

Research on Urban Community Space Based on Architectural Cultural History under the TOC Model: A Case Study of Haikou Qilou Old Street

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Abstract: This paper primarily introduces the study of community space in Haikou Qilou Old Street by applying the TOC model, revealing the key factors influencing the development of this community space and proposing corresponding optimization strategies. The article deeply analyzes the main constraints of the Qilou Old Street community space, such as aging buildings, traffic congestion, and commercial homogenization, and uses the TOC model to dissect the interrelationships and impacts of these factors. Based on this analysis, the paper proposes targeted solutions, including improving traffic conditions, introducing diverse commercial formats, and strengthening cultural heritage protection. These measures aim to contribute wisdom and strength to the optimization of the Haikou Qilou Old Street community space. In summary, this paper aims to provide beneficial insights and inspiration for the development of similar community spaces through the study of Haikou Qilou Old Street community space, promoting the harmonious development and sustainable utilization of urban community spaces.

1. Overview of the TOC Model

1.1. Basic Concepts of the TOC Model

The core idea of the TOC (Theory of Constraints) model is that any system does not exist in isolation but consists of multiple interconnected components that work together to drive the system's operation. However, in this process, some components or links inevitably fail to perform effectively due to various reasons, becoming "bottlenecks" within the system. These bottlenecks not only limit the overall performance of the system but also potentially lead to resource wastage and deviation from goals. The TOC model emphasizes identifying these bottlenecks, or constraints, and taking measures to improve or eliminate them, thereby restoring the system to efficient and orderly operation.[1]

In urban planning and community space research, the TOC model can also play a significant role. A city, as a complex system, faces numerous constraints during its planning and development processes. These constraints may arise from the limitations of the natural environment, the heritage of historical culture, socio-economic conditions, and other factors. The TOC model is a powerful tool that helps identify and address these constraints. By applying the TOC model, we can plan urban

layouts more scientifically, allocate resources more reasonably, and optimize community spaces to achieve sustainable urban development.

1.2. Application of the TOC Model in Urban Planning

The introduction of the TOC model brings a new way of thinking to urban planning. It emphasizes that in a complex system, there are always a few critical factors or constraints that determine the system's overall performance and behavior. By identifying and eliminating these key constraints, we can achieve significant improvements in system performance. In the context of urban planning, this means focusing on the key factors that constrain urban development and alleviating or eliminating these constraints through optimized resource allocation and planning strategies.

The TOC model provides a new perspective and way of thinking for urban planning, helping us more effectively identify and address key constraints in urban development. Through the implementation of measures such as optimized resource allocation, planning strategies, and comprehensive reforms, we can promote sustainable urban development, enhancing the overall performance and competitiveness of cities. In future urban planning, greater emphasis should be placed on the application and practice of the TOC model, using it as an important tool and method to drive urban development.[2]

1.3. Significance of the TOC Model in Urban Community Space Research

In urban community space, the TOC model, with its unique theoretical framework and practical methods, helps us more precisely grasp the pulse of community spaces, understand their internal dynamic changes, and clearly recognize the interrelationships between various elements within the community space. This provides more scientific evidence for space optimization and resource allocation.

In the field of urban planning, with the acceleration of urbanization and changes in social structure, traditional planning methods can no longer adapt to the complexity and diversity of modern cities. It is in this context that the introduction of the TOC model becomes particularly important. It not only compensates for the shortcomings of traditional planning but also provides us with a new paradigm of urban planning.

By applying the TOC model to practical research, we can discover its enormous potential in optimizing community space layout and resource allocation. Through scientifically and reasonably planning community spaces, we can better meet residents' living needs and improve their quality of life. An optimized community space layout can also promote sustainable urban development, driving cities toward a greener, healthier, and more livable future.

2. Urban Community Space Research

2.1. Basic Concept of Urban Community Space

Urban community space, as an area within a specific geographical range where residents live, is a complex and dynamic concept. It is not just a physical space but also a social space that carries multiple functions such as social interaction, cultural heritage, and community governance. In this space, key elements like residential buildings, public facilities, and transportation networks interweave, forming the material foundation of residents' daily lives and providing strong support for community development.

