Understanding the spatial evolution of Xiguan through the lens of land use allows to understand how historical patterns can influence contemporary urban planning and conservation strategies. This analysis highlights the importance of integrating historical perspectives into current urban development plans to ensure sustainable and respectful development. In traditional Xiguan, the land use pattern was distinctly characterized by narrow streets and alleys, where residential and commercial properties were combined. Among them are the iconic “Qilou” buildings, which are arcade-style buildings with commercial space on the ground floor and residential units on the second floor. This dual-use approach helped to maximize the use of limited land while accommodating a dense population (Lu *et al.*, 2022).

Land use regulations in Xiguan have changed markedly over different historical periods. For example, during the Republican era, modernization efforts led to the introduction of new zoning laws and changes in property rights, which significantly affected land use and development. These rules were intended to organize the chaotic expansion of cities and promote more structured growth (Su *et al.*, 2024). Since 2010, the preservation of historical sites in Xiguan has been a key priority. This position is characterized by the preservation of the architectural integrity of the Qilou buildings (since 2012, in accordance with the government’s project for the restoration and conservation of cultural heritage sites) while adapting land use



to modern requirements. The main challenge is to balance the preservation of historical integrity with economic development and urban renewal. Measures have been taken to regulate building heights, preserve street layouts, and manage commercial and residential spaces to preserve the historic character of Xiguan (Venkatachalam *et al.*, 2022).

Current land use and development trends are to integrate the needs of the modern city with its historical structure, which is under pressure from tourism and the demand for modern infrastructure. Local governments and planners have been tasked with developing strategies that will protect Xiguan's heritage while ensuring that it meets modern urban requirements. Developing an urban

landscape management and historic preservation strategy in Guangzhou's historic Xiguan Old Town, considering its morphological characteristics, requires a multifaceted approach and adaptation to the area's unique urban morphology and historic elements. The modernization aims to integrate conservation with urban planning, using sustainable practices and technological innovations to preserve the area's rich historical attributes while meeting the needs of modern cities (Abaikyzy *et al.*, 2020). The rationale for the main components of strategic urban landscape management in the historic Xiguan Old Town, Guangzhou, and the underlying approaches for their implementation are presented in Table 4.

**Table 4.** Components of strategic urban landscape management in the historic Xiguan Old Town, Guangzhou

Strategy component	Characteristics	Approach to implementation
Understanding urban morphology	Detailed mapping and historical research to analyse the existing urban morphology and its evolution	Comprehensive studies to create detailed territory plans. Collecting and analysing historical data to substantiate morphological changes and their socio-economic and environmental interactions
Preserving history through urban planning	Identify heritage protection zones and promote adaptive reuse of historic buildings to preserve the architectural integrity and modern function of the city	Zoning of land in the historical area of the city with the establishment of a legal regime of use. Adapting to the reuse of historic buildings for purposes that enhance local identity
Legal and regulatory framework	Developing guidelines for new reconstructions that take into account the historical urban fabric. Introducing an incentive programme to support the maintenance and restoration of historical and cultural heritage sites	Enshrine legal regulations that include restrictions on building height and facade design. Introduce financial incentives, such as tax breaks and subsidies, for property owners to restore and maintain historic properties
Community engagement and education	Involve local stakeholders in the preservation process and educate the community about the benefits of cultural heritage preservation	Launching educational initiatives to raise public awareness and foster a sense of stewardship among residents
Infrastructure and environmental aspects	Integrating practices to improve the quality and balance of the environment, as well as implementing advanced infrastructure solutions to protect against environmental risks, including floods	The use of green infrastructure methods, such as green roofs. Upgrading public transport and improving public space. Development of advanced flood control and drainage systems to protect the historic district
Monitoring and continuous evaluation	Establish a framework for periodic reviews of current technology to ensure the effectiveness of strategies and adaptation to new challenges or findings	Establish regular review mechanisms to evaluate and improve strategies. Use GIS technology and 3D modelling to monitor urban change and plan more effectively

**Source:** compiled by the author based on Z. Wang *et al.* (2022)

Developing a strategic approach to urban landscape management and preserving the historical characteristics of the historic Xiguan Old Town, Guangzhou, is key to preserving the cultural and historical integrity of the area and protecting national heritage from the erosive effects of modern urban development and globalization.

