

Sidewalks As Contested Space: Spatial Analysis of Walkability and Street Vendor Occupation Patterns in The Central Business District of Medan City

Mufti Ali Nasution¹, Rahil Hasbi², Qurratul Aini³

¹Architecture Study Program, Faculty of Engineering, Universitas Medan Area

²Architecture Study Program, Faculty of Engineering, Universitas Mercu Buana

³Architecture Study Program, Faculty of Engineering, Universitas Muhammadiyah Aceh

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*Correspondence email:

muftiali@staff.uma.ac.id¹,
rahil@mercubuana.ac.id²,
qurratul.aini@unmuha.ac.id³

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ABSTRAK

Sidewalks in the city centers of developing countries frequently become arenas of spatial contestation between walkability principles and informal street vendor (pedagang kaki lima/PKL) activities. However, academic studies that address this phenomenon through a spatial typology lens within the discipline of architecture and urban design remain limited, particularly in Medan City. This study aims to examine the spatial typology of sidewalks in central Medan, analyze the spatial occupation patterns of street vendors as a phenomenon of space production, and formulate inclusive design principles based on a synthesis of precedents from other cities. The research employs a descriptive-evaluative qualitative approach through precedent analysis and literature review, drawing on secondary data comprising Medan City's zoning regulation (Regional Regulation No. 5/2022), technical standards from Ministerial Regulation PUPR No. 03/PRT/M/2014, and international and national journal articles published between 2021 and 2026. The analysis applies walkability frameworks (Speck; Gehl; Whyte) and Lefebvre's production of space theory, reinforced by contemporary studies on counter-space. Findings reveal that the spatial typology of sidewalks in Medan is spectral in nature, encompassing both frontage-based occupation and main-circulation-path occupation, each requiring distinct design strategies. A synthesis of precedents from Hanoi, Bandung, Yogyakarta, and Palopo yields four spatial solution typologies – targeted relocation, micro-spatial demarcation, flexible time-based zoning, and partial shared space – which can be differentially adapted according to the spatial character of each corridor segment. This study contributes to the discipline of architecture and urban design by offering a conceptual framework previously absent from the existing literature on street vendors in Medan City, while recommending that spatial zoning policies be integrated with inclusive design principles that account for vendors' spatial-economic attachment and universal accessibility for persons with disabilities.

INTRODUCTION

In contemporary architectural and urban design discourse, sidewalks are no longer understood merely as linear infrastructural elements for pedestrian movement; rather, they function as multifunctional public spaces accommodating a wide range of urban socioeconomic activities. This conceptual shift aligns with the growing prominence of walkability as a key indicator of sustainable urban quality, in which pedestrian spaces are expected to satisfy the principles of usefulness, safety, comfort, and interest. Nevertheless, the reality of sidewalks in many developing-country cities reveals a spatial paradox: spaces normatively designed to accommodate pedestrian movement frequently become arenas of functional overlap, partly as a result of high-intensity informal trading activities carried out by street vendors.

This phenomenon is not a localized problem but rather a recurring spatial pattern across cities of the Global South. A recent study conducted in Hanoi demonstrates that street vendors in informal settlements engage in complex socio-spatial negotiations with other space users, forming informal codes that reveal a hidden order rather than mere disorder (Thinh et al., 2025). A parallel study in Hanoi documented the application of a simple spatial demarcation element - a painted dividing line on the sidewalk separating the vending zone from the pure pedestrian lane - although adherence to this boundary was frequently violated in practice (Ho et al., 2023). Comparable patterns are relevant at the global level, where urban culture and public perception significantly shape the social acceptance of vending activities within street spaces (Al-Jundi et al., 2022).

