Research on Urban Sharing Linear Space Design Based on Walking Experience

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Abstract

As urbanization accelerates, addressing the basic walking experience needs of citizens in urban spaces becomes increasingly crucial in urban planning and design. This study focuses on the walking experience during the design of urban spaces, with special attention to the sharing design in linear spaces. The paper focuses on the urban mobility space in Shanghai, China, and employs field research, morphological typology, and ethnographic research to study spatial typologies, and categorises it into five spatial forms and three functional types. The study then proposes five elements and corresponding design strategies for the sharing design of urban linear spaces from the perspective of walking experience, including path networks, spatial interfaces, landscape nodes, sharing spaces and social feedback management. The study hopes to optimise the design of urban linear spaces to make walkable urban spaces, enhancing the walking experience shared by all and promoting the sustainable development of the urban environment.

Keywords: Urban Mobility Space, Linear Space, Walking Experience, Sharing Design, Walkablity

1. Introduction

1.1 Background And Motivation For The Study

1.1.1 Informatisation Development Drives New Demands For Urban Walking Experience

In the context of the information age, urban life and the way of using space are undergoing profound changes. The global connectivity of the Internet, the instantaneous communication of electronic media, the in-depth insights of big data and the accurate predictions of artificial intelligence are technological innovations that have not only changed people's lifestyles, but also redefined the way urban space is used and its social functions. In this process of transformation, people's concept of space use is gradually shifting from the traditional mode of private and exclusive use to a new form of mutual use and sharing.

This shift has further increased the demand for people to experience urban space, driving the sharing development of urban walking. Walking is both a mode of transport and a vehicle for physical activity and social interaction, a fundamental form of behaviour (Garau, Annunziata and Yamu, 2024) . The development of information technology has brought new opportunities for people's walking experience in cities. By using modern information technology such as big data and the Internet of Things, real-time monitoring and data analysis of the walking environment in urban space can be achieved, providing walkers with a more convenient and comfortable walking experience. Functions such as route planning by intelligent navigation systems and information updating by real-time environmental monitoring systems, for example, have optimised people's walking experience in urban spaces and promoted the development of urban linear spaces.

Driven by the wave of information technology, the walking experience in urban spaces is no longer limited to the simple process of walking, but needs to incorporate more sharing elements to meet the growing and diversified needs of people. Cities need to provide sharing public spaces and facilities to

facilitate communication and interaction between different groups, as well as policy support for co-management to maintain the sustainability of sharing spaces. With the dissemination of information and the sharing of resources, not only can people's walking experience in cities become more free and inclusive, but they can also improve the effectiveness and utilisation of space and enrich the urban environment.

1.1.2 The Existence And Development Of Urban Linear Space From Ancient Times To The Present Day

Linear space has its roots in the development of cities since ancient times. The existence of linear space in ancient cities is mainly reflected in buildings and structures such as palaces and city walls. For example, the Palace of Versailles in France and the Forbidden City in China both adopt a rigorous sequential linear layout, presenting a strict order and hierarchy, reflecting the authority of the ruler and the stability of the society, and forming a clear spatial order and visual orientation. This linear spatial layout is based more on the ruler's power and the need for social hierarchy than on the individual's need to move.

However, with the rise of the modernist movement, the concept of the layout of architectural space produced a radical transformation. After modernism, more attention was paid to individual mobility and spatial variability, emphasising the openness and inclusiveness of space. For example, in Corbusier's plan for the city of Algiers, buildings in the city unfolded along with major traffic routes, and the centre of the capital relied on ground transportation such as the automobile to keep expanding, creating the idea of the new modernist city.

And in today's information age, the concept of the sharing economy has reshaped people's understanding and use of space, and people's demand for the walking experience has given new life to linear space in cities. Cities should respect people and urban spaces should serve people (Li, 2020), which is no longer just a symbol of power or a bearer of planning concepts, but is transformed into a dynamic vein connecting people to people, activities to activities, and a new spatial strategy to support diversified uses and social interactions. In this way, linear sharing space has become an indispensable and important element of modern urban space, and its potential to improve the efficiency of space use and promote social interaction is gradually being developed and recognised.

