RESEARCH ARTICLE

Improving Urban Streetscape Design Guidelines by Incorporating Street Vendor Factors: A Review

Chen Wenyi[1*], Adam Aruldewan S.Muthuveeran[1,2], Annisa Ummihusna[1,3], Zhang Suyuan[1]

[1]Faculty of Design and Architecture, Universiti Putra Malaysia, Serdang Selangor
[2]Department of Landscape Architecture, Faculty of Design and Architecture, Universiti Putra Malaysia, Serdang Selangor
[3]Department of Architecture, Faculty of Design and Architecture. Universiti Putra Malaysia, Serdang Selangor

*Corresponding author: chenwenyi1994@gmail.com

Abstract

In the face of rapid urbanization, the influx of large numbers of rural migrants has reshaped urban dynamics, and the unexpected outbreak of the COVID-19 epidemic has further highlighted the importance of street vendors. They have brought vitality and diversity to urban streetscapes, but also problems of congestion and chaos. Therefore, this study aims to integrate street vendors into the design of urban streetscapes, analysis the social networks of street vendors to explore their behavioural patterns and more accurately reveal the interaction mechanism between vendors and streetscapes and propose strategies to optimize street design to enhance the working comfort and experience of vendors while reducing interference with street order. To balance the relationship between street vendor activities and the urban streetscape environment. On the basis of maintaining the positive impact of street vendors, the quality and function of urban streetscapes should be improved. The article suggests that future urban streetscape design should pay more attention to the social network relationship of street vendors and achieve harmonious coexistence between street vendors and urban streetscapes. The ultimate goal is to promote win-win development between street vendors and the wider urban community.

Keywords: *Urban streetscape, street vendors, social networks, streetscape design, street vendor management*

Citation:
Chen, W., Muthuveeran, A. A. S., Ummihusna, A., & Zhang, S. (2025). Improving urban streetscape design guidelines by incorporating street vendor factors: A review. Alam Cipta, 18(Special Issue 2), [Article 4]. https://doi.org/10.47836/AC.18.S2.PAPER04

Received:
04 June 2025

Accepted:
18 September 2025

Published:
November 2025

Introduction

According to the 2018 World Urbanization Prospects report released by the United Nations, 55% of the world's population currently lives in urban areas, and the global urbanization rate is expected to reach 68% by 2050. It is estimated that by 2050, the world will have an additional 2.5 billion urban residents, of which 90% will occur in Asia and Africa. Urbanization refers to the process of increasing the proportion of the population living in urban areas, mainly driven by natural population growth and large-scale rural-urban migration ((Montgomery et al., 2013; Menashe-Oren & Bocquier, 2021). At present, China's urbanization is mainly caused by a large influx of rural population into cities, which has brought about a population surge (Chang & Brada, 2006). The population surge will bring tremendous pressure to the existing infrastructure and public services in cities (Li et al., 2019). At the same time, rural migrants play a key role in driving economic growth and improving urban productivity. They also make important contributions to the urban labor market,

especially in the informal economy that is not regulated and protected (Gregory & Meng, 2018). For example, street vendors are a typical manifestation of the informal sector, providing goods and services at competitive prices, contributing to the economic development of the city and the vitality of the streets.

Street vendors are small vendors who set up temporary stalls in the streets or other public places to sell goods or provide services (Bromley, 2000). The main participants in the street vendor economy include exploited workers, rural migrants with low socioeconomic levels, ordinary workers, and some individual households (Jiang & Luan, 2021). Street vendors play an important role in the urban economy, providing multiple benefits to the socioeconomic system but also bringing complexity to urban management. Street vendors are also a coping mechanism for rural migration and economic downturns. After the severe financial crisis in Thailand in 1997, many unemployed workers chose to return to rural employment or find part-time jobs in the city, but many people also chose to stay in the city and become street vendors to obtain higher income and greater flexibility (Maneepong & Walsh, 2013). Especially during and after the COVID-19 epidemic, the Chinese government realized the importance of street vendors in the urban economy and strongly supported and encouraged the street vendor economy. For example, during the COVID-19 epidemic (2020-2022), the Chinese government relaxed its regulatory policies on street vendors, hoping to help people who lost their livelihoods and assist in the restoration of socioeconomic order (People's Daily, 2020). Affected by this, many unemployed people in China have flocked to the street vendor economy, especially individual vendors, who have high hopes for the street vendor economy, Individual vendors began to enter the street vendor economy, 'Street vending' instantly became a hot topic online (Cao et al., 2021). In June 2020, Guangzhou City issued the "Work Plan for Temporary Operation of Merchants in Some Areas during the Normalization of Street Prevention and Control of the Epidemic in Guangzhou" and began to relax the control of street vendors. After the epidemic (2023-now), China began to allow and legalize (encourage and support) the street vendor economy and fully lifted the ban on street vendor. Street vendors have gradually become legalized, such as Shenzhen issuing the "Regulations on Urban Appearance and Environmental Sanitation Management of Shenzhen Special Economic Zone." In Guangzhou, a large number of street vendors poured into the streets and squares. As shown in the picture: Figure 1 & 2.

Figure 1 & 2 : Taken by Author

The impact of street vendors was particularly significant during and after the COVID-19 epidemic, when they flooded the city streets, reshaping urban dynamics and highlighting the importance of the vendor economy. They not only reduce unemployment rates and improve the allocation of labour resources but also bring convenience to urban residents and vitality and diversity to cities (Jacobs, 1963; Bhowmik, 2012; Simone, 2021; Takabvirwa, 2024). However, Street vendors can easily affect the use of urban public spaces, urban hygiene and urban image, as well as product quality and health and safety issues. The most common impact of street vendors is spatial conflict. They occupy public spaces and traditional markets, causing many problems for residents, pedestrians, formal retailers and public institutions. They sometimes provoke social conflicts and even violence (Tonda & Kepe, 2016; Torky & Heath, 2021). Consequently, managing street vendors and retaining their social group without negatively impacting the urban streetscape and environment has become a crucial issue in urban management. Balance the activities of street vendors with the needs of the urban environment in urban management, in order to maintain their positive role while preserving the quality of the urban streetscape, has become an important issue in contemporary urban streetscape design and planning. Landscape architecture projects in Malaysia face numerous challenges that often hinder the achievement of project objectives due to project management and stakeholder factors. (Muthuveeran et al., 2022, 2024). Recognizing street vendors as active users of streetscapes, and integrating their needs early in design, is therefore essential to improve adaptability and long-term sustainability.