2.2. Characteristics and Issues of the Haikou Qilou Old Street Community Space

2.2.1. Characteristics of the Haikou Qilou Old Street Community Space

Haikou Qilou Old Street interweaves architecture and streets, forming a charming commercial and residential social space that showcases the essence of Hainan's diverse culture. With the continuous advancement of urbanization, Qilou Old Street faces unprecedented challenges. The destruction of traditional architectural styles and the influx of new buildings and modern facilities pose the risk of demolition and a lack of harmony with the surrounding environment, disrupting the overall appearance of the old street. Additionally, the decline of community functions puts immense pressure on Qilou Old Street. The once prosperous commercial and close social networks are disintegrating, with many old shops forced to close due to poor business or rising rents, gradually diminishing the commercial atmosphere of the old street. The breakdown of social networks weakens the connections among residents, reducing the community's cohesion and sense of belonging.[3]

More seriously, residents face deteriorating living environments and insufficient infrastructure. Some old residential buildings are dilapidated due to a lack of maintenance and updates, resulting in poor living conditions. The insufficient infrastructure makes residents' lives inconvenient and restricts the community's future development.

We cannot remain indifferent to these challenges. Qilou Old Street is not just a street but also an important carrier of Hainan's historical culture. It bears the historical memory and cultural heritage of the people of Hainan and is a valuable cultural heritage of the region. Protecting and developing the Qilou Old Street community space is of utmost importance.

We need to strengthen the protection of traditional architectural styles. The government should introduce relevant policies and measures to repair and maintain historical buildings, preserving their integrity and authenticity. The construction of new buildings and modern facilities should harmonize with the surrounding environment to avoid disrupting the overall appearance of the old street.

We need to revitalize community functions. The government and society should work together to promote the commercial revival and reconstruction of social networks in the old street. This can be achieved by supporting old shops and introducing new business formats to stimulate commercial vitality and revitalize the old street. Organizing various community activities can also strengthen the connections and interactions among residents, enhancing the community's cohesion and sense of belonging.

The government should intensify efforts to repair and update old residential buildings, improving residents' living environments. Strengthening the construction and maintenance of infrastructure to provide convenient living conditions for residents is also crucial. Only by improving residents' quality of life can they become more actively involved in the protection and development of the community.

Protecting and developing the Haikou Qilou Old Street community space is a long-term and arduous task. We need the joint efforts of the government, society, and residents to form a cohesive force to rejuvenate Qilou Old Street with vitality and vigor.

3. Analysis of the Haikou Qilou Old Street Community Space Based on the TOC Model

Haikou Qilou Old Street, a historical imprint of the city, prompts us to consider: How can we rejuvenate it? When applying the TOC model to the study of Haikou's urban community space, what problems and measures will we discover?

3.1. Issues in the Haikou Qilou Old Street Community Space

3.1.1. Aging Buildings

These Qilou buildings, many of which have weathered a century of storms, face issues of structural aging and outdated facilities despite their unique style. This not only affects the residents' quality of life but also hinders community development.[4]

3.1.2. Traffic Congestion

With urban development, the traffic pressure on Qilou Old Street has increased. Narrow streets, limited parking spaces, and growing traffic volumes exacerbate the traffic situation. Traffic congestion not only affects residents' travel but also restricts commercial development. Improving traffic conditions has become an urgent problem to solve.

3.1.3. Commercial Homogenization

On the commercial streets of Qilou Old Street, many similar shops and products can be found. This commercial homogenization phenomenon not only reduces consumers' shopping experience but also weakens the attractiveness of the commercial street.