By combining modern urban needs with the preservation of historic districts, the strategy promotes a balanced approach that ensures economic vitality without compromising cultural heritage. In particular, such development can attract tourism and improve the quality of life of residents, thereby contributing to the local economy. A multifaceted approach to strategic planning allows for the adaptive reuse of historic buildings and spaces, giving them new life and function while preserving their historic character (Subin-Kozhevnikova *et al.*, 2023). This not only prevents these buildings from falling into disrepair and neglect, but also provides the community with valuable

spaces for cultural, educational and commercial activities. The strategic management of urban landscapes in historic districts, such as Xiguan, involves the use of advanced technologies and methodologies such as geographic information systems (GIS) and three-dimensional modelling. These tools provide precise monitoring and control over development planning, ensuring that changes made, or restoration work carried out, are historically accurate. This approach helps to preserve the authenticity and value of cultural heritage sites. Thus, the strategic management of Xiguan's urban landscape and historic features includes not only preservation, but also the active promotion of an urban environment that harmoniously combines historic integrity, community engagement, economic development, and sustainable urban practices. This integrative approach ensures that Xiguan remains relevant and vibrant in the context of the modern world, while maintaining its unique historical narrative and cultural significance.



## DISCUSSION

The study of the urban spatial evolution of the historic old town of Xiguan in Guangzhou, conducted using the methodology of the Conzen School, analyses urban transformations and their impact on the historical structure of the urban landscape. This method focuses on the morphology of Guangzhou's historic area, taking into account aspects such as the street network, coastlines, riverbeds, plots and buildings, as well as the periodization of their historical development. This approach allows to identify and analyse key stages in the development of the urban environment, changes in planning and development that have occurred under the influence of various social, economic and political factors. The results of such a study are important for understanding how historical events and decisions in urbanism have influenced the current appearance and functioning of old cities, including Xiguan. The scientific significance of the study lies in the possibility of applying the knowledge gained to develop strategies for the preservation of cultural heritage, as well as to plan the future development of urban areas, taking into account historical value and identity. This approach also helps to create a balance between the preservation of historical heritage and the need to adapt the urban environment to modern needs and challenges.

The application of the Conzenian approach to urban morphology in the context of World Heritage management can provide a systematic and objective way to assess changes in urban form and their impact on the city's outstanding universal values (OUVs). T. Venkatachalam *et al.* (2022) believe that innovative urban regeneration strategies should go beyond traditional methods of "monitoring" and "design" and instead aim to create more inclusive governance structures that set priorities and shape new discourse. It is necessary to develop a theoretical and methodological framework that contributes to a sound understanding of the complexity and institutional challenges that arise in the context of global urban regeneration and the management of creative transformations in historic district renewal projects, as noted by G.F. Hassan *et al.* (2022). This approach opens up new perspectives for the development and implementation of management strategies that are adequate to modern requirements and challenges in the context of the urban development of Shanghai's Old Town.

The application of available photogrammetry techniques to the detailed documentation of architectural entrances in historic buildings in Old Tripoli, Lebanon, has allowed the creation of accurate 3D models that reflect the physical characteristics and context of the entrances, which is especially important in light of the potential threat from armed conflict, neglect, and environmental risks that could lead to the disappearance of these monuments, as noted in research by N. Mohareb *et al.* (2023). The use of these technologies contributes not only to the preservation of information about cultural values for future generations, but also supports the awareness and appreciation of the historical and cultural importance of architectural elements,

according to Sh. Zhang *et al.* (2021). The regeneration of the historic centres of Chinese cities often follows two main scenarios: "demolition-reconstruction" and "frozen protection". While these strategies have the potential to preserve cultural values, they can lead to fragmented and heterogeneous urban environments and limitations in historic preservation and infrastructure development.