Against this backdrop, this study aims to integrate street vendors into urban streetscape design by exploring effective design strategies to achieve a balance between the vendors' activities and the urban streetscape environment, to enhance the vendors' experience of use, and ultimately to promote the harmonious coexistence of street vendors with the wider urban community.

Methodology

The literature review study adhered to the distinctive "Literature Review Synthesis Process" (Ibrahim & Mustafa, 2018). This is an independent typology of literature review, is a "journal-length article whose sole purpose is to review the literature in a field (Okoli & Schabram, 2010), aiming to systematically analysis and comprehend a set of selected relevant literature.

The article through databases such as Science Direct, SCOPUS and Google Scholar, combined with keywords related to the article's research themes: "The Importance of Street Vendors," "Urban Streetscape Design," "Social Networks of Street Vendors," and "Street Vendor Management Strategies," comprehensive literature articles were retrieved. The research methodology is divided into the following four steps.

Step 1: Determination of Research Questions

The design of the research questions adopts Ibrahim's Research Question Conception (RQC) classification technique (Ibrahim, 2011; Ibrahim, 2020), which divides the research questions into "who" (the elements affected by the research), "what" (the information or knowledge system required to solve the problem), and "how" (the expected impact of the research). In this study, "street vendors" is set as "what 1," "urban streetscape design strategies" is set as "what 2," and "social networks of street vendors" is set as "how." This study chooses to explore the "what" and "how" constructions and proposes the following research questions:

1. What is the importance of street vendors in urban streetscapes?
2. What are the current urban streetscape design strategies for street vendors?
3. How to use the social network of street vendors to analyze streetscape usage?

Step 2: Literature Search and Screening

Based on the research questions and objectives of this article, literature was searched in Science Direct, Scopus, and Google Scholar databases with these keywords: “street vendors,” “streetscape design,” “social network,” “vendor management strategy,” “urban design,” and “sustainable streetscape design,” and they were combined using the “AND” symbol. A total of 3,857 articles were obtained in the initial search. Subsequently, inclusion and exclusion criteria were set according to the research objectives:

1. All articles were published in peer-reviewed journals;
2. Studies on urban streetscape design that were not related to street vendors were excluded;
3. Studies that only addressed the law, rights, or economics of street vendors were excluded;
4. Studies on ‘urban design’ that were not directly related to urban streetscape design were excluded;
5. Only studies within the last five years (2020-2024) were included.

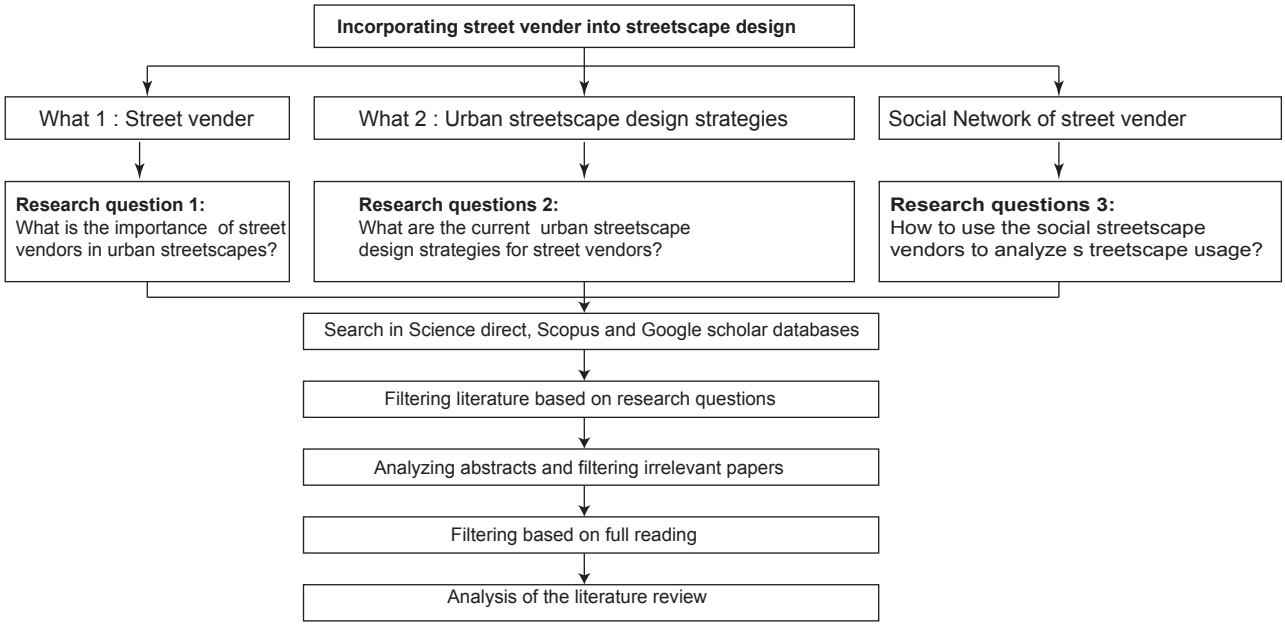
Finally, 77 eligible documents were selected for analysis.

Step 3: Literature Classification and Synthesis

The abstracts of the 77 selected articles were reviewed in detail, including their main research content and conclusions, their support for future research, and areas that need further exploration. This process aims to classify literature into the best sub-themes and generate a comprehensive summary for each theme.

