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Survey and Research on Accessible Slow Walking Space in Fayuan Temple Historical Neighborhood of Xicheng District, Beijing, China

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Abstract: ***As society progresses and civilization develops, the construction of accessible environments is increasingly receiving widespread public attention. As an important part of urban space, optimizing the accessibility of slow-moving spaces to provide a more convenient, safe and comfortable travel environment for groups such as the elderly and people with travel disabilities has become an important initiative to promote friendly and inclusive development for the whole society. However, the barrier-free transformation of slow-moving spaces in historic districts faces multiple challenges, such as traffic congestion, spatial limitations, and landscape coordination. In order to analyze and identify the problems, and to better balance the protection of historic districts and modern accessibility construction, this project takes the Fayuan Temple Historic District in Xicheng District of Beijing as a case study, and comprehensively evaluates the accessibility environment of the district through various research methods such as experiential surveys, on-site surveys, in-depth interviews, and so on. The study found that: 1) the roads in the historic district are generally narrow and uneven; 2) there is a lack of necessary barrier-free facilities and parking spaces at the entrances and exits of the buildings; 3) there is a scarcity of barrier-free service facilities and they are not in harmony with the neighborhood's style; and 4) the willingness of the people with mobility impairments to travel is affected by the physical environment. This paper puts forward the corresponding policy suggestions for the above problems to provide useful references for the relevant government departments and related designs.***

Keywords: Accessibility, Slow Space, Historic District**.**

1. Introduction

1.1 Research Background

1.1.1 Research on Accessible Environment

Barrier-free environment refers to all the conditions provided to ensure that people with mobility disabilities such as the disabled, the elderly and other members of society can independently, safely and conveniently pass through, use facilities and access information and services [1]. In recent years, with the aging of the population and the public's concern for social equity, the construction of a barrier-free environment has become an important issue for urban renewal and the promotion of socially inclusive development.

Theoretical research and practice of barrier-free environment modification has accumulated rich experience, foreign research can be traced back to the 1930s, when Sweden, Denmark and other countries have begun to build facilities in the city specifically for people with disabilities [2]. So far, the relevant foreign research has been quite in-depth, and the relevant empirical analysis is also more comprehensive, covering a variety of aspects such as barrier-free travel [3], barrier-free facilities renovation [4]. The barrier-free environment construction in developed countries such as Europe, America and Japan has been quite mature, and the overall atmosphere of the society is friendly and inclusive. In the public space of these countries, groups such as the physically disabled, the elderly with limited mobility, pregnant women, and parents pushing strollers are able to enjoy an autonomous and convenient activity environment.

Domestic research on accessibility has also made remarkable progress, covering a wide range of fields. In the context of the implementation of the Law on the Construction of Barrier-Free Environment, scholars Shao Lei and Liu Zhirui (2023) put forward a strategy to promote the standardization and sustainable development of urban and rural barrier-free environments [5]. Scholars Liu Huadong and An Shenglan (2024) discussed the importance of barrier-free environment for urban beautification from multiple perspectives [6]. Scholars Kai Zhang & Xin Zhou et al. (2024), on the other hand, analyzed the similarities and differences between fine-grained governance and institutional exploration of accessibility in urban public spaces [7][8].

With the promulgation and implementation of the Barrier-Free Environment Construction Law in 2023, a more friendly and convenient social environment will be created for the disabled, the elderly and other groups in China. However, the theoretical research on barrier-free environment construction in China still mainly focuses on urban public space and community environment [9], and although the research on the needs of special groups such as the elderly and the disabled is gradually increasing [10], the exploration of barrier-free environment construction in historical and cultural neighborhoods and gender perspective still needs to be deepened.

1.1.2 Research on historical and cultural neighborhoods

Historical and cultural neighborhoods record the historical evolution of the city, reflecting the plurality of social life and cultural composition, it is the most intuitive and typical scene portrayal of urban cultural coexistence and historical inheritance, and also the most image of the city's cultural lineage, the most vivid external performance. Protecting the historical and cultural neighborhoods and utilizing the historical and cultural neighborhoods is an important

component of the inheritance and development of urban culture, and it is also an important hand in creating a good living environment [11]. In the study of accessibility in historic districts, Shan Zhiran, Chen Minglu et al. (2020) pointed out that the travel intention of people with travel barriers in historic districts is affected by both the physical environment and the characteristics of the heart [12].