The morphological transformation of the historic urban quarters near Maldah Patti in Dinajpur, according to A.T.M. Shahriar *et al.* (2023), has had a negative impact on the architectural integrity due to the low level of economic development, inefficient management sector at the local level, and monopoly of owners. In today's rapidly urbanizing world, there is a need to harmonize historical heritage and modern socio-economic needs, emphasizing the importance of design that recreates the historical context while taking into account functional and spatial requirements, as shown in the example of Guangzhou. No less crucial are the issues noted by B. Arandelovic & R. Musil (2023), these matters are the renovation, rehabilitation, and adaptation of buildings of exceptional historical value. The authors consider four important reconstructions for architectural monuments in the historic centre of Vienna. These objects are of different scale and functional purpose, belong to different historical periods, but they have in common their exceptional heritage and location in the centre of Vienna. In such circumstances, it is important to apply a comprehensive approach to the restoration of historic buildings that considers architectural, historical, social and environmental aspects.

In conformity with P. Daly *et al.* (2023), the application of an integrated approach to study the transformation of traditional housing in four historic districts of the Kathmandu Valley as a result of natural disasters is extremely effective, as it combines both quantitative and qualitative methods. The large-scale earthquake of 2015 in Nepal revealed serious shortcomings in the existing methods of protection and restoration of architectural objects, which emphasizes the need to develop more effective reconstruction strategies. In turn, F. Giuliani *et al.* (2020) focus on the role of urban configuration and morphology in ensuring the safety and resilience of historic settlements during earthquakes, using an interdisciplinary approach. The use of spatial syntax allows analysing road networks and developing scenarios to optimize evacuation routes. In studying the urban spatial evolution of the historic old town of Xiguan in Guangzhou, floods, storms, and earthquakes, among others, have had a significant impact on morphological changes. Indeed, these natural disasters have changed urban structures, forcing city administrations to redevelop and rebuild the affected areas, prompting the introduction of new building codes and standards aimed at reducing the city's vulnerability to similar events in the future (Fedonuk *et al.*, 2024).

F. Ribera *et al.* (2020) emphasize in their works the importance of preserving cultural heritage through continuous monitoring and selection of compatible uses to avoid





abandonment. The authors propose an innovative and economical valuation model to determine the highest and best use of historic buildings. The model is tested on the example of the monumental Palazzo Genovese in Salerno, demonstrating the practical utility of the protocol in making decisions on the reuse of architecture that maximizes economic benefits and ensures the preservation of cultural heritage. This model allows not only assessing the financial effectiveness of restoration interventions, but also their impact on the community, creating new functions and employment opportunities, promoting cultural development while preserving historical and architectural values (Kotkevych, 2023). S. Pavel & I.S. Jucu (2020) analyse the urban transformations and cultural evolution of Timișoara (Romania) and focus on important cultural stages that shaped the post-socialist urban identity. Spatial changes caused by different historical periods have an impact on the current challenges and opportunities arising from the city's new status as the European Capital of Culture, according to E. Elldér (2024). The above study aims to provide a scientific basis for understanding and capitalizing on the local cultural heritage, contributing to the further socio-economic development of historical and cultural centres like Timișoara and Guangzhou.

R. Caro & J.J. Sendra (2021) investigate the energy efficiency of historic buildings by conducting experimental studies through measurements of indoor air temperature, CO<sub>2</sub> concentration and humidity. Given the fact that it is quite difficult to improve energy efficiency in historic buildings without damaging architectural values, the results of this study can provide valuable information for developing strategies that can be easily adapted to historic properties and are efficient in terms of energy consumption. The protection of urban cultural heritage highlights the problems and challenges faced by historic suburban villages under the pressure of modern urban development, as noted in studies by B. Olczak *et al.* (2022) and A. Majewska *et al.* (2022). The study of the situation in Bronowice Małe, which is part of Kraków, highlights the conflict between the need to preserve historic architecture and the rapid expansion of urban development. This study is important from the point of view that suburban village areas are often subject to intensive development that does not take into account historical features, and the availability of strategies and methodologies that allow assessing the compliance of new development with historical standards is critical for preserving the cultural identity of these places.