A number of cities have opted for inclusive approaches that accommodate functional coexistence through the principle of shared space: a design approach that eliminates formal barriers between space users, thereby allowing interaction and mutual awareness to develop organically (Batista et al., 2023), (Xu et al., 2022). This approach has also proven relevant for vulnerable user groups such as persons with disabilities, whose acceptance of shared space

design requires specific investigation to ensure that the principle of inclusivity is genuinely achieved (Lawson et al., 2022), (Koesoemawati et al., 2025). Within the Indonesian context, operational performance evaluations of pedestrian spaces in urban public areas serve as important instruments for measuring how effectively a sidewalk serves pedestrians, as demonstrated by a study of Lapangan Merdeka in Medan City itself (Nst et al., 2021), which indicates that pedestrian space performance has long attracted scholarly attention, yet is still approached primarily from a traffic engineering standpoint rather than from a spatial typology perspective within architecture and urban design.

The diversity of design approaches across these cities confirms that the relationship between walkability and informal activity is a spatial problem that merits examination within the framework of architecture and urban design. It requires contextual reading of the spatial character and occupation patterns prevailing in each city, rather than the application of a single universal governance model.

As one of the largest metropolitan cities in Indonesia outside of Java, Medan City presents a highly relevant spatial context for further inquiry. The central business district of Medan, which encompasses historically significant commercial corridors such as the Kesawan district and its surroundings, is characterized by a high density of informal economic activity. Approximately 18,900 street vendors have been recorded operating across 21 sub-districts in Medan City, a figure that underscores the significant scale of informal activity relative to urban space (Siregar, 2025). The City Government of Medan has responded to this phenomenon through Regional Regulation No. 5 of 2022, which establishes a zoning system for street vendor activity based on three spatial categories: red, yellow, and green zones (Siregar, 2025). In the context of this study, this zoning document is not read as a legal-regulatory instrument; rather, it is treated as a spatial typology reference representing the formal effort to categorize space according to the degree of accommodation provided for informal activity, in which the data is relevant to be read through the lens of architecture and urban design.

Regrettably, academic studies that address the sidewalk phenomenon in Medan City specifically through a spatial typology and walkability lens (as part of the discipline of architecture and urban design) remain very limited. The bulk of available studies on street vendors in Medan tend to focus on economic empowerment and policy implementation (Siregar, 2025), while existing pedestrian studies in the city remain confined to traffic engineering performance evaluation (Nst et al., 2021), without addressing the spatial-design typology dimension. Similar patterns are observable in studies of street vendor relocation in other Indonesian cities such as Yogyakarta (Rahmah et al., 2025), (Lira & Saputra, 2024), and Bandung (Agustin et al., 2025), which generally stop at the level of site suitability evaluation or policy implementation. Studies more closely aligned with a walkability conceptual framework are beginning to emerge, such as an investigation of accessibility and inclusivity of public space in the Titik 0 Malioboro precinct using Speck's walkability variables (Vedayana et al., 2026), but such studies have yet to engage with sidewalk contexts explicitly confronted by large-scale PKL occupation pressure comparable to that in Medan City. Yet understanding spatial occupation patterns and sidewalk spatial typologies is an essential prerequisite for formulating inclusive pedestrian space design principles, as further evidenced by a study of flexible zoning systems in Palopo (Utami et al., 2025) and sidewalk-pedestrian conflicts in a university campus context in Jember (Aminingrum et al., 2023).

This gap is what the present study seeks to address. Drawing on the conceptualization of space as an entity perpetually produced through spatial practice, representations of space, and lived space, and reinforced by contemporary scholarship on the production of counter-space by urban informal workers in Dhaka (Lata, 2022), sidewalks in central Medan can be read not as static spaces that have failed in their function, but as spaces continuously reproduced through socio-spatial negotiation between the interests of pedestrians and street vendors: a phenomenon that calls for a comprehensive reading within architecture and urban design.