1.2 Research Purpose and Significance

This paper attempts to explore the construction of slow walking space accessibility in urban historic districts, focusing on the current problems and improvement strategies of slow walking space accessibility in historic districts. It analyzes the status quo of the barrier-free environment of the slow-moving space in historic districts and the needs of the barrier-free users through cases, and puts forward policy suggestions to continuously improve the inclusiveness and diversity of the historic districts, to build a more humanized and barrier-free human environment, to create a more friendly and convenient travel environment, and to provide references for the updating and design of the barrier-free environment of the slow-moving space in the historic districts.

1.3 Research Objectives

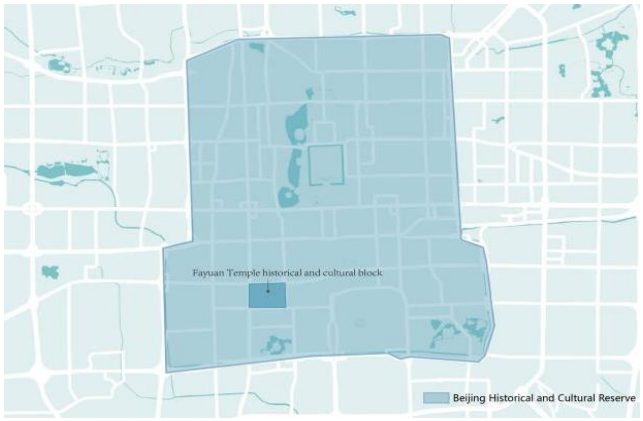

Figure 1: Fayuan Temple Historical and Cultural Neighborhood Self-drawn

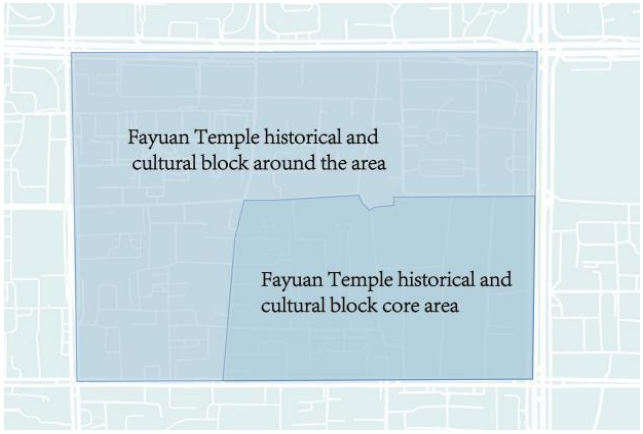

Figure 2: Division of Fayuan Temple Historical and Cultural Neighborhood Self-drawn

The Fayuan Temple Historical and Cultural Neighborhood is located in Niujie Street, Xicheng District, Beijing, and consists of a hutong area west of Caishikou, with a core protection area of 161,600 square meters (Figures 1 and 2). Located in the middle of Fayuan Temple Historical and Cultural Neighborhood, Lanman Hutong is the most important north-south hutong in the neighborhood, starting from Lotus Hutong in the north and ending at South Hengxi Street in the south. The Fayuan Temple Historical and Cultural Neighborhood is one of the 33 historical and cultural preservation zones within Beijing, and is classified as the Xuanxi - Fayuan Temple Cultural Essence Area in the Beijing Urban Master Plan (2016-2035) released in 2017 [13]. Since 2018, Fayuan Temple Historical and Cultural Neighborhood has been launched for protective upgrading and transformation [14], and most of its core area has been basically transformed, but some of the roads in the core area and the surrounding area still exist, such as narrow roads, bumpy roads, and lack of barrier-free service facilities.

This study focuses on the accessibility environment, especially the environment of established facilities. Among them, the groups of people mentioned in this study with travel barriers are not only limited to people with disabilities, but also include the elderly, pregnant women, and individuals who move unchanged at certain times of the year such as those dragging baggage or pushing strollers, which often face special challenges when traveling through the historic districts, and are the main focus of this study.

2. Research Methods

This study comprehensively and thoroughly investigated the accessibility facilities in the Fayuan Temple Historical Neighborhood by comprehensively applying a variety of methods such as the literature research method, the field research method, the questionnaire survey method, and the experiential survey method [15]. Among them, the main method of this study is the experiential survey method, which is a social survey method that starts from the perspective of the respondents, simulates the experience through the selected situation, and practically feels their activities and psychological state, so as to get the feedback results [16]. The experiential survey method emphasizes the importance of experiencing the real situation of the subject through first-hand experience, which enables a deeper understanding of the problems and challenges faced by the subject.