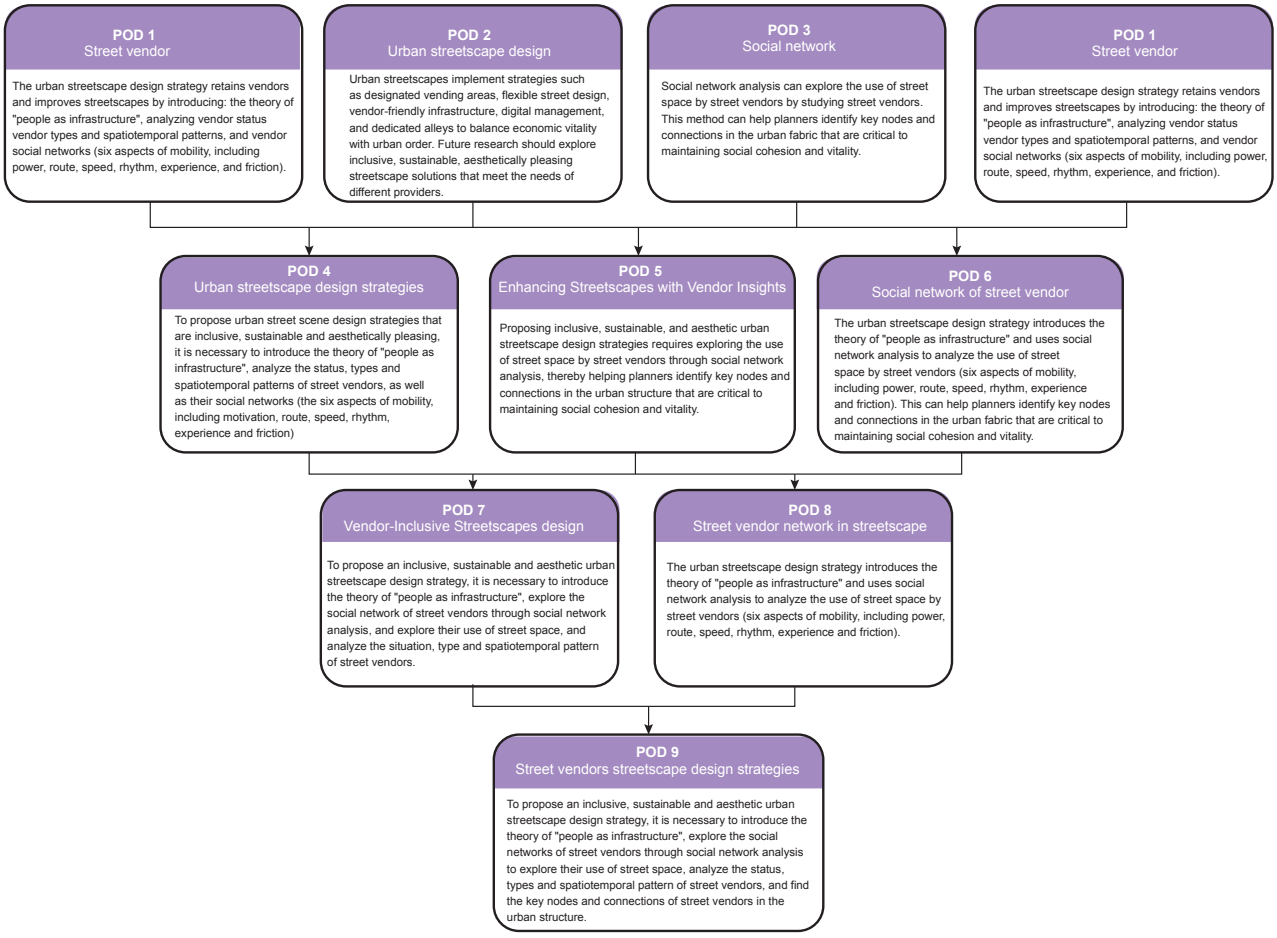
Step 4: Comprehensive Analysis and Solution Extraction

Through cross-analysis of the comprehensive abstracts, multiple possibilities are integrated, and potential solutions that can improve urban streetscape design and retain street vendor groups are prioritized. Finally, the key conclusions are presented in the form of a “POD (point of departure) tree diagram. Figure 3 shows the article’s flowchart of the literature review methodology.



Source(S): Figure 3 Created by Authors Adapted with Permission from Yuting Wu, Copyright (2023)

This study was cross-analysis using comprehensive abstracts, and POD 9 was the result, as shown in Figure 4 which is adapted from the framework model of Ibrahim and Mustafa Kamal (2018). The main conclusions are: By through incorporating street vendors into streetscape design, analyzing the social networks of street vendors to explore their behavioral patterns, revealing the interaction mechanism between vendors and streetscapes in order to proposing streetscape design strategies to enhance the working comfort and experience of vendors, while reducing interference with street order and improving the inclusiveness and sustainability of street space.



Source(S): Figure 3 Created by Authors Adapted with Permission from Yuting Wu, Copyright (2023)

Results and Discussion

What is the Importance of Street Vendors in Urban Streetscapes?

For street vendors, the urban streetscape is an important workspace in which they make a living (Basu & Nagendra, 2020). At the same time, street vendors also have a profound impact on the urban streetscape. The way they use the streets, including the use of space on building facades, working patterns, and the various objects they use (such as stalls, tents, umbrellas, and carts), together shape the unique form of the streetscape. Street vendors have the potential to be place-making tools for creating dynamic public areas (Salim et al., 2023). Their activities bring rich sensory experiences and physical atmospheres, such as sounds, smells, advertising signs, and differences in texture, color, and temperature. These sensory

dimensions not only change the characteristics of the street from a physical level but also have a profound impact on the psychology of its users, reflecting the complex interaction between the sensory elements of the streetscape and human psychology (Abusaada & Elshater, 2021).

As Kevin Lynch's theory of urban imagery in The Image of the City emphasizes, the perceptibility and legibility of the urban environment are its core characteristics. He points out that streets are pathways through which observers move habitually, accidentally, or potentially. For many people, streets are the most dominant element in the image of the city, and the specific uses and activities along the streets leave a deep impression on observers. Zaman and Ahmed (2023) studied the impact of street vendors on the social sustainability of public spaces in Khulna, Bangladesh, and found that street vendors played a key role in redefining the functions of these spaces. They not only created a sense of belonging but also ensured the safety of public spaces and attracted a diverse population while highlighting the wider socio-economic benefits of street vendors, including promoting community cohesion and enhancing street vitality.