On this basis, the present study is formulated to address the following research question: how is the spatial typology of sidewalks in central Medan City constructed amidst the contestation between walkability principles and street vendor occupation patterns, and what design principles can be adapted from precedents in other cities to formulate more inclusive sidewalk spaces without sacrificing the qualities of usefulness, safety, and comfort for pedestrians? The study pursues three objectives: (1) to examine the spatial typology of sidewalks in central Medan in relation to walkability criteria; (2) to analyze street vendor occupation patterns as a phenomenon of space production; and (3) to formulate inclusive design principles based on a synthesis of design precedents from cities confronting comparable challenges. The novelty of this study lies in its position as a spatial-conceptual inquiry within the discipline of architecture and urban design that specifically addresses the sidewalk phenomenon in Medan City; an approach not yet present in the existing literature, which tends to stop at the level of economic empowerment, traffic engineering performance evaluation, or program implementation.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Walkability as a Normative Framework in Architecture and Urban Design

The concept of walkability originates in a critique of the automobile-oriented urban design paradigm that dominated much of the twentieth century. Four foundational conditions must be met for a pedestrian space to be deemed *walkable*: *useful* (in proximity to daily activity destinations), *safe* (both physically and perceptually), *comfortable* (in terms of dimensions and microclimate), and *interesting* (visually and socially engaging). These four principles constitute the primary reference for evaluating the quality of pedestrian space, including sidewalks, as designed architectural and urban elements rather than mere residual products of vehicular road planning.

In alignment with this, the space between buildings, including sidewalks, is positioned as the principal container of urban public life, accommodating three categories of activity: *necessary activities*, *optional activities*, and *social activities*. Within this framework, the presence of informal trading activity on sidewalks can be read as a manifestation of socioeconomic activity that enlivens space, rather than being viewed solely as a disruption to circulatory function. This perspective is reinforced by foundational empirical observation of human behavioral patterns in urban public space, which demonstrates that spaces characterized by high levels of occupancy and activity (including informal activities such as vending), tend to be more animated than spaces that appear ‘clean’ yet devoid of activity.

Contemporary scholarship further enriches this understanding from the perspective of public perception. A path-model study examining public perceptions found that urban culture has a significant relationship with the acceptance or resistance of street vending practices in urban space (Al-Jundi et al., 2022), confirming that the social acceptance of multifunctional sidewalks is not solely a matter of technical-dimensional compliance but also a socio-cultural construction.

Space as an Arena of Production and Contestation

To read the dynamics of sidewalks as spaces contested by competing interests, this study employs the framework of the **production of space**. It holds that space is never neutral but is perpetually produced through three mutually imbricated dimensions: everyday spatial practice, formally conceived representations of space (such as spatial zoning), and space as lived and experienced by its users (lived space). Within this framework, sidewalks in central Medan can be read as spaces continuously reproduced: on one side, a formal representation in the form of spatial zoning (Regional Regulation No. 5/2022); on the other, the lived practices of vendors and pedestrians that actually constitute space in situ.

This framework receives contemporary reinforcement through Lata’s study (Lata, 2022) on the production of counter-space by informal workers in Dhaka, which affirms that access to public space for livelihood is a fundamental concern for street vendors in Global South cities amid ongoing population growth (Lata, 2022). This is a condition highly relevant to Medan City, given the scale of 18,900 PKL distributed across 21 sub-districts (Siregar, 2025). The concept of public space as an arena of contestation further illuminates how the same space can be differently conceived and contested by distinct user groups: pedestrians demanding continuity of movement versus vendors requiring fixed occupation points for economic survival.

Sidewalks as Multifunctional Space: Review of Contemporary Studies (2021–2026)

Recent literature reflects a shift in academic perspective on the relationship between walkability and informal activity, moving away from a dichotomous framing (ordered vs. chaotic) toward a more nuanced and contextual understanding. A study of the spatiality of informal vending in Hanoi settlements affirms that street vendors engage in complex socio-spatial negotiations in their interactions with public-private space interfaces and mobility patterns in urban in-between spaces (Thinh et al., 2025). At the micro-design level, another Hanoi study documented the application of a painted line demarcating the sidewalk into two functional zones, though this visual marker was frequently disregarded in practice (Ho et al., 2023). A multi-typology urban perception study in Hanoi further employed objective audit instruments such as the Microscale Audits of Pedestrian Streetscapes (MAPS) to evaluate sidewalk physical features (Ho et al., 2021). It is a methodological approach relevant to the conceptual evaluation of sidewalk spatial typologies in Medan.