First of all, the literature research method is used to sort out the development lineage of barrier-free transformation in the historic district and the relevant theoretical knowledge of accessibility, and to analyze, synthesize, compare and summarize a large amount of information collected from the survey. On this basis, the field research method, questionnaire survey method and experiential survey method were combined to conduct a comprehensive visit and research on various points of the Fayuan Temple Historic District, and through the field simulation and feeling of the travel mode of the people with travel disabilities, we analyzed in-depth the difficulties that they may encounter during the travel process, as well as the related accessibility facilities and field environmental problems. Finally, the existing problems of accessibility construction in the Fayuan Temple Historic District are summarized, and targeted strategies for improving the accessibility of the slow-moving space are proposed.

3. Findings and Discussion

3.1 Survey of Accessibility Perceptions in Historic Districts

Figure 3: Questionnaire for Fayuan Temple Historical and Cultural Neighborhood Self-drawn

Figure 3 shows the results of our group's research on accessibility in the Fayuan Temple Historic District in Xicheng District, Beijing, where the responses of different groups of people (local residents and tourists) reflect their perceptions of and needs for accessibility. The following is a summary and analysis of the questions and responses:

Overall experience: Both local residents and tourists expressed some inconvenience in terms of accessibility in the Fayuan Temple neighborhood. Tourists generally think the overall environment is relatively good, but there is still room for improvement, especially in terms of road smoothness and walking comfort within the neighborhood. Young people have higher expectations for accessibility and experience, while older people are more concerned about safety and the reasonable distribution of facilities.

Accessibility of barrier-free facilities: Most people reflected that the facilities are insufficient or inadequate, especially in details such as ramps and handrails. Young people would like to see modernized barrier-free facilities added to improve efficiency, while older people would like the facilities to be in keeping with the traditional style and be safer.

Rest Areas and Signage: Rest areas were mentioned more often as being unevenly distributed or fewer in number, and tend to be crowded especially during peak hours. Local residents preferred the practicality of the facilities, while visitors wanted more rest areas and clear signage for easy orientation and rest.

Accessibility and cultural features: Many people raised the issue of preserving the historical and cultural features while at the same time modernizing the accessibility. Residents were particularly interested in the design of the facilities to incorporate the historical context, while visitors wanted facilities that would help them better understand the culture of the neighborhood.

Experience feeling: Both young and old people hope that the facilities can better meet the needs of different groups of people, especially for those with mobility problems. It is recommended that additional accessible facilities be installed in key areas and that the accessibility of existing facilities be optimized.

Overall, the feedback reflects the different needs of various groups of people for barrier-free facilities: residents tend to prefer the safety of the facilities and their fit with the culture of the neighborhood, while tourists are more concerned about convenience and the reasonable distribution of facilities. Suggestions for improvement include the creation and optimization of rest areas and accessible signage to better serve the diverse user groups while maintaining the historical and cultural characteristics of the neighborhood.

3.2 Status of Accessibility in Historic Neighborhoods

3.2.1 Site roads

Figure 4: Degree of road openness Self-drawn

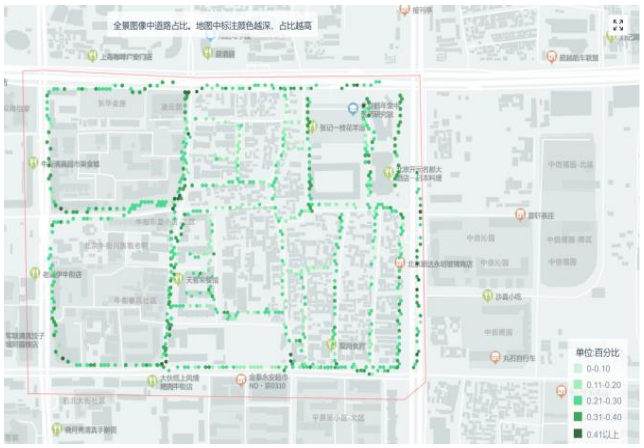

Figure 5: Spaciousness of roads Self-drawn

Figure 6: Road flatness Self-drawn

Figure 7: Excessively steep road gradient Self-photography

Figure8: Narrow road Self-photography

Figure 9: Narrow and curved road Self-photography

Figure 10: Bumpy road Self-photography

Table 1: Impact of road openness on accessibility Self-drawn

	0.41 and above	*0.31-0.40*	*0.21-0.30*	*0.11-0.20*	*0.0-0.10*
Degree of openness	Supreme	High	General	Relatively low	Lowest
Travel impacts	Facilitates access	Fit for purpose	Access needs largely met	Partial access restricted	Very unfavorable
Region of distribution	Eastern, partly southern	Parts of the western and central regions	Coverage of most areas	Parts of the central and south-eastern regions	North, partly south