3.1.4. Aging Infrastructure

a. Road Damage: The roads in Qilou Old Street are generally damaged and uneven. Due to long usage periods, frequent passage of heavy vehicles, and a lack of effective maintenance measures, the road surfaces are severely worn. This not only affects the safety of residents' travel but also damages the overall image of the old street.

b. Poor Drainage: The drainage system of Qilou Old Street is of low design standards and poorly maintained. During the rainy season, poor drainage often leads to flooding. This not only inconveniences residents but also easily causes urban flooding and further damages the buildings and infrastructure of the old street.[5]

c. Multiple Safety Hazards: The aging infrastructure of Qilou Old Street leads to numerous safety hazards, such as aging electrical wires, gas leaks, and collapsing dilapidated buildings. These issues pose significant threats to the safety and property of residents.

3.2. Recommendations for the Haikou Qilou Old Street Community Space Based on the TOC Model

By applying the TOC model, we can accurately identify and effectively address bottlenecks or constraints in the process of renovating old communities. This method allows decision-makers to allocate resources more efficiently, maximizing resource utilization. In the context of old community renovation, this means we can more precisely respond to the actual needs of residents, thereby enhancing the overall environment and living quality of the community. By eliminating constraints, we can remove obstacles to community development, drive better outcomes for renovation projects, and meet residents' expectations for higher quality living.

3.2.1. Protection and Renewal

Excessive commercial development can cause irreversible damage to the historical appearance of Qilou Old Street. Our primary consideration should be ensuring that the cultural authenticity and purity of Qilou Old Street are not compromised. This means that any renovation or development must

respect the original historical appearance, avoiding tendencies toward over-commercialization, and preserving the street's true essence.

We can adopt a combined approach of protection and renewal. Historical buildings should be repaired and protected to retain their original appearance and characteristics. Buildings lacking functionality and comfort can be updated and renovated to enhance their usability and living experience. We can also introduce elements of the cultural and creative industries to inject new vitality and charm into the old street.

3.2.2. Planning and Management

Improvements can be made from both planning and management perspectives. In planning, measures such as optimizing street layouts and increasing parking spaces can improve traffic conditions. In management, enhancing traffic guidance and order maintenance can reduce traffic congestion. We can also encourage residents to adopt green travel methods such as walking and cycling, reducing the frequency of motor vehicle use.

3.2.3. Enhancing Vitality

With urban development and the diversification of residents' needs, Qilou Old Street community space can introduce modern commercial, cultural, and educational functions while retaining its original appearance. For example, through reasonable spatial planning and functional layout, the traditional shops on the old street can be integrated with modern cultural and creative industries, creating a multifunctional community space for shopping, leisure, entertainment, and learning. This not only enhances community vitality but also promotes the modern inheritance of historical culture, achieving harmonious coexistence between history and modernity.

3.2.4. Improving Community Quality

To further enhance the quality and vitality of urban community spaces, we can take multiple approaches. For example, strengthening the construction of community public service facilities, improving supporting facilities such as education, medical care, culture, and sports to meet residents' diverse living needs; promoting community cultural innovation through various cultural activities and art exhibitions to enrich residents' cultural and spiritual lives; enhancing community safety management by improving security and prevention systems to ensure residents' safety and property. Implementing these measures can enhance the attractiveness and competitiveness of urban community spaces and inject new vitality into sustainable urban development.

3.2.5. Sustainable Development

With the increasingly severe global climate change and resource scarcity, green ecology and sustainable development have become inevitable trends in urban development. In optimizing urban community spaces, we should focus on implementing environmental protection measures such as energy conservation, emission reduction, and resource recycling. For example, green building materials and renewable energy can be introduced in the renovation of Qilou Old Street to improve the energy efficiency of buildings. By reasonably planning green spaces and vegetation, we can increase the community's green coverage rate and create a livable ecological environment. This approach not only improves residents' quality of life but also promotes the harmonious coexistence of urban community spaces and the natural environment.

3.2.6. Public Space Renovation and Landscape Improvement

Renovating and beautifying public spaces and landscapes in Qilou Street are crucial. We can comprehensively improve the road system, greenery layout, and night lighting of these areas to create a comfortable and pleasant environment. To inject more artistic and cultural elements, public art installations and landscape sculptures can be creatively integrated. Additionally, organizing a variety of cultural activities and celebrations can attract more citizens to these public spaces, bringing vitality and vibrancy to the entire street.

