



**Analysing the relationship between street edge characteristics and
peoples' everyday behaviors in the Chinese Urban Villages of Wuhan**

By:

Jie Xiong

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Department of Landscape Architecture
Faculty of Social Science
University of Sheffield

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Abstract

The prevailing narrative is that Chinese Urban Villages are substandard living environments requiring regeneration, and decision-makers often underestimate their current worth as rich and complex environments by viewing the land on which they sit as ripe for development. However, this doctoral research aims to demonstrate the value inherent these settings, notably in terms of their human-scaled composition (encompassing interconnected social, spatial and material facets) and the bustling daily life they foster. These elements have received insufficient scholarly attention, a gap in this PhD seeks address. Through this, the research will offer fresh perspectives that underscore the importance of appreciating and preserving these unique environments.

This study builds upon existing knowledge and theory relating to urban street edges to underpin a detailed empirical assessment of the social, spatial and material attributes of these realms, while also understanding the influence of these attributes upon peoples' behaviour. This all takes place within the context of Chinese Urban Villages, in particular Tan Hualin and Si Menkou urban villages of Wuhan. Methodologically the research employs a transitional edge analysis (employed in the context of interest for the first time) and video-based data collection. The research, bolstered by progressive analytical approaches and techniques, offers direct insight into peoples' engagement with street edges and in particular their segments (territorially distinct realms within street edges). The research findings provide a solid, theoretical-grounded basis for future development in urban design, particularly in Chinese urban village context.

The insights gained from the current research place emphasise the significance upon territorialisation and personalisation of street edges, especially at segment scale (a subdivision nested in street edge with socio-spatial complexities). This idea primarily arises from street edge framework (extent, laterality, locality) and segment understanding (social, spatial, and material dimensions) in the exploration of the

relationship between human behaviour and the structural characteristics of the streets. It contributes to regard street edges as socio-spatial entities, thus they have a strong potential role to play in establishing the balance between top-down and bottom-up in Chinese urban villages.

The findings generated in this research make a significant contribution to urban design discourse, specifically concerning the development of street edges and segments in Chinese urban villages. This work strives to craft socially responsive street environments through balancing top-down and bottom-up engagement. In essence, this study establishes a robust, evidence-based understanding of how socio-spatial qualities of street edges stimulate pedestrian engagement and experience.

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Chapter I

Introduction

The treatment of the city's edges, particularly the lower floors of buildings, has a decisive influence on life in city space.

Gehl, 2010, p. 75

In recent years, numerous urban scholars and researchers have highlighted that street edges, which sit at the interface between public and private realms along urban streets (Figure 1), serve as a key zone influencing pedestrian experience, while providing opportunity for enduring and fleeting social interactions (Mehta, 2007; Gehl, 2010; Thwaites et al., 2020; Simpson et al., 2022). However, across the world, challenges remain when attempting to create as well as preserve engaging and appealing street edges for people to inhabit and use during their daily life (Dovey and Wood, 2015; Kamalipour, 2017). Within the context of interest during this current study, Chinese Urban Villages, street edges are under significant pressure. Gradually they are becoming less engaging for street inhabitants due to their homogenisation and singularity (Hsing, 2010; Lu, 2012). The reason for this is top-down dominated modern urban development, meaning that there is erosion of the spatial and social fabric of street edges in Chinese urban villages (Liu, 2010). Whilst this is noticeable, limited knowledge remains about the social dynamics and physical attributes of street edges in Chinese urban villages. This lack of knowledge means that the true value of these environments is not fully understood. The current research seeks to address this via a series of themes, along with associated aims:

1. Research Theme 1: Comprehensively analyse the interconnected spatial, material, and social composition of street edges, and in particular differing territorially defined realms within them known as 'segments' (to be introduced later in Chapter 3), in a Chinese urban village context;
2. Research Theme 2: Captured the richness of peoples' everyday activities that take place along street edges within a Chinese urban village context;
3. Research Theme 3 – Analyse the relationship between the composition of street edges (Theme 1) and peoples' everyday activities (Theme 2) in order to better

understand how spatial, material and social attributes of this distinguishable place influence users' engagement in a Chinese urban village context.