1.1.3 Urbanisation Drives New Uses Of Linear Space

Urbanisation is an important symbol of the development of modern society, which brings about population concentration, industrial concentration and infrastructure improvement. However, as the scale of cities continues to expand, problems such as traffic congestion and environmental pollution are becoming more and more prominent. In this context, how to effectively utilise the limited space in the city, improve the efficiency of its use, improve the quality of life of the people and promote social interaction has become an issue to be considered. At the same time, human scale has not been given the appropriate attention in modernist design, especially in public spaces such as gatherings and pedestrian events (Gehl, 2011) . These issues have fuelled a rethinking of the question of how to make better use of urban public space.

Linear space is the very backbone of urban public space, and public transport and pedestrians are important components of linear urban space. In urban planning, the two important concepts of mobility and walkability of urban space revolve around the notion of providing healthy communities, reducing car dependency and raising awareness of people's health (Ar Romel, 2019) . Urban mobility and walkability are important for the overall image of the city and the quality of life of its citizens. Excellent urban space is not only able to provide citizens with a comfortable and convenient walking environment, but also able to show visitors the characteristics and charms of the city, which is of great research significance.

As the demand for urban renewal increases, linear sharing space can not only regenerate old neighbourhoods and revitalise abandoned sites, but also maintain the continuity of urban culture and local characteristics. At the same time, as an important channel connecting different areas of the city, the organisation of traffic and pedestrian flow in linear space has a significant impact on the operational efficiency and development status of the city. Research on urban linear space not only needs to explore how to optimise the traffic and flow organisation of the space and increase the diversity of functions within the limited space, but also discuss how to promote green travel and ecological diversity to enhance the quality of urban life and ecology. Linear space in the city is no longer a carrier of a single function, but has become a new spatial pattern that is multidimensional, dynamic and able to adapt to the needs of future urbanisation.

1.2 Purpose And Significance Of The Study

Walkability has increasingly been recognised as an important factor for sustainable urban development (Zhang et al., 2019) . This study hopes to analyse the key factors affecting the walking experience by investigating the current situation and problems of walking experience in urban linear space. Through investigating the current situation and problems of walking experience in urban linear space, this study hopes to analyse the key factors affecting walking experience, further explore the spatial elements of urban linear space, and propose design methods that can promote the optimisation and enhancement of urban space, as well as possible future urban travel modes. It will provide theoretical support and practical guidance for urban planning and design, and provide scientific basis and technical support for improving the walking experience in urban linear space.

2 Methodology

2.1 Choose Urban Linear Space In Shanghai As The Research Object

2.1.1 Urbanisation And Spatial Development Characteristics Of Shanghai Municipality

Shanghai is one of the most representative metropolises in China, and its urbanisation process and spatial development have typical characteristics. Since the reform and opening up, Shanghai has experienced a rapid urbanisation process, with an expanding city scale, growing population and increasingly perfect urban functions, which is of great research value and significance in the context of contemporary urbanisation development.

[1] As one of China's national centre cities, Shanghai connects internationally and serves the whole country (Wu et al., 2013) , and is one of the largest metropolitan areas in the world. Since becoming an open commercial port in 1843, Shanghai has grown rapidly to become the largest city in the Far East. The spatial structure of Shanghai includes various types of historical and cultural districts, modern business districts, industrial parks, and dense residential areas, etc. The evolution and interaction of these spaces show the diversity and complexity of the city. At the same time, the urban spatial development of Shanghai is deeply influenced by the two main river axes, the Huangpu River and the Suzhou River, which form a unique ribbon urban form and have a profound impact on urban mobility.

Urbanisation in Shanghai has shifted from monocentric agglomerative development to polycentric and multicore. However, the population distribution and economic activities still maintain a clear monocentric pattern (Zhou and Chen, 2015). The significant agglomeration effect of the central city has led to high density pedestrian activities in the central city. Shanghai has implemented a series of advanced explorations in urban planning and design of the central city, such as "Low Traffic Neighborhoods" and "15-minute Community Living Circles", which provide important practices for sustainable urban development. The city's sustainable development has been recognised as an important practice.

Therefore, this study chooses Shanghai as a typical research object, through in-depth study of its urbanisation process and spatial development characteristics, it can deepen the understanding of China's urbanisation process, explore the impact of urban spatial structure on walking activities, and draw on its practical experience to provide reference for optimising urban spatial layout.