On the plane of alternative design approaches, shared space has emerged as a paradigm worthy of investigation. Shared space is understood as a set of context-sensitive design treatments aimed at creating pedestrian-friendly environments (Kaparias & Li, 2021). A video-based survey study found that pedestrian and cyclist preferences for shared space design can be systematically evaluated through virtual environment simulation, with both user groups responding positively to protective design elements and mid-space features (Batista et al., 2023). A virtual reality experiment further revealed varying levels of acceptability among pedestrians and drivers for shared space schemes (Xu et al., 2022). A study of persons with disabilities found that the removal of kerbs and controlled crossings risks creating new barriers: confusion, danger, and exclusion, for users with visual impairments or low vision (Lawson et al., 2022). A recent study on inclusive pedestrian accessibility further emphasized the importance of community

involvement in design processes to ensure that inclusivity is genuinely realized (Koesoemawati et al., 2025). These findings are critical for this study in formulating design principles that are genuinely accommodating for all sidewalk user groups.

In the domestic Indonesian context, an examination of Medan City's PKL zoning policy demonstrates the scale and complexity of the spatial challenges involved, with Regional Regulation No. 5/2022 categorizing trading space into red, yellow, and green zones (Siregar, 2025). The Teras Cihampelas case in Bandung illustrates that formal relocation facilities do not automatically resolve vendors' economic sustainability concerns tied to their spatial-economic attachments to original locations (Agustin et al., 2025). A study of Teras Malioboro in Yogyakarta found that vendor relocation brought significant changes to pedestrian lane service performance, assessed across six components: accessibility, attractiveness, safety, comfort, inclusivity, and institutional governance (Rahmah et al., 2025), though the suitability of relocation sites in relation to vendors' spatial needs remains an open question (Lira & Saputra, 2024). A recent walkability study in the Titik 0 Malioboro precinct, applying Speck's framework, found that walkability quality is not equally experienced across all community groups due to activity density, informal activity, and limited universal accessibility (Vedayana et al., 2026). These findings echo tensions anticipated in central Medan. At smaller city scale, a Palopo study underscores the importance of flexible zoning to accommodate dynamic vending patterns (Utami et al., 2025), while a Jember campus study extends the understanding of sidewalk-PKL conflicts beyond major city centers (Aminingrum et al., 2023). The performance evaluation of pedestrian space at Lapangan Merdeka, Medan City, confirms that sidewalk performance in Medan has long attracted attention, even if not yet through an architectural spatial typology lens (Nst et al., 2021).

Synthesis and Study Positioning

Based on the foregoing review, three theoretical threads frame this study. *First*, walkability provides a normative framework for evaluating sidewalk quality, yet must be read contextually and enriched by contemporary findings on socio-cultural perceptions of vending (Al-Jundi et al., 2022) and their Indonesian application (Vedayana et al., 2026). *Second*, the production of space framework, reinforced by Lata's study (Lata, 2022), provides a lens for reading sidewalks not as static space but as a continuously reproduced field of negotiation between formal representations (zoning, Regional Regulation No. 5/2022 (Siregar, 2025)) and the lived practices of users. *Third*, contemporary studies (2021-2026) from Hanoi (Thinh et al., 2025; Ho et al., 2023; Ho et al., 2021), shared space evaluations (Batista et al., 2023; Lawson et al., 2022; Kaparias & Li, 2021), inclusivity studies (Koesoemawati et al., 2025), and domestic studies from Medan (Nst et al., 2021; Siregar, 2025), Bandung (Agustin et al., 2025), Yogyakarta (Rahmah et al., 2025; Lira & Saputra, 2024; Vedayana et al., 2026), Palopo (Utami et al., 2025), and Jember (Aminingrum et al., 2023) collectively signal that the discipline of architecture and urban design is moving toward design approaches more accommodating of multifunctional sidewalks. These three threads form the foundation for a comprehensive reading of sidewalk spatial typologies in central Medan, elaborated in the method and discussion sections that follow.