Table 2: Impact of road space spaciousness on accessibility Self-drawn

	0.41 and above	*0.31-0.40*	*0.21-0.30*	*0.11-0.20*	*0.0-0.10*
Roominess	Supreme	High	General	Relatively low	Lowest
Travel impacts	Facilitates access	Satisfying access	Access needs largely met	Partial access restricted	Very unfavorable
Region of distribution	Central, partly southern	Western, south-eastern	North-west, north-east, partly central	Parts of the central and south-eastern regions	North, partly south

Table 3: The influence of road flatness on accessibility passage Self-drawn

	0-10 (green area)	*11-30 (yellow zone)*	*31-60 (orange zone)*	*61 and above (red areas)*
Evenness	Best	preferably	Mediocre	Relatively low
Travel impacts	Facilitates access	Satisfying access	Access needs largely met	Partial access restricted
Region of distribution	Internal Neighborhood Roads	Internal Neighborhood Roads	Central, Southern	Partial road localization

The main problems in the historic district of Fayuan Temple are as follows:

Some roads in the historic district are too narrow (Figure 4, Figure 5). As shown in Tables 1 and 2, a score of 0.21 or less indicates that some of the roads in the neighborhood are narrow (Figures 6 and 7), making it difficult for wheelchairs and other aids to pass through.

Some of the roads in the neighborhood are uneven (Figure 8). The road leveling data in Table 3 show that a score of 31 and above indicates that some roads in the neighborhood are uneven, mainly in two aspects: first, there are more entrances and the gradient is too steep (Figure 9); and second, some roads in the neighborhood are paved with inappropriate materials, which leads to unevenness in the passage of wheelchairs and other assistive devices (Figure 10).

3.2.2 Site environment

There are two main problems in the Fayuan Temple Historic District environment:

First, there is a lack of barrier-free facilities at the entrances and exits of buildings (Figure 11). The core area of the Fayuan Temple Historic District and the surrounding buildings lacked accessibility facilities in the early stages of construction due to their early construction (Figure 13).

Second, the Fayuan Temple Historic District has a long history and culture, attracting a large number of tourists to visit, but there is a relative lack of parking spaces in the district (Figure 12). Especially during the peak tourist season, the traffic flow in the neighborhood surges, traffic congestion (Figure 14, Figure 15) and other phenomena, resulting in travel difficulties for people with travel barriers.

Figure 11: Analysis of accessibility facilities at building entrances and exits Self-drawn

Figure 12: Parking Occupancy Analysis Self-drawn

Figure 13: Lack of accessible ramps Self-photography

Figure 14: Random Parking Self-photography

Figure 15: Traffic congestion Self-photography

3.2.3 Service Facilities

The upgrading of barrier-free service facilities in the Fayuan Temple Historical Quarter has achieved some success, mainly in the areas of resting seats, sports equipment, and handrails (Figure 16 and Figure 17), which have to a certain extent improved the level of accessibility in the Quarter. However, there are still problems such as the lack of various types of barrier-free service facilities in the neighborhoods, which makes it difficult for people with travel disabilities to pass through. The specific problems are described below:

Figure 16: Distribution of Rest Seats in Fayuan Temple Historic District Self-drawn

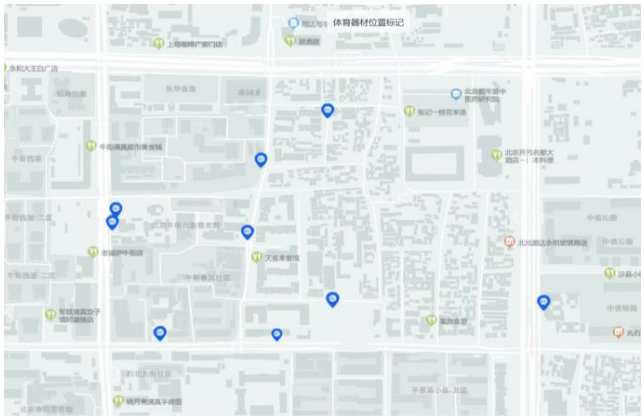

Figure 17: Distribution of Sports Equipment in Fayuan Temple Historic District Self-drawn