2.1.2 Shanghai Urban Space Design Practices

With the concept of "people's city for the people[1] " deeply rooted in people's minds, Shanghai, an international metropolis, is actively responding to the new urbanisation strategy of the new era, and has put the idea of "people-oriented" into all aspects of urban planning and construction. Especially in the design of urban space, not only focusing on the physical form of the space, but also attaching more importance to the actual impact of space on the lives of citizens, it puts forward the development vision of "buildings can be read, neighbourhoods are suitable for strolling, and the city always has a temperature[2] ", aiming to create a modern city that is suitable for living, working and travelling. On this basis, Shanghai has developed a series of advanced practices in urban space design.

·Creating pedestrian-friendly cities: By adopting a development strategy that prioritises public transport and is friendly to slow-moving traffic, actively building infrastructure such as walking paths and cycling lanes, and optimising the walking environment, such as installing additional resting seats and lighting, the accessibility and comfort of walking in the city has been greatly improved.

[1] During a visit to Shanghai in November 2019, Chinese President Xi Jinping said, "Cities are the people's cities, and the people's cities are for the people."
[2] In May 2017, the report of the 11th Party Congress of Shanghai put forward the need to focus on creating a city of innovation, humanism and ecology, in which it was specifically proposed that "buildings can be read, neighbourhoods are pleasant to walk, and the city always has a temperature".

·Continuity design of urban space: By organically connecting various areas of the city and forming a continuity of urban space, it breaks down the compartmentalisation and restrictions of traditional urban space. On both sides of the Huangpu River and along the Suzhou Creek, Shanghai has built a large number of green spaces, parks and other open spaces, integrating the urban landscape and public space, and providing citizens with more places for leisure, entertainment and interaction.

·Coordinated development of urban transport: Through the establishment of a diversified transport network, basically full coverage of rail stations has been achieved (Shanghai Municipal Bureau of Planning and Natural Resources, 2018), providing citizens with convenient ways of travelling. At the same time, measures to reduce the use of private cars and encourage low-carbon travel through traffic and number restrictions have effectively improved the urban traffic situation and promoted the flow and vitality of urban space.

Through in-depth study of walking experience and urban linear space in Shanghai, it can provide useful reference for the design of walking space and urban planning in other cities.

2.2 Research Methodology

This research proposes to study urban linear sharing spaces and walking experiences using four methods: documentary research, fieldwork, morphological typology, and ethnographic research. These interdisciplinary research methods complement each other and can provide multi-dimensional perspectives and in-depth analyses for the study.

2.2.1 Fieldwork And Literature Research Of Related Cases

As the skeleton of urban public space, urban linear space has always been in the position of being valued in urban construction, and there have been more successful practice cases, which can be used as the case base for related research. This study will collate the relevant literature of Shanghai's excellent urban linear space cases to clarify the development of urban linear space. At the same time, based on the information obtained from the field survey and cross-referenced with the literature, we can analyse the design techniques and strategies in more detail.

2.2.2 Analysing Linear Spatial Types By Morpho-Typological Methods

Morphological typology derives from the concept of biological taxonomy (Zhu, 1992), which refers to the formation of categories according to the common nature and characteristics of things. Architectural typology is an important branch of morphological typology, represented by scholars such as Rossi, which emphasises the concern for urban space and attempts to solve the urban problems brought about by modernism through the study of types.

Architectural typology can be distinguished into two concepts: functional types, which are categorised on the basis of different functions, and formal types, which are categorised on the basis of formal characteristics and involve the study of composition, transformation and grouping forms. Through the

study of building typology, it is possible to gain a deeper understanding of the structure and evolution of urban space, as well as the impact of different types of space on the pedestrian experience.

2.2.3 Ethnographic Research To Study The Experience Of Walking In Linear Spaces

Ethnographic research originated from cultural anthropology, through in-depth field research, observation and interviews with specific groups in order to understand their behavioural patterns, perceptions and experiences. In the Internet era, "cyber ethnographic research" has become an online mode of ethnographic research, which can also be used as an important method to know and understand social and cultural phenomena (Lai, 2020).

When studying urban space, ethnographic research methods interact with pedestrians through field observations, in-depth interviews, questionnaire surveys, etc., to dig deeper into the behavioural motives of walkers, their behavioural patterns, and their perceptions and experiences in urban space, helping to understand how walkers interact with urban space, and how environmental features affect walkers' behaviour and perceptions.