METHOD

Research Approach

This study employs a **descriptive-evaluative qualitative** approach, drawing on **precedent analysis** and **urban design literature review** techniques. This approach is selected because the research objectives are conceptual, aiming to formulate spatial typologies and inclusive design principles, rather than testing quantitative hypotheses or conducting direct field measurement. The study is positioned squarely within the discipline of architecture and urban design, with all secondary data read as references for spatial typology and dimensions rather than as objects of legal or policy analysis.

Subject and Data Sources

The object of inquiry is the spatial typology of sidewalks in central Medan City, with a focus on commercial corridors characterized by high-density informal activity (e.g., the Kesawan district and surroundings). All data are secondary, organized into three categories: (a) technical dimensional documents from Ministerial Regulation PUPR No. 03/PRT/M/2014, used as an ideal dimensional reference (effective width, amenity zone, circulation zone); (b) spatial zoning documents comprising Medan City's RTRW/RDTR and Regional Regulation No. 5/2022 (Siregar, 2025), used as references for the spatial occupation zone typology (red-yellow-green); and (c) design precedent literature from international and national journal articles published between 2021 and 2026 (Thinh et al., 2025; Kaparias & Li, 2021).

Data Collection Technique

Data collection was carried out through document review and systematic literature study in three stages. First, identification of relevant technical and spatial Medan City documents, including Ministerial Regulation PUPR, RTRW/RDTR, and PKL zoning documents. Second, literature search across Scopus, Google Scholar, ScienceDirect, and national journal databases (Garuda/Sinta), using the keywords ‘sidewalk vendor’, ‘walkability’, ‘shared space’, and ‘informal economy urban design’, bounded to the publication period 2021-2026. Third, precedent selection based on typological relevance (relocation, time-based zoning, shared space, spatial demarcation) and contextual similarity, with Global South and Southeast Asian cities prioritized.

Data Analysis Technique

Analysis proceeded in three stages aligned with the research objectives. The first stage involved spatial typology analysis, comparing the dimensions and layout of existing sidewalks in Medan City (drawn from secondary data) against ideal walkability typology standards. The second stage involved spatial occupation pattern analysis, reading the distribution of PKL zones (red-yellow-green) as a phenomenon of space production using Lefebvre’s framework reinforced by contemporary scholarship (Lata, 2022). The third stage involved design precedent synthesis, grouping precedents from other cities into solution typologies (total separation/relocation, time-based zoning, spatial demarcation, full shared space), then identifying design principles potentially adaptable to central Medan. All three stages are qualitative-interpretive in character, without statistical testing, consistent with the study’s conceptual positioning.

Research Limitations

This study does not involve direct field observation or interviews with vendors or pedestrians; consequently, findings are conceptual and require empirical verification through subsequent field research. The sidewalk dimensional data used are dependent on the availability of publicly accessible secondary documents, which may carry limitations in terms of resolution or data currency.

RESULT

Spatial Typology of Sidewalks in Central Medan City

Drawing on Medan City’s PKL zoning document (Regional Regulation No. 5/2022), which categorizes trading space into red (prohibited), yellow (conditional), and green (permitted) zones (Siregar, 2025), it can be identified that Medan’s spatial planning approach already contains a logic of spatial typology, even if not yet explicitly formulated in the language of architectural design. When read through the technical dimensional framework of Ministerial Regulation PUPR No. 03/PRT/M/2014 – which stipulates the presence of a pure pedestrian circulation zone, an amenity zone (seating, vegetation, street furniture), and a frontage zone (transition to buildings) – the yellow and green zones in Medan’s scheme potentially overlap directly with the circulation and amenity zones that should be free of permanent occupation.