3.2.7. Government Support and Guidance

Government support and guidance are particularly important to stimulate the vitality of Haikou Qilou Old Street. The government should strengthen support for these areas through financial and tax policies to provide necessary assistance and incentives for businesses and entrepreneurs, encouraging their active participation in various activities and renovation projects. Additionally, the government needs to enhance planning and management to ensure the effective execution of maintenance and management work by relevant departments. Furthermore, the government can organize relevant training and consultation services to help businesses and residents better participate in enhancing the street's vitality, thereby collectively creating a more attractive and vibrant commercial environment.

3.2.8. Continuous Improvement and Feedback

The TOC model emphasizes establishing continuous improvement and feedback mechanisms. Regularly evaluating renovation effects and collecting resident feedback can help identify and solve problems in a timely manner, ensuring that renovation work always progresses in the right direction.

4. Conclusion and Outlook

4.1. Conclusion

Introducing the TOC model into the study of urban community spaces provides a systematic approach to analyzing and understanding the complex issues within these areas. The TOC model, which focuses on identifying and resolving system constraints, helps us analyze and understand the complexities of urban community spaces more systematically. Our in-depth exploration of the application of the TOC model in urban community space research has underscored its importance, particularly in the context of Haikou's Qilou Old Street.

Qilou Old Street, a historical witness and cultural treasure of Haikou, requires careful preservation and transmission. Our research findings provide a robust theoretical basis for the protection of Qilou Old Street and offer valuable references for relevant departments in formulating protection policies.

Through comprehensive research on Haikou Qilou Old Street, we have achieved significant and valuable results. These findings are not only important for the preservation and transmission of historical cultural heritage but also offer beneficial insights and guidance for the harmonious development of urban community spaces. In future work, we will continue our dedication to research and exploration in this field, contributing more wisdom and strength to cultural heritage and community development.

4.2. Outlook

Haikou Qilou Old Street, as a witness of history, carries the rich cultural heritage and unique architectural art of Hainan. Looking to the future, how to seek innovation in preservation to revitalize

this old street is a critical issue we must consider.

The charm of Qilou Old Street primarily comes from the resilient Qilou buildings that have stood the test of time. These buildings are not only treasures of Hainan's architectural art but also carriers of the city's historical culture. Protecting cultural heritage should be the top priority in the development of Qilou Old Street. Regular maintenance and restoration of the existing Qilou buildings are necessary to ensure they can withstand the passage of time and continue to stand on this land. We should also delve deeply into the historical and cultural stories behind Qilou Old Street and spread and pass on these stories in various forms, so more people can learn about and fall in love with this place.

The prosperity of commerce is another key to revitalizing Qilou Old Street. In the past, Qilou Old Street was once the commercial center of Hainan. Although times have changed, commerce remains an indispensable part of the street. To restore Qilou Old Street to its former glory, we need to optimize the existing commercial layout. Introducing more diversified commercial formats and specialty products can meet the diverse needs of tourists and residents. Additionally, improving the service quality of merchants is essential to ensure every visitor feels welcome. Hosting various cultural and promotional activities can attract more foot traffic and financial inflows, aiding the prosperous development of Qilou Old Street.

As urbanization accelerates, urban community spaces increasingly exhibit diversity and complexity. In this context, expanding the scope of research is particularly urgent. We should explore urban community spaces with unique charm and distinctive characteristics. These spaces may be hidden in corners of bustling cities or scattered in rural landscapes, but they are all integral parts of urban development and worthy of in-depth research and reference.

Looking ahead, urban community space research will face more challenges and opportunities. With technological advancements and social development, urban community spaces will present new features and trends. For example, concepts such as intelligence, greening, and sharing will be more widely applied in urban community spaces, and residents' pursuit of quality of life will become more diverse and personalized. This requires us to continuously update our research concepts and methods, keeping pace with the times. We believe that in the near future, more innovative and practical research results will emerge, painting a brighter blueprint for future urban development.

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