3 Discussion And Results

3.1 Typologies Of Urban Mobility Spaces In Shanghai

Generally speaking, urban space can be analysed by type in terms of both spatial form and internal function. According to the morphological characteristics of the space, the flow space in the city can be classified into four types, horizontally into point, linear and network types, and vertically into a type of flow space. This study focuses on the morphological features and functional characteristics of linear spaces, as well as the role that sharing spaces play for the experience and feelings of people walking in them.

3.1.1 Classification Of Space Types

·Pointed mobility spaces: Transport hubs or transport nodes in cities, such as airports, railway stations, metro stations, bus stops, etc., are point mobility spaces. These spaces have a concentrated traffic flow and a high degree of crowd congregation, so they need to be designed and planned with efficient, safe and comfortable transport facilities and services. There are two types of points: single-point, which is a relatively single and concentrated transport hub, and scattered-point, which is distributed in different parts of the city or in localised areas.

·Linear mobility space: roads, streets, motorways and other traffic corridors in the city undertake the transport functions of vehicles, pedestrians and bicycles, etc. This urban space form is linear and needs to consider problems such as congestion and safety, as well as the living needs of the surrounding residents. According to the distribution of traffic space on both sides of the linear space, the linear flow space can be divided into three types: single-line type, fishbone type and semi-fishbone type.

The single-line type is a main passage space that cannot be penetrated through both sides. Commonly found in the interior of linear buildings, such as the Swatch headquarters building, there is only a single entrance and exit, and there is no other way to pass through both sides of the building. Fishbone refers to a traffic axis consisting of a main arterial road and side roads perpendicular to it on both sides, similar to the structure of a fishbone. This spatial type is common in cities and consists of the main urban arterial road and the roads on both sides. Semi-fishbone is a variant of fishbone, where one side of the main traffic space is impassable and the other side is distributed with branch roads. Commonly found in riverfront and riverside public spaces, the side that backs up to the waterfront extends towards the interior of the city, creating a space guided perpendicular to the waterfront.

·Networked mobility space: The transport network in the city is a networked mobility space, which connects point and line mobility spaces and provides diversified travelling paths and choices for people. Its design and planning need to consider the distribution of traffic flow, intersection design, pedestrian safety and other factors to ensure the smooth operation of the transport system and the interconnection of urban space. Among them, there is the trunk type which takes the main road as the centre and radially extends the branch roads to form a network-like layout form. When there is no clear main road in a certain area, but a traffic network composed of many interconnected roads, it is a network flow space without trunk.

·Vertical mobility space: This mainly refers to three-dimensional transport systems in cities, such as underground subways, viaducts and pedestrian footbridges, which are often used as supplements to the urban transport system and can make effective use of air and underground space, alleviate the pressure of ground-level traffic, and improve the efficiency of traffic and the utilisation of urban space. Such design and planning need to take into account factors such as land use, environmental protection and traffic safety to ensure their coordinated and integrated development with the surrounding environment.

3.1.2 Classification Of Functional Types

Urban mobility space is an area in the city for people's mobility, transport and activities, and the classification of its functions is crucial to urban planning, design and management. According to the main functions of urban mobility spaces, they are classified into the following three categories: streets and pavements, waterfront corridors, and greenways and parks.

·Streets and pavements: Streets, the most basic public goods in the city, are the most closely related public activity places for urban residents (Shanghai Urban Planning and Land Resources Administration, Shanghai Municipal Transportation Commission, Shanghai Urban Planning Design Research Institute, 2016). Streets, as the main traffic corridors in the city, carry the dual functions of pedestrian and vehicular traffic. Some streets will adopt a time-sharing approach, closing the entrances and exits to vehicular traffic on weekends or holidays, so as to allow the public to hold pedestrian activities such as street fairs. Pavements, as an integral part of the street, primarily serve pedestrians by providing a safe and comfortable walking environment. Sidewalks often share areas with storefronts on both sides of the street, providing both usable space for pedestrians and foot traffic for shops. Commercial neighbourhoods and bazaars in cities are also a type of space where people walk to experience urban public space.