Giraldo et al. (2020) and Rahman et al. (2020) explore street vending as transformative entrepreneurship, emphasizing its positive impact on individual and collective well-being. The research shows that street vending contributes to hedonic well-being, benefiting vendors, their families, and the wider community. This perspective underscores the need to recognize the entrepreneurial potential of street vendors and their significant contributions to urban life. Similarly, Deore and Lathia (2019) explored the role of street vendors through spatial analysis and perception research in Ahmedabad, India. They believe that street vendors have made great contributions to the vitality, safety, and inclusiveness of urban streets, making streets an important part of fair and vibrant public spaces. Jane Jacobs's theory of urban vitality in The Death and Life of Great American Cities also emphasized the importance of street diversity, compactness, and the concept of "eyes on the street." She believed that diverse urban functions and active streets are the key to urban safety and vitality.

Piazzoni and Jamme (2020) showed that the personalized use of public space by street vendors is crucial for increasing familiarity between different groups of people. The activities of street vendors facilitate encounters between strangers and help to enhance the public character of the street. Street vendors can even serve as a supplement to infrastructure, Simone (2004) proposed the concept of 'people as infrastructure,' emphasizing economic cooperation between residents who seem to be marginalized and impoverished by urban life. In 2021, Simone further refined the concept of 'people as infrastructure,' proposing that the interaction between body and material can produce new combinations of capabilities, giving collective life a dynamic infrastructural language. Silver (2014) also argues that 'human movement and circulation should be seen as a form of infrastructure itself.' Sun Ping et al. (2022) further point out that the core of the concept of 'body as infrastructure' is that infrastructure should not be seen as an 'external object' independent of people, but as an organic part of 'living labor.' For example, during the COVID-19 epidemic in Shanghai in March 2022, food delivery riders became an important "flesh infrastructure" that connected the city's operations in the face of the rapidly increasing number of orders and the need for isolation at home.

In addition, street vendor culture is also a form of living heritage. In December 2020, "Singapore Hawker Culture" was inscribed on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity (Lee, 2022). As such, street vendors play an important role in the urban streetscape. They not only enhance the diversity and vitality of the streets and promote community cohesion but also strengthen the city's identity and inclusiveness while providing services as a supplement to infrastructure.

By proposing appropriate streetscape planning and design strategies for street vendors, a win-win situation can be achieved for urban streetscapes and vendor groups, which will not only reduce the negative impacts of vendor activities on the streets but also help the streets to become more diversified, vibrant, and sustainable public spaces.

What are the Current Urban Streetscape Design Strategies for Street Vendors?

Street vendors have, to some extent, compensated for the shortcomings of the formal economy, relieved social pressure, reduced unemployment, provided convenience to city residents, and injected vibrancy into urban streetscapes (Zhang et al., 2021; Mahopo et al., 2022). However, the activities of street vendors can also have negative impacts on the use of urban public spaces, such as causing traffic congestion, obstructing pedestrian traffic, affecting the hygiene and image of the city, and the quality and health and safety risks of the goods sold (Rahman et al., 2020; Torky & Heath, 2021b). How to reduce the negative impact of street vendors on urban streetscapes while maintaining the social group of street vendors has always been a difficulty and a challenge in urban development and is also the core issue explored in this article.

Based on this, different cities around the world have proposed a variety of streetscape planning and design strategies, aiming to balance the relationship between the streetscape environment, urban order, economic vitality, and social inclusiveness. The main strategies are as follows:

Designated Vending Zones

By establishing special vendor markets, scattered street vendors are concentrated in specific areas, equipped with unified management and facility construction. By demarcating dedicated areas, the government ensures that hawkers operate in a hygienic and safe environment while reducing the impact on public space and traffic flow (Radomskaya & Bhati, 2022; Zhang & Shao, 2024). For example, Singapore's hawker centers are a model for designated vending area management, which provide unified infrastructure such as sanitation, water supply, and garbage disposal systems (Squarzon, 2020). Bangkok, Thailand, has set up specific night markets and hawker areas, especially in areas with dense tourist and residential areas. In this way, it attracts tourists while alleviating the problem of illegal occupation of public space (Kalnaovakul & Promsivapallop, 2021). Similarly, Delhi, India, has demarcated specific hawker areas in the city by enacting the Street Vendor Protection Act (Kaur, 2020). These areas are determined through consultation between the community and hawkers and are planned without affecting public transportation and residents' lives.

Flexible Street Design Strategies

Reserve flexible spaces in the streetscape design to allow vendors to operate during specific time periods, such as morning markets, night markets, Pop-Up Canopy Markets or festivals (Albright, 2020). For example, the Ratchada Train Night Market in Bangkok and the Lorong TAR Night Market in Kuala Lumpur provide temporary vendor areas on main streets at night or on weekends (Tan & Chan, 2021; Sun et al., 2019). London's Southbank Centre outdoor market uses a pop-up market model, and Beijing's Longfu Temple Morning Market is open from 4 am to 9 am and is a car lane at other times (Li et al., 2018). These temporary markets allow vendors to set up stalls during specified times and serve local residents and tourists. This strategy reduces the problem of long-term occupation of public space, relieves traffic pressure on the streets, and increases the flexibility of vendors' operations.

Vendor Friendly Street Design

Provide vendors with a long-term, fixed operating space by designing spacious sidewalks, stall separation areas, and awnings. For example, Ahmedabad, India, has reserved vendor-friendly areas in urban street planning based on the Street Vendor Protection Act to ensure the legitimacy of vendors and reduce conflicts Srivastava et al. (2012); Tsoriyo et al. (2021); Seliari et al. (2021)

Environmentally Friendly Vendor Tool Design

Designing vendor tools that are attractive, convenient, and eco-friendly can lift the visual quality of streets while improving vendors' operations and environmental performance. Some scholars advocate vendor tools that are aesthetically pleasing, easy to use, and environmentally responsible. For example, Bogota's Eco-Vendor Program has improved the environmental impact of the street economy by promoting environmentally friendly vendor carts and garbage sorting systems (Sanjaya et al., 2024). Complementing this, Damanik et al. (2022) proposes a lightweight, safe, and visually coherent tent-frame system that improves set-up efficiency and public safety. Product-level innovations broaden the toolkit: Pimthong et al. (2024) outline a redesigned ice-cream truck to enhance service and street compatibility, while Mahadevan et al. (2025) introduce a renewable-energy smart umbrella that integrates power generation and shade to support street vending. Together, these approaches point to a practical design agenda that simultaneously upgrades street aesthetics, vendor convenience, and environmental sustainability.