The types and number of barrier-free service facilities are on the low side, and some of these facilities are used inefficiently or even inaccessibly. Existing barrier-free facilities in the neighborhoods are mainly concentrated near the homes of the elderly and disabled, and the neighborhoods have not yet formed a comprehensive system of barrier-free facilities, and irregularities in new construction or renovation have also affected the effectiveness of the use of barrier-free facilities. For example, the spatial design of the entrance to public toilets does not meet the requirements of the turning radius of wheelchairs, resulting in wheelchairs not being able to enter the toilets smoothly; most of the public toilets in the neighborhoods are still ordinary toilets, and there is only one dedicated accessible toilet and it is far away from the entrance (Figure 18), causing inconvenience to the users; some of the accessible facilities such as the seats have been blocked or occupied, and they can't be used normally (Figure 19); the number of types of sports equipment is small, and there is a lack of maintenance and management, resulting in the use of disabled facilities. Some accessible facilities, such as seats, are blocked or occupied, and cannot be used properly (Figure 19); the sports equipment is small in number and lacks maintenance and management, which makes it inconvenient for disabled people to use.

Figure 18: Lack of accessible restrooms Self-photography

Figure 19: Occupancy of rest areas Self-photography

Barrier-free facilities are not in harmony with the historic district. Although the existing barrier-free facilities in the district meet the basic use requirements of people with disabilities, the color, scale and other details of their design do not fully take into account the historical and cultural characteristics of the district, which adversely affects the harmony and unity of the district's landscape (Figure 20).

Figure 20: New handrail destroys neighborhood appearance Self-photography

Lack of supporting barrier-free intelligent equipment. There is a lack of barrier-free intelligent navigation systems and information service platforms in the historic districts, making it difficult for people with mobility impairments to travel and participate in the daily life of the districts.

4. Research Summary

Field research has found that the Fayuan Temple Historic

District has a friendly neighborhood atmosphere on weekdays, and the barrier-free environment in its core area is relatively well built, however, due to the excessive flow of people and traffic in the district, it has caused certain obstacles to the travel of people with travel disabilities, which has led to their general negative resistance to barrier-free travel. Therefore, in the study of barrier-free travel, on the basis of research and analysis of the current situation of the barrier-free environment, it is also necessary to comprehensively consider the practical needs of the elderly, people with travel disabilities, and other groups, and further enhance the practicality and comfort of the barrier-free environment, so as to improve their willingness to travel, and the following suggestions are put forward.

4.1 Enhancement of Accessibility Planning and Design in Historic Districts

In view of the complexity of the construction of barrier-free environment in historic districts, we should reasonably plan the daily travel routes of people with travel disabilities in historic districts and the routes for tourists to play, so as to avoid excessive flow of people and traffic, which will cause obstacles to the travel of people with travel disabilities, and to eliminate people's negative resistance to barrier-free travel. At the same time, we need to meet the needs of different groups of barrier-free facilities, and establish a sound regular maintenance and management mechanism.

4.2 Improvement of Accessibility in Historic Districts

Repairing uneven roads in the neighborhoods and widening narrow roads. At the same time, obvious barrier-free signs are installed at key locations such as entrances and exits of historic districts, main roads and public restrooms, making it easy for groups such as the elderly and people with travel disabilities to identify and use them. In addition, barrier-free ramps, handrails and other auxiliary facilities are added to ensure smooth passage for people with travel disabilities. Barriers such as steps and thresholds in the neighborhoods are modified to reduce their height or adopt a sloping design to accommodate the needs of different groups of people. Finally, barrier-free seats, tables and other facilities are installed in public rest areas to provide comfortable and convenient rest spaces for special groups.

4.3 Regular Visits to Survey the Status of the Barrier-free Environment, the Use of the Environment by People in Need and Their Psychological State

In order to enhance the travel comfort and satisfaction of people with accessibility needs in historic districts, and thus increase their willingness to travel, it is necessary to start from the psychological characteristics of people in groups with travel barriers. Regular household surveys should be conducted to gain a better understanding of the accessibility needs of the elderly, the disabled and other groups, in order to provide better guidance for barrier-free environment renovation work. At the same time, the creation of jobs specifically for people with mobility impairments will not only provide them with employment opportunities, but also enhance their sense of integration and belonging to their neighborhoods.

4.4 Utilize Technology to Establish a Smart Accessibility Cloud Platform

Against the backdrop of the booming development of information, digitization and intelligent urban construction, historic districts should actively advocate the building of an integrated smart accessibility cloud platform, and develop application modules based on this platform for travel services, living services, public services environmental governance, etc., so as to build a panoramic smart accessibility system. For example, the intelligent guide system can professionally collect accessibility information, integrate indoor and outdoor accessibility elements, and draw a digital map of accessibility, so as to provide more convenient and efficient services for the travel of people with travel disabilities.

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