· Waterfront corridors: Linear open spaces built along rivers, lakes, oceans and other waters in cities are waterfront corridors. They are close to the water and have unique natural landscape and ecological environment. Not only do they provide an excellent view of the water, but they are also a good place for public leisure, recreation and exercise. Waterfront corridors often host cultural exchange activities to promote the sharing of the waterfront by all people. The design of waterfront corridors usually focuses on coordination with the surrounding environment, emphasising ecology and sustainability; at the same time, water-friendly nodes will be considered in localised areas to provide pedestrians with an interactive experience with the water.

·Blueways and parks: Blueways are linear pathways connecting urban green spaces, parks and other open spaces, and are mainly composed of walking paths, cycling paths and so on. The park space in the city is also an important place for citizens to relax, have fun and socialise, equipped with a variety of facilities to provide walkers with a comfortable and safe walking experience. Together, blueways and parks form the city's green network and carry the city's historical and cultural memories, providing citizens with opportunities to get close to nature and enjoy outdoor life.

3.2 Current Situation And Analysis Of Walking Experience In Urban Linear Spaces In Shanghai

Through the ethnographic research method mentioned in section 2.2 and the research method of landscape anthropology, the authors visited a number of linear flow spaces in the centre of Shanghai and investigated pedestrians' experience of walking in linear flow spaces in Shanghai by means of a questionnaire. The questionnaires were used to understand people's ratings of how they felt about walking in Shanghai, as well as the strengths and weaknesses of the urban spaces they experienced while walking, and their suggestions.

Comprehensive survey results show that the majority of respondents have a high opinion of the walking experience in Shanghai, especially with regard to the spaciousness of the walking paths and the greenery. The survey results show that the majority of respondents walk for 1-5 hours per week, and that the urban linear spaces where they often walk are mainly the streets around the neighbourhoods where they live, as well as the neighbourhood parks and small-scale green spaces. Respondents rated the safety, convenience and ambience of walking in Shanghai highly, with an average score of 7.9/10. Key strengths of walkable urban spaces in Shanghai include spacious and level walking paths, abundant green vegetation, and safe neighbourhoods; however, there are also weaknesses, including crowded walking paths in some areas, and a lack of shade and shelter at times. The survey found that 76 per cent of people thought that urban walking facilities were adequate, while a small number of people suggested that urban planning and design departments should strengthen the maintenance and management of walking paths, increase the area covered by greenery, and arrange more safety measures to enhance the quality of the walking experience. These findings provide useful references for urban planning and design.

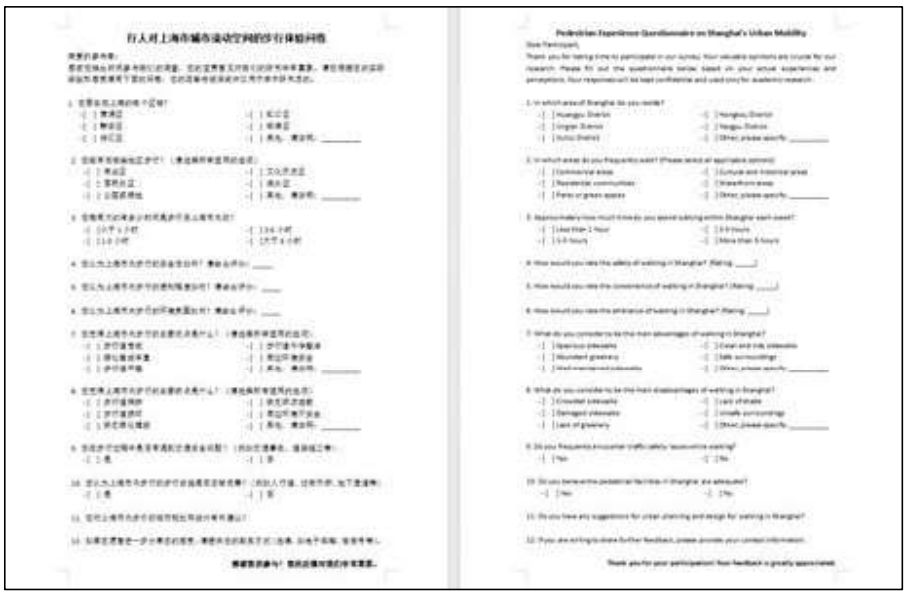

Figure 1. Questionnaire on Pedestrian Walking Experience, photo credit: Mengying Tang