Mobile and Digital Management Platforms

Optimize the management of vendors and consumer experience with the help of digital technologies, such as smart stall management, electronic payment and real-time monitoring (Majoni et al., 2020, May; Singh et al., 2022b). For example: Hangzhou, China, uses the smart night market management system to realize the allocation of stalls through online reservation, real-time monitoring of vendor operations, and support electronic payment and feedback mechanisms. Jijenge's mobile application in Kenya allows street vendors to register online and apply for sales licenses. The platform also provides street vendors with sales data and market analysis to help them optimize their business strategies. This digital management improves the efficiency of vendors and the government's supervision capabilities (S. Li, 2024). and Hong Kong's food hawker management uses an electronic supervision system to track the application and renewal of licenses (Rewal, P). The government conducts regular hygiene and safety inspections and uses digital platforms to record violations in order to manage hawker activities transparently and efficiently.

Dedicated vendor alleys

Plan dedicated vendor streets or alleys to avoid conflicts with main roads and shops. For example, 36 Hang Street in Hanoi, Vietnam, gathers traditional handicraft vendors and street vendors, who have long developed in the alleys and are now developing them into tourist attractions (Pham, 2024).

Discussion

These strategies aim to balance the economic contribution of street vendors with urban order and the efficiency of public space utilization. However, most of these strategies strengthen the management of vendor activities through time and space restrictions while limiting the number of vendors allowed to enter and introducing digital management methods. However, these strategies are not suitable for all vendors. Some street vendors are highly dependent on the specific conditions of their neighborhoods or streets, such as local cultural handicraft vendors who rely

on historical sites or tourism resources and vendors who provide instant services in traditional markets. They have long served specific communities and have formed stable social relationships with customers by building trust relationships. It is difficult for these types of street vendors to leave their streets and operate directly.

There is currently a lack of clear streetscape planning and design strategies for these specific types of vendors. Future research should explore more flexible, inclusive, and sustainable streetscape planning methods to meet the specific needs of these vendors in order to achieve a win-win situation for urban development and the street economy.

How to Use the Social Network of Street Vendors to Analyze Streetscape Usage?

A social network refers to a relatively stable relationship system formed through interaction between individual members of society, focusing on the interaction and connection between people. Social interaction affects people's social behavior (Marin & Wellman, 2014). Street vendors have formed stable social network relationships with other vendors and customers. Especially in the case of increasing marginalization, this network has become an important tool for street vendors to survive in their daily lives (Journals & Njaya, 2015). Similarly, Hilmi and Consultant (2020) pointed out that effective food marketing in the BOP (Bottom of the Pyramid) environment requires not only a deep understanding of the market but also attention to key elements such as social relationships. A full understanding of the market can establish effective networks, such as social relationships, word of mouth, and social media.

As mentioned in Section 3.2, street vendors who provide immediate services to specific communities and regions often build trust through long-term services and form stable social networks with customers. This social network in turn affects the behavior patterns of vendors. Studies have shown that older adults with close social networks use urban parks more frequently than those who are more isolated in their daily lives (Enssle & Kabisch, 2020). Similarly, street vendors with close social networks may use street spaces more frequently than pedestrians and tourists.

In recent years, social network analysis has been increasingly used in the study of urban space. For example, used social network analysis to study the spatial configuration of streets and its impact on pedestrian movement. Their study found that streets with higher connectivity and centrality scores tend to attract more people, which in turn promotes social interaction and economic activity (Louf et al., 2014; Grace-McCaskey et al., 2023). Researchers conducted a comprehensive social network analysis of street networks in European cities and found that streets with higher betweenness centrality are more likely to support active commercial and social activities, used social network analysis to assess the accessibility of public spaces to different social groups and proposed an inclusive streetscape design strategy with different population needs to improve social equity and quality of life in urban areas (Porta et al., 2006; Amen et al., 2023). Lee, C. and Lee (2022) combined social network analysis (SNA) with GIS to more accurately map the relationship between social interaction and spatial configuration. This technological synergy can help create data-driven streetscape designs that are responsive to the needs and behaviors of urban residents. According to Enssle and Kabisch (2020b), understanding the social networks of groups can be used to map social relationships and activities in urban spaces, revealing patterns that influence urban design and policy decisions. This approach helps urban planners or designers to identify key nodes and connections within the urban structure, which is essential for maintaining social cohesion and vitality.

In addition, Kong and Luo (2024) proposed a dynamic evolution model based on social networks to study the strategic interaction between three groups: managers, vendors, and citizens. This model shows that managers can adjust the intensity of supervision, vendors can choose business strategies, and citizens can choose supervision strategies. These three types of subjects interact in the network through free movement and learning, providing a dynamic perspective for the evolution of social networks.

Discussion

Although the above-mentioned studies mainly explore the relationship between social networks and urban streetscape planning from the macro level, there is still limited attention to micro-level streetscape elements (such as ground interfaces, building facades, enclosure interfaces, infrastructure, street greening, etc.). In fact, the street is the main working space for street vendors, who spend most of their day on the street. Research by Basu and Nagendra (2020b) found that street vendors are one of the groups most significantly affected by urban street greening (such as trees), but they are often excluded from urban street planning considerations.

Therefore, analyzing how street vendors' social networks are formed, how they interact through connections, how these social activities occur in the street space, and how they use the street space is one of the key issues in incorporating street vendors into streetscape design. Based on the behavioral habits of street vendors, optimizing street design to improve vendors' comfort and working experience while reducing obstacles to their activities can effectively alleviate street congestion and chaos. This vendor-centered streetscape planning method can not only support the livelihood of vendors but also provide new solutions for the sustainable development of urban public spaces.