According to M. Wang *et al.* (2022), one of the crucial problems of urban spatial evolution is the uncontrolled proliferation of tourism enterprises, which can lead to changes in the traditional urban landscape, destruction of architectural values and overloading of infrastructure, which threatens the preservation of cultural heritage. Thus, the use of multifactorial analysis and the creation of spatial databases to assess the impact of the tourism business allows to identify both high-risk areas and opportunities for sustainable development, ensuring a balance between

economic development and the preservation of historical value. It is worth noting that the development of the tourism industry raises the importance of historical assets as a potential for economic growth, despite the pressure of urban modernization (Buil *et al.*, 2016). Thus, A.S. Yawer *et al.* (2023) emphasize the need to create a strategy for the protection of historic cities on the example of Mosul (Iraq), which allows their residents to continue living in them, adapting to the principles of sustainable development. Using an inductive methodology and sustainable development concepts, the authors identify goals, strategies, and tools to ensure that historic cities can develop sustainably. Indeed, this study contributes to the development of strategies that combine the preservation of cultural heritage with the needs of modern communities, ensuring a balance between historical values and the requirements of residents.

Based on the initiative of the European Cooperation in Science and Technology (COST), which identified three main roles of culture for achieving the goals of sustainable development – “IN”, “FOR”, “AS”, H.W. Al-Shami *et al.* (2024) developed a theoretical framework for cultural sustainability using the concept of “Third Place”, which includes culture in the integrated planning of urban spaces, supporting sociability and attachment to place. Using Briggate Street in Leeds, UK, as an example, the authors used visual surveys and interviews to determine users' perceptions of the critical role of cultural resilience in cities. These approaches allowed them to formulate recommendations for improving the quality of urban areas and achieving cultural well-being while preserving the cultural heritage of these places. This approach helps to understand how historical and contemporary processes influence the formation of the urban landscape and what strategies can be used to manage future development, while preserving the historical heritage and cultural value of urban space, which is also agreed in work by N.C. Palazzi *et al.* (2023). In this study, for a more detailed visualization of the spatial layout of Guangzhou's Old Town, a map was generated using the QGIS software of the Quick Map Service search module, Esri World Imagery, which uses remote sensing data. This method also aims to identify urban landscape transformations and their impact on the future development of the historic area. M.A. Ali & H. Abouelfadl (2022) study the peculiarities of overcoming the challenges of segregation between the viability of Kom al-Nadur as a cultural and tourist site and the local community, which largely ignores its historical significance. The site, despite its rich history spanning the Fatimid, Mamluk, Ottoman, French expedition and Muhammad Ali eras, remains inaccessible and unrecognizable to the public. As in the case of Qom a Nadur, the study of the historical site in Guangzhou highlights the need to develop strategies that would allow the archaeological site to be used to strengthen intercultural dialogue and social cohesion. In this way, it is possible to identify the links between historical sites and other material historical assets in the region, including ancient cisterns, a large memorial hall, a Taoist temple, Arab city

walls and Sufi mosques, and Buddhist temples, in order to create an integrated cultural landscape (Stoiiian, 2024).

Thus, the conducted research includes some recommendations how to increase tourism potential, raise awareness of Xiguan's historical wealth, and strengthen the local economy. Stakeholders such as government agencies, NGOs, and academia can use this research to prepare grant applications, develop educational programmes, and initiatives aimed at increasing public participation in cultural heritage preservation.

## CONCLUSIONS

Conzen's morphological approach allowed to substantiate the historical continuity and interconnection between urban geography, economy, culture and spatial configuration. The analysis of the urban architecture typification of Xiguan in Guangzhou has opened up new opportunities for urban landscape management and conservation planning. In particular, the study emphasizes the importance of the historical integrity of street, site and building systems in shaping the urban fabric, which affects the overall image and functionality of the city.