3.3 Design Elements And Methods For Urban Sharing Linear Spaces

As an important part of urban planning and design, urban linear space not only carries the operation and expansion of urban functions, but also is an indispensable part of people's daily life. The acceleration of urbanisation and the change of people's lifestyles in the context of information technology have put forward higher requirements for the design of urban linear space. Referring to Kevin Lynch's five images of urban space classification (Lynch, 2002), the elements of urban linear space sharing design are divided into four elements: path network, spatial interface, landscape node, and sharing space, and also focus on social feedback and management mechanism, and design urban linear space from both physical space and spiritual space.

3.3.1 Establishment Of Path Network Connectivity

In the design of urban linear space, the connectivity of the path network is the most basic and core, which directly affects the accessibility and experience of the walkers. In the design, it is necessary to focus on the continuity and convenience of the paths, and at the same time consider the safety and comfort of the walkers.

Paths in linear space first need to ensure their accessibility, rationally plan the path network, reduce unnecessary detours and congestion, and ensure that walkers can reach their destinations efficiently and quickly. Traffic nodes, such as intersections, roundabouts, and stagecoaches, should also be reasonably set up to ensure smooth connections between paths.

When establishing a path network, multi-level path planning and node settings are required to meet the needs of different groups. For example, the Nanjing Road Pedestrian Street in Shanghai has multiple paths along both sides of the main pedestrian road, which enhances the circulation of the whole area; at the same time, the Golden Line[3] is taken as the core of the design, and multiple traffic nodes are set up to limit the dynamic and static activity areas (Zheng, Qi and Wang, 2000), which are closely connected with the surrounding commercial and cultural facilities, realising the integration of historical features and modern functions. It is also closely connected with the surrounding commercial and cultural facilities, realising the integration of historical features and modern functions.

3.3.2 Ambiguity And Transparency Of Spatial Interfaces

The spatial interface of urban linear space should be ambiguous and transparent, taking into account the openness and interactivity of the space by softening the boundaries and integrating the functions, so as to enhance the visual perception and emotional experience of the walkers, and effectively improve the quality and attractiveness of the space.

The technique of interface blurring increases the inclusiveness and openness of the space by creating a private but not closed space that interpenetrates the internal and external space. For example, Changli Garden reconstructs the community wall so that it is replaced by a fuzzy space with garden interest, expands the street space, loads the walking path, and creates a place-based linear garden (Tong and Ren, 2020).

The street interface on both sides of the pedestrian area should appropriately adopt transparent interface design to increase the sense of openness and attractiveness of the space. For example, the design of shops on the pedestrian street of Huaihai Zhong Road mostly adopts open facades and glass curtain walls, so that pedestrians can clearly see the interior of the shops and at the same time feel the vitality and prosperity of the street outside.

3.3.3 Increase Continuous Landscape Nodes for Guidance

Landscape nodes play an important guiding role in urban linear space, attracting pedestrians' attention and enriching the walking experience. Reasonable installation of landscape nodes, such as sculptures, fountains, gardens, etc., so as to form a coherent whole, can increase the walking pleasure. For example, the Sculpture Park in Jing'an District, Shanghai, has become one of the favourite parks for young people in Shanghai by taking sculpture display as its theme and interpenetrating greenery with sculpture vignettes[4] .

Through landscape design techniques, such as plant configuration, terrain changes, and repetitive elements, it is possible to link landscape nodes so that pedestrians are feeling the flow and change of space. The Xuhui Runway Park in Shanghai continues the cultural elements of the original site,

[3] Design proposal by Chartres Architects Associates La Défense Development, France
[4] https://www.jingan.gov.cn/rmtzx/003001/20221012/741c4a9b-dce0-4f09-8db8-f88ef9b7bb66.html

Longhua Airport, and guides pedestrians to fully experience the 1,830-metre-long linear park through subtle design details such as the undulation of the ground and the continuous water system[5] .

3.3.4 Creation And Design Of Sharing Spaces

The 2016 UN Habitat III Conference proposed a vision of cities for all, arguing that future cities should seek to promote inclusiveness and ensure equal access to and enjoyment of the city by all residents[6] . It can be seen that sharing space is an important part of the linear space in contemporary cities, which can promote communication and interaction between cities and citizens, and achieve a balanced use of social resources.