Conclusion

As an important part of the urban streetscape, street vendors not only inject vitality into the urban economy, relieve social pressure, and provide employment opportunities, but also influence the use and function of urban streetscapes through their unique social networks and interactive behaviors. This study found that although street vendor activities pose challenges to the use and management of public space, diverse streetscape design strategies provide valuable theoretical insights and practical guidance for balancing the street vendor economy, urban order, and public space utilization. However, while these strategies have achieved certain results in general street vendors and at the macro level, exploration of special street vendors and at the micro level is still insufficient.

By incorporating street vendors into streetscape design and analyzing the social networks of street vendors to explore their behavioral patterns, the study can more accurately reveal the interactive mechanism between street vendors and streetscapes and propose optimized street design strategies to enhance the comfort and experience of street vendors while reducing interference with street order. While retaining street vendors, it can also improve the inclusiveness, aesthetics, and sustainability of the street space. Future research should build a bridge between the macro and micro levels, based on data-driven design methods, to provide scientific support for the coordinated development of street vendors and urban streetscapes and achieve a win-win urban planning goal.

Research Contribution

This study proposes a multi-level analytical framework around the relationship between street vendors and urban streetscapes, making important contributions to urban planning and streetscape design. Firstly, by systematically organizing the multiple roles of street vendors at the economic, social, and cultural levels, and

secondly, by summarizing the effective streetscape design strategies that promote the balance between the street vendor economy and urban order, it provides diverse reference experiences for practice. In addition, this study introduces the perspective of social network theory to explore how the social network of street vendors influences their behavioural patterns and use of street space. This method provides an innovative perspective for traditional streetscape planning and a scientific basis for the coordinated development of street vendors and urban streetscapes. It not only fills the gap in micro-level streetscape design research but also provides new research paradigms and design strategy suggestions for building more inclusive, sustainable, and multifunctional urban streetscape spaces.

Practical contributions

The practical contribution of this study is to provide practical guidance for urban managers, planners, and designers to promote the coordinated development of street vendors and urban streetscapes. This study summarizes effective streetscape design strategies from around the world, such as designated vending areas, flexible street design, vendor-friendly street planning, environmentally friendly vendor tool design, digital management platforms, and exclusive vendor alleys, and provides specific practical ways forward. The study focuses on micro-level streetscape optimization. By analyzing the behavior patterns and social network characteristics of street vendors, it proposes a streetscape design method that meets the needs of vendors. Through these innovative practices, this study provides practical solutions for building a more balanced and harmonious urban public space.

Acknowledgement

I would like to express my sincere gratitude to all the people who have supported and helped me during the writing of this article. First of all, I would like to thank my supervisor, Dr. Adam, and my co-supervisor, Dr. Annisa, for their patient guidance and help in choosing the topic and writing my thesis. At the same time, I would like to thank Professor Ibrahim, the research methodology instructor, and Teaching Assistant Rafeah for providing a good learning atmosphere and selfless help during my studies.

References

World Urbanization Prospects: *The 2018 Revision*. (2019b). https://doi.org/10.18356/b9e995fe-en

Montgomery, M. R., Stren, R., Cohen, B., & Reed, H. E. (2013). Cities Transformed: Demographic Change and its Implications in the Developing World. *Routledge*.

Menashe-Oren, A., & Bocquier, P. (2021). Urbanization is no Longer Driven by Migration in Low- and Middle-Income Countries (1985–2015). *Population and Development Review*, 47(3), 639–663. https://doi.org/10.1111/padr.12407

Chang, G. H., & Brada, J. C. (2006). The Paradox of China's Growing Under-Urbanization. *Economic Systems*, 30(1), 24–40. https://doi.org/10.1016/j.ecosys.2005.07.002

Li, Y., Westlund, H., & Liu, Y. (2019). Why Some Rural Areas Decline while Some Others not: An Overview of Rural Evolution in the World. *Journal of Rural Studies*, 68, 135-143.

Gregory, B., & Meng, X. (2018). 21. Rural-to-Urban Migration and Migrants' Labour Market Performance, 2008–16. C*hina's 40 Years of Reform and Development,* 395.

Bromley, R. (2000). Street Vending and Public Policy: A Global Review. *International Journal of Sociology and Social Policy*, 20(1/2), 1-28.

Jiang, Q., & Luan, C. (2021). How does Street Vending Economy Help Rural to Urban Migrants Integrate into Cities? *Macro Management & Public Policies*, 3(3).

Maneepong, C., & Walsh, J. C. (2013). A New Generation of Bangkok Street vendors: Economic Crisis as Opportunity and Threat. *Cities*, 34, 37-43.

People's Daily. (2020, June 6). Guiding the Orderly Development of the "Street Vendor Economy." *People's Daily*. https://paper.people.com.cn/rmlt/html/2020-07/11/content_2000532.htm

Cao, J., Liu, F., Shang, M., & Zhou, X. (2021). Toward Street Vending in Post COVID-19 China: Social Networking Services Information Overload and Switching Intention. *Technology in Society*, 66, 101669. https://doi.org/10.1016/j.techsoc.2021.101669

Jacobs, J. (1992). *The Death and Life of Great American Cities*. Vintage Books.

Simone, A. (2021). Ritornello: "People as infrastructure". *Urban Geography*, 42(9), 1341-1348.

Takabvirwa, K. (2024). Make Shift: Street Vendors as Mobile Infrastructure in Zimbabwe. *Current Anthropology*, 65(3), 393-414.

Bhowmik, S. (2012). Street Vendors in the Global Urban Economy. *Taylor & Francis*.

Tonda, N., & Kepe, T. (2016, September). Spaces of Contention: Tension Around Street Vendors' Struggle for Livelihoods and Spatial Justice in Lilongwe, Malawi. *In Urban Forum* (Vol. 27, No. 3, pp. 297-309). Dordrecht: Springer Netherlands.

Torky, E., & Heath, T. (2021). Perception of Street Vendors and Their Effect on Urban Settings in Portobello Road, London. *Archnet-IJAR: International Journal of Architectural Research*, 15(3), 589-604.