This pattern aligns with findings from Hanoi, where sidewalks divided by simple painted demarcation lines continued to experience boundary violations in practice, as visual markers alone are insufficient to withstand the pressure of informal economic occupation (Ho et al., 2023). This indicates that the spatial typology of sidewalks in central Medan is in all likelihood not singular but spectral: ranging from (a) sidewalks with street vendor occupation attached to shopfronts that consistent with the frontage occupation pattern common in dense Asian cities, to (b) sidewalks with vendor occupation in the primary circulation lane, directly confronting pedestrian flow. Operational performance evaluations of pedestrian spaces in Medan City have confirmed that pedestrian lane performance challenges are a real and present concern (Nst et al., 2021), even though those studies have not yet anatomized the causal spatial typology from an architectural standpoint.

Formulating this typology is essential because the appropriate design strategy depends critically on the type of occupation encountered: frontage-type occupation can potentially be accommodated through demarcation or partial shared space approaches, while primary-circulation-lane occupation tends to require more decisive relocation or time-based zoning strategies.

Spatial Occupation Patterns and Spatial Contestation

Read through Lefebvre’s production of space framework, Medan City’s red-yellow-green zoning can be understood as a formal representation of space: the state’s effort to conceive and categorize sidewalk space from above. Yet, as Lata’s study in Dhaka affirms, urban poor groups consistently possess the capacity to form counter-space that constituted through everyday lived practices that do not always comply with formal representations (Lata, 2022). Given the scale of 18,900 street vendors distributed across 21 sub-districts (Siregar, 2025), the intensity of

spatial negotiation between formal representations (zoning) and lived space (actual trading practices) in central Medan likely operates at a significant scale not fully captured in official zoning maps.

Comparable contestation patterns are observable in the Teras Cihampelas precedent in Bandung, where the construction of formal relocation facilities that representationally ‘resolved’ the spatial planning issue in practice continued to generate resistance, as relocation severed vendors’ spatial-economic attachment to their original locations built through years of practice (Agustin et al., 2025). An even stronger pattern is evident in the Teras Malioboro case in Yogyakarta, where replacement facilities were found not to fully satisfy vendors’ spatial-functional needs (Lira & Saputra, 2024), while a walkability study in the same precinct revealed residual tension between a physically strong pedestrian network and walkability experience not yet equally felt across all user groups (Vedayana et al., 2026).

This analysis underscores a critical point for the Medan context: a purely representational design strategy – one that merely redraws zoning on a map – risks failure if not accompanied by an understanding of vendors’ lived spatial patterns, including their operational hour patterns, proximity to customer flows, and dependence on particular building facades, as further evidenced by the need for time-flexible zoning in the Palopo case (Utami et al., 2025).

Inclusive Design Precedents as Learning Models

Synthesis of precedents from multiple cities reveals at least four spatial solution typologies mappable as a spectrum of approaches ranging from most segregative to most inclusive.

Typology 1: Total Separation/Relocation. Represented by Teras Malioboro, Yogyakarta (Rahmah et al., 2025; Lira & Saputra, 2024) and Teras Cihampelas, Bandung (Agustin et al., 2025), in which street vendors are entirely relocated to centralized trading facilities, leaving the original sidewalk as a pure pedestrian space. This approach is effective visually and functionally in the short term, but consistently reveals challenges regarding vendors’ economic sustainability and the suitability of replacement locations in relation to established trading patterns (Lira & Saputra, 2024; Agustin et al., 2025).

Typology 2: Micro-Spatial Demarcation. Represented by the painted dividing line precedent in Hanoi (Ho et al., 2023), in which the sidewalk is divided into two functional lanes without the total elimination of trading activity. This approach entails lighter physical intervention, yet remains vulnerable to boundary violations without accompanying enforcement mechanisms or clear compliance incentives (Ho et al., 2023).