At the intersection of urban public street space and private space such as merchants and residential areas, part of the private space can be opened up to the outside, gaining vitality and richness while yielding space. For example, Xintiandi merchants mostly use open-air café seating, or borrow plazas, or set back their storefronts, attracting a large number of citizens and tourists to experience the neighbourhood, which is full of life.

Various activities at different times, such as cultural exhibitions, performances, bazaars, etc., can be set up in the urban linear space to attract the participation of different groups and enrich the vitality of the space at all times. For example, the Daxue Road in Shanghai organises various cultural activities and bazaars from time to time during weekends and festivals, attracting a large number of people to participate in the experience and share the street at different times.

3.3.5 Social Feedback Mechanisms And Management Policies

As urban linear spaces need to be fully engaged and experienced, it is crucial to establish effective social interaction and feedback mechanisms. By collecting and analysing feedback from walkers, we can continuously optimise design solutions, manage the way space is used and improve the quality of the walking experience.

In areas where crowd activities are more concentrated and the number of residents in the surrounding community is large, the whole process of designing a linear space requires timely information feedback. Facilities such as bulletin boards and information boards can be set up, or a platform for communication and feedback can be provided through community meetings and questionnaire surveys, etc. At the same time, a sound management mechanism needs to be set up, including personnel management and maintenance of facilities in order to safeguard the normal operation and order of the urban space. In the design of Parkview Park, the surrounding residents will participate in the process of design and implementation, guided by professional designers who will design, update and maintain the settlement space. This will not only gain residents' recognition, but also motivate them to take the initiative to maintain and self-manage the public space (Liu and Liang, 2022).

[5] https://www.sasaki.com/projects/xuhui-runway-park/

[6] The third United Nations Conference on Housing and Sustainable Urban Development, Habitat III, held in Quito, Ecuador, from 17-20 October 2016.

Table 1. Five design elements and methods for urban sharing linear spaces, photos credit: Mengying Tang

Building pathway network connectivity		
	Nanjing East Road Pedestrian Street	
Ambiguity and Transparency in Spatial Interfaces		
	Chang Li Garden	Middle Huaihai Road
Landscape node continuity guidance		
	Jing'an Sculpture Park	Xuhui Runway Park

Creation and design of sharing spaces		
	Shanghai Xintiandi	Daxue Road
Social Feedback Mechanisms And Management Policies		
	Shanghai Millennium Park	

3.4 Challenges And Prospects For The Design Of Urban Linear Sharing Spaces

3.4.1 Facing Challenges

Although Shanghai has achieved a number of success stories in the design of urban linear spaces, there are still some problems and challenges. These include the disconnection of some spaces with poor accessibility; the lack of integration of the surrounding environment; and the lack of safety facilities.

The problem of spatial disconnection sometimes arises due to historical reasons or poor planning. For example, the Suhe Half Horse Park in Putuo District has a riverfront walkway truncated by the Zhenguang Road cut-through, resulting in walkers needing to take a diversion around the footbridge to reach the other side of the road. This situation reduces spatial accessibility and requires the planning of new walkways or footbridges to improve the situation. Certain areas also suffer from environmental incongruity. For example, Shaanxi North Road, as a historical and cultural neighbourhood, the architectural style and commercial environment of some of the shops do not match the overall ambience of the street, which can cause some nuisance and discomfort to walkers. Effective urban design is needed to improve environmental integrity and enhance the walking experience. The lack of safety facilities should not be ignored. In the Suzhou River section of the East China University of

Political Science and Law, part of the section is still under construction, with insufficient lighting at night and broken roads, which increases the safety risk for walkers. The construction and management of safety facilities need to be strengthened to enhance the safety of the walking area.

Taken together, solving these problems requires the joint efforts of the government, planning designers and citizens to continuously improve the quality and experience of urban linear space in Shanghai through rational planning and scientific design.

3.4.2 Future Prospects

With the development of information technology, the construction of urban mobility space will gradually shift: from a focus on motor vehicle traffic to a comprehensive focus on human communication and lifestyles; from the control of road red lines to the control of street space; and from an emphasis on transport functions to the promotion of urban neighbourhood development. Based on this shift, the construction and renovation of streets will be mainly in the areas of integration and assistance.