The recommendations of the study are aimed at preserving the traditional modules of the plots during reconstruction in order to reduce the impact on street spaces and maintain the harmonious coexistence of traditional and modern forms. It is noted that the integration of the theoretical foundations of urban morphology into practical urban planning can significantly improve the processes of renovation and preservation of historic districts, as well as contribute to the preservation of the identity of urban spaces. It is important to create strategies that take into account the links between historical and modern urban forms, which is a key factor in protecting urban heritage and effective urban development management. The result

of this study is proposals for the development of strategies for the preservation of historical heritage, considering the specifics of the urban morphology and identity of Xiguan. Strategic planning is the key to implementing an effective urban landscape management policy that will maintain a balanced combination of the latest urban development and the historical value of the area.

The study of the urban spatial evolution of the historic old town of Xiguan in Guangzhou based on the methodology of the Conzen school, although significant, has several limitations that should be considered. The first and main limitation is the availability of archival data. Another important limitation is the subjectivity of the interpretation of historical materials. Individual interpretations of historical sources may differ, which affects the objectivity and universality of the study's conclusions. In addition, the use of Conzen's methodology may be difficult to adapt to local conditions in Xiguan if the cultural and historical characteristics of the region are not taken into account. The methodology may require some modifications or additions to reflect the unique aspects of urban development. The study of the urban spatial evolution of the historic old town of Xiguan in Guangzhou using the methodology of the Conzen School opens up prospects for further research that could focus on a detailed analysis of the interaction between historic buildings and modern urban interventions. A relevant area of research is the analysis of socio-economic changes in the Xiguan community and their impact on urban spatial planning.

## ACKNOWLEDGEMENTS

None.

## CONFLICT OF INTEREST

None.

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## Урбаністична просторова еволюція історичного старого міста Гуанчжоу Сігуань: аналіз під кутом зору семантики школи Концeni

**Анотація.** Аналіз міської морфології з використанням методів Конзена є актуальним з точки зору вивчення історичної трансформації міського ландшафту та його взаємодії з сучасними містобудівними процесами. Незважаючи на численні дослідження загального процесу урбанізації в Гуанчжоу, специфічні аспекти історичного розвитку Сігуаня залишаються недостатньо висвітленими. Метою цього дослідження є обґрунтування просторової структури та еволюції району Гуанфу Нань у Гуанчжоу з детальною ідентифікацією, аналізом ключових змін у містобудівній організації цього історичного району та пропозиціями щодо ефективного управління міським ландшафтом і розвитку культурної інтеграції. Інформаційно-методологічною основою роботи є історичні карти, архівні матеріали та інші першоджерела, що дозволяють відновити та обґрунтувати еволюцію міського середовища, а також розробити сучасні стратегії просторового планування для історичного міста Сігуань. У дослідженні проаналізовано ключові реформи містобудування та індустріалізації в Китайській Народній Республіці, визначено їхній вплив на міську морфологію, економіку та соціальну структуру, з особливим акцентом на періодизацію історичного розвитку річки Дагуан та комерційного району Сігуань. Детальний аналіз розвитку вуличної мережі, розподілу земельних ділянок та архітектурного планування був проведений з використанням історичних картографічних даних та змін у землекористуванні. Результати показали, як історичні, культурні та економічні чинники спільно вплинули на формування міського ландшафту Сігуаня, підкресливши його унікальний внесок у ширший контекст урбанізації Гуанчжоу. Це дослідження не тільки збагатило розуміння історичного процесу урбанізації на півдні Китаю, але й надало цінні емпіричні дані для планування майбутнього розвитку та збереження історичних районів регіону. Практичне значення роботи полягає у розробці пропозицій щодо стратегічних напрямів ефективного управління міським ландшафтом та збереження історичної спадщини старого міста Сігуань у Гуанчжоу

**Ключові слова:** морфологія міста; адаптація історичних районів; трансформація міського ландшафту; раціональне землекористування; стратегічне управління; охорона та збереження культурної спадщини