S.Muthuveeran, A. A., Mohd Tahir, O., Hassan, M. A., & Yin, I. (2022). Investigating The Current Risk Management Process Practice In Malaysian Landscape Planning Projects. *Planning Malaysia*, 20(1), 48–63. https://doi.org/https://doi.org/10.21837/pm.v20i20.1078

S.Muthuveeran, A. A., Kamal, M. F. M., Yin, I., & Rasidin, E. W. (2024). Developing A Conceptual Framework Integrating Risk Process Into Landscape Planning Project Lifecycle. *Journal of Design and Built Environment*, 24(3), 108–121. https://doi.org/https://doi.org/10.22452/jdbe.vol24no3.7

Ibrahim, R., & Mustafa Kamal, R. (2018). Templates for Thinking. *Unpublished Literary*. Copyright MYIPO LY2018002437, 260.

Okoli, C., Schabram, K. (2010). "A Guide to Conducting a Systematic Literature Review of Information Systems Research,". *Sprouts: Working Papers on Information Systems*, 10(26). http://sprouts.aisnet.org/10-26

Ibrahim, R. (2011). Demystifying the Arduous Doctoral Journey: The Eagle Vision of a Research Proposal. *The Electronic Journal of Business Research Methods*, 9(2), 130. http://psasir.upm.edu.my/id/eprint/22543/

Ibrahim, R. (2020). Thinking Tools: Navigating a Three-Year Phd Journey. (2020). *Partridge Publishing Singapore*.

Wu, Y., Azmi, A., Ibrahim, R., Ghafar, A. A., & Salih, S. A. (2025). Creating a Sustainable Urban Ecosystem: the Azheke village model. *Smart and Sustainable Built Environment*, 14(4), 1150-1171.

Basu, S., & Nagendra, H. (2020). The Street as Workspace: Assessing Street Vendors' Rights to Trees in Hyderabad, India. *Landscape and Urban Planning*, 199, 103818.

Salim, N., Sallehudin, N. S., & Kamal, A. S. S. (2023). Potentials of Informal Street Vending as a Place Making Tool in Bandar Tasik Puteri, Selangor. *e-BANGI,* 20(4), 190-198.

Abusaada, H., & Elshater, A. (2021). Effect of People on Placemaking and Affective Atmospheres in City Streets. *Ain Shams Engineering Journal*, 12(3), 3389-3403.

Lynch, K. (1964). The Image of the City. *MIT Press*.

Zaman, S., & Ahmed, N. N. (2023). The Impact of Street Vendors on Social Sustainability of Public Places: The Case of Khulna City in Bangladesh. *ISVS e-journal*, 10, 163-81.

Giraldo, M., Garcia-Tello, L., & Rayburn, S. W. (2020). Street Vending: Transformative Entrepreneurship for Individual and Collective Well-Being. *Journal of Services Marketing*, 34(6), 757-768.

Rahman M, Mukta F A, Rahman M H. Socio-Economic Condition of Vegetable Street Vendors: A Study on Dhaka City[J]. *International Journal of Multidisciplinary Informative Research and Review*, 2020, 1(1): 35-48.

Deore P, Lathia S. Streets as Public Spaces: Lessons from Street Vending in Ahmedabad, India[J]. *Urban Planning*, 2019, 4(2): 138-153.

Piazzoni, F., & Jamme, H. T. (2020). Private Uses Make Public Spaces: Street vending in Ho Chi Minh City and Rome. *In Routledge handbook of street culture* (pp. 159-169). Routledge.

Simone, A. (2004). People as Infrastructure: Intersecting Fragments in Johannesburg. *Public culture*, 16(3), 407-429.

Silver, J. (2014). Incremental Infrastructures: Material Improvisation and Social Collaboration Across Post-Colonial Accra. *Urban Geography*, 35(6), 788-804.

Sun Ping, Li Yunfan, and Wu Junshen (2022). "Why the Body Becomes Infrastructure - A Study of Delivery Riders in the Context of Platform Labor", *Published in "News and Writing"*, Issue 9, 2022.

Lee, C. L. (2024). Singapore Hawker Centres: A Linguistic Landscape of Identity, Diversity, and Continuity. *Journal of Asian Pacific Communication,* 34(1), 23-55.

Zhang, Y., Zhou, L., & ZHANG, Z. (2021). Identities and Spaces for Mobile Hawkers. *A Study of Chinese Urban Policies and Planning.*

Mahopo, T. C., Nesamvuni, C. N., Nesamvuni, A. E., de Bryun, M., Van Niekerk, J., & Ambikapathi, R. (2022). Operational Characteristics of Women Street Food Vendors in Rural South Africa. *Frontiers in Public Health*, 10, 849059.

Rahman, B., Noviani, A., & Rosyadea, R. (2020, October). The Effect of Street Vendors' Activities in City Park on the Functions of Park as a Public Space. *In Journal of Physics: Conference Series* (Vol. 1655, No. 1, p. 012114). IOP Publishing.

Torky, E., & Heath, T. (2021). Perception of Street Vendors and Their Effect on Urban Settings in Portobello Road, London. *Archnet-IJAR: International Journal of Architectural Research*, 15(3), 589-604.

Radomskaya, V., & Bhati, A. S. (2022). Hawker Centres: A Social Space Approach to Promoting Community Wellbeing. *Urban Planning,* 7(4), 167-178.

Zhang, X., & Shao, J. (2024). Evaluation of the Suitability of Street Vending Planning in Urban Public Space in the Post-COVID-19 Era. *Land*, 13(4), 489.

Squarzon, C. (2020). Taking the Street Out of Street Food: the Singapore Case 1.

Kalnaovakul, K., & Promsivapallop, P. (2021). Dimensions of Night Market Visit Experience of International Tourists: An Analysis of Google Reviews of Night Markets in Phuket, Thailand. *Asia-Pacific Social Science Review*, 21(3), 6.

Kaur, K. (2020). Urban Informality and the Politics of Street Vendors'right to the City in a South Delhi Market. *Eastern Anthropologist*, 73(1).

Albright, K. (2020). 4. *Pop-Up Canopy Markets.*

Tan, K. S., & Chan, S. K. (2024). From Train Station to Night Market: Bangkok's Talad Rod Fai as Urban Liminoid Space. *Space and Culture*, 27(4), 413-427.