Integration mainly lies in the integration of transport modes and road facilities. It is possible to articulate different modes of transport through the integration of travel modes, enhance sharing travel services, and increase cooperation with public transport agencies in order to complement the existing transport infrastructure, improve the overall travel choices of the public, and leave safer passageways for walking spaces. In terms of integration of facilities, intensive transformation of street space, intelligent transformation of existing facilities, unified transformation of service facilities such as bus stops, newspaper kiosks and telephone booths, and consolidation of fragmented street facilities such as nymphomaniacs, chairs, street signs and rubbish bins, to create an efficient and smooth traffic space.

Secondly, the goal of sharing mobility in the future also lies in travel assistance. Traffic signals, street lights, traffic monitoring systems and other regulatory systems using intelligent management transformation, such as improving the level of intelligent traffic signals, to provide time-sensitive public transport information release, by the sharing bicycle rental points to provide information on the surrounding rental points and reservation services. It should also enhance the information interaction of public service level, add intelligent monitoring that focuses on maintaining urban safety and focusing on the needs of the disadvantaged, strengthen the environmental management that detects the street environment and reduces energy consumption, and establish a safe and smooth mobility space (Shanghai Urban Planning and Land Resources Administration, Shanghai Municipal Transportation Commission, Shanghai Urban Planning Design Research Institute, 2016) .

Overall, the future of sharing mobility is expected to be characterised by innovation, collaboration and sustainability in an effort to address the current challenges facing urban mobility spaces and to create a more ACCESSIBLE, WALKABLE and SUSTAINABLE transport system for citizens.

4. Summary

Walking is a major type of transport for people to experience urban space and one of the basic human activities. Walking experience in urban linear space requires both physical space and spiritual feeling levels. This study reveals the centrality of walking experience in the design of urban spaces, with particular attention to the sharing experience in linear spaces, and explores the design elements of linear sharing spaces and their impact on walking experience. The study analyses the effectiveness and shortcomings of urban linear space design in Shanghai, and proposes corresponding strategies and suggestions, with a view to providing insights into urban planning and design.

The study firstly elaborates that, driven by the development of information technology, people's demand for walking experience in urban space has increased both qualitatively and quantitatively. Linear space has been the most important component of urban space since ancient times, and as the main spatial form for people to experience walking in the city, it is an important spatial carrier for the study of walking experience. The process of urbanisation has promoted the development of urban linear space, and at the same time generated new possibilities to create a mobile spatial experience for citizens and the city simultaneously.

The study selects the urban linear space in Shanghai, China, as the research object, and on the basis of the field survey and literature research on international excellent urban linear space cases, analyses the types of linear space with morphological typology methods, and investigates people's walking experience and usage feelings in linear space with ethnographic research and landscape anthropology methods, so as to better understand the current situation of the walking experience in urban linear space and problems.

The study classifies the spatial types of urban linear space into four types: point, line, network and vertical, among which linear space is subdivided into three categories; meanwhile, according to the type of internal function of the space, urban linear space can be classified into three categories: street, greenway and waterfront public space. Analysing the characteristics of different space types helps to systematically organise and classify urban linear spaces, and then design and use them in a targeted way. Combined with the perception and experience of pedestrians of Shanghai's linear space in the research report, the study proposes five elements and corresponding design strategies for the sharing design of urban linear space, i.e., establishing path network connectivity, focusing on the transparency and richness of spatial interfaces, increasing the continuity of the landscape nodes to guide the process, paying attention to the establishment of and interaction with the sharing space, as well as strengthening the social feedback mechanism and management, in order to solve the problems and challenges in the design of urban linear space. The problems and challenges in the design of urban linear space are solved.

It can be seen from the study that Shanghai has achieved remarkable results in terms of walking experience in urban linear sharing spaces. However, the city still faces problems such as spatial disconnection and lack of accessibility, lack of environmental integration, and lack of safety facilities. To address these problems, this thesis proposes strategies and recommendations to further optimise the design of urban linear spaces and enhance the walking experience for all. These strategies and recommendations not only guide the urban planning and design of Shanghai, but also provide important insights into the spatial design and enhancement of the walking experience in other cities.

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