Typology 3: Flexible Time-Based Zoning. Represented by the Palopo precedent (Utami et al., 2025), in which the same sidewalk space functions differently across different time windows: one vendor group in the morning to midday, another in the afternoon to evening. Thus, the occupation of the space is rotational rather than permanent.

Typology 4: Full Shared Space. It is represented by the global shared space conceptual framework (Batista et al., 2023; Xu et al., 2022; Kaparias & Li, 2021), in which formal boundaries between users are entirely dissolved and coexistence is mediated through shared behavioral awareness. This typology is the most inclusive in principle, but studies of persons with disabilities indicate that the removal of physical boundaries risks creating new barriers for users with visual or mobility impairments (Lawson et al., 2022). Acceptability studies further indicate that user preference for shared space depends strongly on specific design elements; the placement of protective features and mid-space elements is generally received better than fully open space without differentiating features (Batista et al., 2023; Xu et al., 2022).

Implications for Central Medan City. Based on this four-typology mapping and the existing red-yellow-green zoning scheme (Siregar, 2025), this study proposes that sidewalk design in central Medan should **differentially adapt typologies** according to the spatial character of each segment:

- In segments with very high PKL density and limited sidewalk width (potentially corresponding to existing red zones), Typology 1 (targeted relocation) is the more realistic option, with the critical caveat from the Bandung and Yogyakarta precedents that replacement locations must preserve vendors’ spatial-economic proximity to their original sites (Lira & Saputra, 2024; Agustin et al., 2025).
- In segments with frontage-type occupation and adequate sidewalk width (corresponding to yellow zones), Typology 2 (spatial demarcation) reinforced by permanent physical elements – rather than painted lines alone – is potentially more effective than the Hanoi precedent, which relied solely on visual markers (Ho et al., 2023).
- In segments with temporally patterned vending activity (evening food vendors, night market stalls), Typology 3 (time-based zoning) as per the Palopo precedent can be adapted to optimize the use of the same space by different user groups across the day (Utami et al., 2025).
- In segments with a public-tourism spatial character (comparable to the Kesawan precinct), partial shared space elements may be considered, subject to the non-negotiable requirement of maintaining tactile paths and universal accessibility elements for persons with disabilities, directly referencing the critical findings of the shared space-disability study (Lawson et al., 2022) and community engagement principles in inclusive design (Koesoemawati et al., 2025).

The cross-typology principle extractable from the full body of precedents is a successful inclusive sidewalk design is not one that eliminates spatial contestation, but one that designs a structured spatial negotiation mechanism; whether through temporal division, physical zone division, or the provision of replacement space that is economically and spatially equivalent rather than merely administratively equivalent.

CONCLUSION

This study has examined sidewalks in central Medan City as a contested space between walkability principles and street vendor occupation patterns, through a literature review and design precedent analysis approach within the disciplinary framework of architecture and urban design. Three conclusions can be drawn on the basis of the research objectives.

First, the spatial typology of sidewalks in central Medan City is not singular but spectral, mappable into at least two primary patterns: frontage-type occupation (attached to building facades) and primary-circulation-lane occupation, each requiring a different design approach. The red-yellow-green zoning scheme established by Regional Regulation No. 5/2022 (Siregar, 2025) already contains the seeds of spatial typology logic but has not yet been translated into explicit architectural design language: a gap corroborated by the limitations of existing Medan pedestrian studies, which remain confined to traffic engineering performance evaluation (Nst et al., 2021) without anatomizing the causal spatial typology.

Second, street vendor occupation patterns in central Medan can be understood as a continuously unfolding space production phenomenon, in which formal representation (zoning) is confronted by lived space through everyday trading practice (Lata, 2022). Precedents from Bandung (Agustin et al., 2025) and Yogyakarta (Lira & Saputra, 2024; Vedayana et al., 2026) consistently demonstrate that purely representational approaches – those that merely redraw zoning on a map without understanding vendors' lived spatial patterns – risk generating resistance and functional failure in replacement facilities.