Sun, Z., Bell, S., Scott, I., & Qian, J. (2020). Everyday Use of Urban Street Spaces: The Spatio-Temporal Relations Between Pedestrians and Street Vendors: A Case Study in Yuncheng, China. *Landscape Research*, 45(3), 292-309.

Li, J., Ren, L., Hu, T., & Wang, F. (2018). A City's "Urban Crack" at 4 Am: A Case Study of Morning Market Vendors in Beijing's Longfu Temple Area. *Habitat International*, 71, 14-21.

Srivastava, A., Ram, V., Kurpad, M., & Chatterjee, S. (2012). Formalising the Informal Streets: A Legislative Review of the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Bill, 2012. J. *Indian L. & Soc'y,* 4, 247.

Tsoriyo, W., Ingwani, E., Chakwizira, J., & Bikam, P. (2021). Vendor and Pedestrian Experiences of Their 'Right to the City'in Street Design and Management in Small Urban Centres in the Vhembe District, South Africa. *Town and regional planning*, 79, 6-17.

Sanjaya, K. H., Yukhi Mustaqim, K. S. B., Saputra, H. M., Lusijarto, T. T., Subagio, D. G., Subekti, R. A., & Rajani, A. (2024, August). Design of Multi-Purpose Portable Lamp for Peddlers and Street Vendors. *In AIP Conference Proceedings* (Vol. 3069, No. 1, p. 020135). AIP Publishing LLC.

Damanik, I. I., Raniasta, Y. S., & Seliari, T. (2022). Examining the Wahidin Street Vendors' Tent Frame using Community Development Approach. *Journal of Innovation and Community Engagement*, 3(4), 226–239. https://doi.org/10.28932/ice.v3i4.5093

Pimthong, B., Kritsanaphan, P., Bejrananda, J., & Lo, V. L. (2024). Design and Development of an Ice Cream Cart by Upcycling Automobile Scraps to Promote Street Food Vendors (StartUp) in Bangkok, Thailand. *Archives of Design Research*, 37(1), 103-120.

Mahadevan, V., Vikraman, B. P., Al-Hatmi, H. Y., & Al-Shaqsi, H. S. (2024). Renewable Energy Based Smart Umbrella for Street Vendors.

Majoni, T., Zegeye, Y., & TUCKER, W. (2020, May). Mose: A Mobile Application for Women Street Vendors in Cape Town. *In 2020 IST-Africa Conference (IST-Africa)* (pp. 1-8). IEEE.

Singh, A., Kalita, P. C., Singh, G., & Singh, R. (2021, December). Digitizing the Street Vending Market. In International Conference of the Indian Society of Ergonomics (pp. 675-688). *Cham: Springer International Publishing.*

Li, S. (2024, January). The Principles of Digital Transformation on China's Street Vendor Economy. *In Proceedings of the 2024 Guangdong-Hong Kong-Macao Greater Bay Area International Conference on Digital Economy and Artificial Intelligence* (pp. 115-120).

Rewal, P. Hawkers in Hong Kong. *Royal Asiatic Society*, 285.

Pham, S. D. (2024). Street Vending and its Resilience in the Alleys of Hanoi (Vietnam). Belgeo. *Revue Belge de Géographie,* (3).

Marin, A., & Wellman, B. (2014c). Social Network Analysis: An Introduction. *In SAGE Publications Ltd eBooks* (pp. 11–25). https://doi.org/10.4135/9781446294413.n2

Journals, I., & Njaya, T. (2015). Strategies for Daily Survival: The Role of Social Capital among Street Vendors of Harare Metropolitan [Dataset]. In Figshare. https://doi.org/10.6084/m9.figshare.1480570

Hilmi, M., & Consultant, G. (2020). Street Food Vendors' Entrepreneurial Marketing Characteristics and Practices from 12 Countries: What Lessons Can be Learnt for Improving Food Marketing in BOP/Subsistence marketplaces. *Middle East Journal of Agriculture Research*. https://doi.org/10.36632/mejar/2020.9.2.27

Enssle, F., & Kabisch, N. (2020). Urban Green Spaces for the Social Interaction, Health and Well-Being of Older People— An Integrated View of Urban Ecosystem Services and Socio-Environmental Justice. *Environmental Science and Policy*, 109, 36–44. https://doi.org/10.1016/j.envsci.2020.04.008

Louf, R., & Barthelemy, M. (2014). How Congestion Shapes Cities: From Mobility Patterns to Scaling. *Scientific Reports*, 4(1). https://doi.org/10.1038/srep05561

Grace-McCaskey, C. A., Ramos, M. C., Sjostrom, A., & Page, S. E. (2023). Combining Social Network Analysis and Ethnography to Better Understand Fishers' Organization and Promote Sustainable Small-Scale Fisheries in St. Croix, US Virgin Islands. *Marine Policy*, *152*, 105573.

Porta, S., Crucitti, P., & Latora, V. (2006). The Network Analysis of Urban Streets: A Primal Approach. *Environment and Planning B Planning and Design*, 33(5), 705–725. https://doi.org/10.1068/b32045

Amen, M. A., Afara, A., & Nia, H. A. (2023). Exploring the Link Between Street Layout Centrality and Walkability for Sustainable Tourism in Historical Urban Areas. *Urban Science*, 7(2), 67.

Lee, C. A., & Lee, S. K. (2022). Combining Social Network Analysis and Geographic Information System for Communication Research: An Application to Immigrant Communities. *Cogent Social Sciences*, 8(1), 2123085.

Enssle, F., & Kabisch, N. (2020). Urban Green Spaces for the Social Interaction, Health and Well-Being of Older People—An Integrated View of Urban Ecosystem Services and Socio-Environmental Justice. *Environmental Science and Policy, 109*, 36-44.

Kong, H., & Luo, W. (2024, August). A Study of Street Vendor Economy from the Perspective of a Tripartite Evolutionary Game. In *Proceedings of the International Conference on Digital Economy, Blockchain and Artificial Intelligence* (pp. 1-11).

Basu, S., & Nagendra, H. (2020b). The Street as Workspace: Assessing Street Vendors' Rights to Trees in Hyderabad, India. *Landscape and Urban Planning, 199*, 103818. https://doi.org/10.1016/j.landurbplan.2020.103818