Third, synthesis of precedents from multiple cities yields four spatial solution typologies adaptable in a differential manner according to the spatial character of each sidewalk segment in central Medan: targeted relocation, micro-spatial demarcation, flexible time-based zoning, and partial shared space (Ho et al., 2023; Batista et al., 2023; Lawson et al., 2022; Lira & Saputra, 2024; Agustin et al., 2025; Utami et al., 2025; Kaparias & Li, 2021). The cross-typology principle found is that a successful inclusive sidewalk design is not one that eliminates spatial contestation, but one that structures a negotiation mechanism for it.

In so doing, this study answers the research question posed at the outset. The spatial typology of sidewalks in central Medan City is constructed through the interaction between formal zoning representations and dynamic PKL occupation practices, and the design principles adaptable from precedents in other cities are contextually differential in character rather than constituting a single uniform solution.

Scientific Contribution

This study contributes to the discipline of architecture and urban design in three respects. Conceptually, it introduces a spatial typology reading framework for sidewalks in Medan City not previously available in the literature, which has generally stopped at the level of street vendor economic empowerment (Siregar, 2025) or traffic engineering performance evaluation (Nst et al., 2021). Methodologically, it demonstrates that architectural and urban design research can be legitimately conducted through precedent synthesis and literature review without direct field observation, while still producing applicable findings. Practically, the mapping of four spatial solution typologies in Section 4.3 can serve as an initial reference for urban designers or stakeholders seeking to design more contextually sensitive spatial interventions on sidewalks in central Medan.

Recommendations

The following recommendations are advanced on the basis of the study's findings, all positioned as spatial design principles rather than regulatory recommendations.

1. Segment-based spatial typology mapping rather than uniform zoning. Each sidewalk corridor segment in central Medan should be mapped according to its actual occupation character (frontage vs. primary circulation lane), rather than relying solely on the administratively framed red-yellow-green zone categories (Siregar, 2025).
2. Strengthening physical demarcation elements rather than visual markers alone. Drawing on the Hanoi precedent, which demonstrated the weakness of painted lines as boundaries (Ho et al., 2023), segments employing a spatial demarcation approach should use permanent physical elements, such as changes in level, material, or landscaping, to reinforce the effectiveness of spatial division.
3. Application of time-based zoning to segments with temporal vending patterns, adapting the flexibility principle from the Palopo precedent (Utami et al., 2025), particularly in corridors where evening food vending does not conflict directly with peak pedestrian hours during the day.

4. Relocation design that preserves spatial-economic proximity, rather than merely providing replacement space. Relocation failures in Bandung and Yogyakarta are frequently rooted in the severance of vendors' spatial-economic attachment to their original locations (Lira & Saputra, 2024; Agustin et al., 2025); replacement facility design must therefore account for distance, visibility, and existing customer flow patterns.
5. Universal accessibility as a non-negotiable priority in any shared space scheme. Given the critical finding that shared space risks creating new barriers for persons with disabilities (Lawson et al., 2022), any application of partial shared space typology on Medan's sidewalks must incorporate tactile paths and universal accessibility elements through a community-engaged design process (Koesoemawati et al., 2025).

Limitations and Directions for Future Research

As established in the methodology section, this study is conceptual in character and does not involve direct field observation or interviews with street vendors or pedestrians in central Medan City. The spatial typology mapping presented in the discussion is hypothetical-conceptual, based on the synthesis of secondary data and design precedents, and consequently requires empirical verification through subsequent field research. Future research is therefore recommended to:

- Conduct field spatial surveys to validate the proposed occupation typologies in Section 4.1, including actual sidewalk dimensional measurements across selected corridor samples in central Medan;
- Conduct interviews or focus group discussions with street vendors and pedestrians, including persons with disabilities, to directly elicit lived space patterns complementing the Lefebvrian conceptual framework employed in this study (Lata, 2022);
- Test the effectiveness of the proposed spatial solution typologies through simulation studies or pilot case studies on a selected corridor before broader application.

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