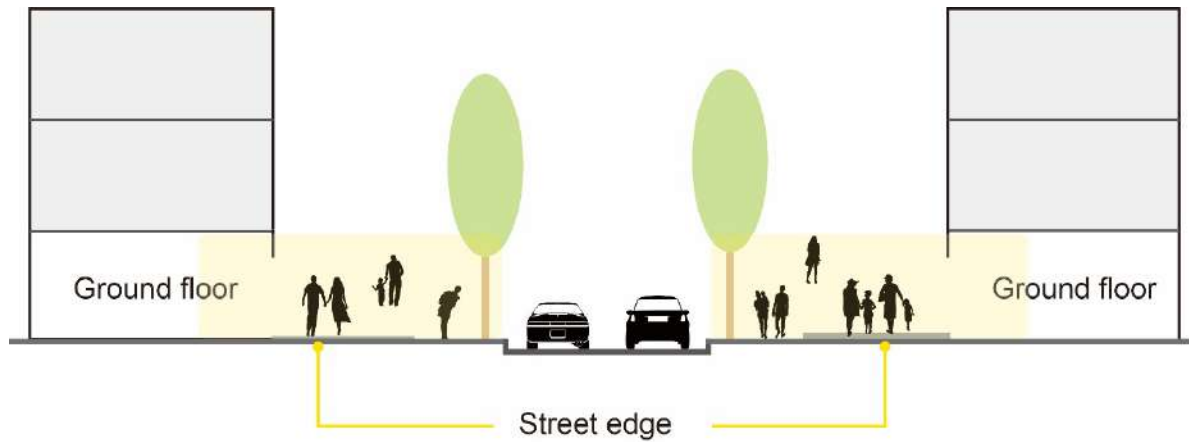


Figure 1 Street edge

Academic contribution

There is a growing body of academic research which continues to highlight the social significance of urban street edges (Gehl, 2010; Dovey and Wood, 2015; Mehta, 2019; Thwaites et al., 2020; Simpson et al., 2022). However, modern urban development practices have signaled trends towards commercialisation and homogenisation as well as decline of street edge space (Bobic, 2004; Gehl, 2010; Kickert, 2016; Goldhagen, 2017). This raises questions about whether street edges are being negatively impacted or if they are treated as an attachment of the building structure. This research seeks to contribute to ongoing discourse surrounding street edges, particularly exploring the relationship between their socio-spatial qualities and activity engagement. It thus aims to answer this primarily focused upon the following three aspects:

1. Advancing academic debate – The study builds upon the works of influential scholars, such as Dovey (2010), Gehl (2010), Glaser *et al.* (2012), Thwaites *et al.* (2013), Mehta (2019), and Simpson *et al.* (2022), to further the academic discussion on the socio-spatial attributes of street edges in urban discourse;
2. Exploring outdoor activities – This research delves into the debate on outdoor

activity tasks, its relation to everyday lives of street inhabitants, drawing from the fundamental work of Gehl (1987) and Mehta (2019);

3. Developing a refresh methodological framework – This study introduces an advanced and practical approach to provide insights that are currently lacking in urban design discourse. While there is substantial literature on the importance of bottom-up interventions, there is a dearth of research on how material and spatial qualities influence social engagement in current discourse, in particular Chinese urban villages. It thus aims to fill the gap in understanding the interaction between socio-spatial qualities of street edges and everyday engagement, which has not been explored before.

Covid-19 mitigation statement

As the world continues to cope with the challenges posed by the Covid-19 pandemic, it is imperative for the author to adapt their research methodologies and practices to ensure the safety and well-being. In response to this unprecedented situation, this mitigation statement outlines the measures and strategies in the current research to mitigate and cope with Covid-19 while continuing the academic pursuits.

1. More observation less communication

In light of social distancing guidelines and restrictions on in-person gatherings, author prioritise remote work approach whenever possible. This includes conducting literature reviews, onsite observation, and other research activities remotely using online resources and tools. Through this, it will help author to collect data to the greatest extent possible. Methods such as focus group, thus, interview or workshop were not taken into account due to social distancing at the time.

2. Health and safety protocols

Author prioritise his health and safety as well as the health and safety of others in their research environments. This includes adhering to recommended health and safety protocols such as wearing masks, practicing good hand hygiene, and maintaining

physical distancing when conducting fieldwork or interacting with others in person. Author also stay informed about the latest guidance from public health authorities and academic institutions and comply with any additional safety measures implemented by their research institutions.

3. Community engagement and stakeholder consultation

Although large-scale engagement with communities and stakeholders may be limited due to the pandemic, author explore alternative methods for community engagement and stakeholder consultation, primarily adopt observation and video recording to gather input and feedback from relevant stakeholders. Author strive to maintain open lines of communication with communities and stakeholders and adapt their engagement strategies to meet the unique challenges posed by the pandemic.

4. Ethical Considerations

Prior to conducting data collection, an ethical approval was authorised by Department of Landscape Architecture, The University of Sheffield (Reference Number: 036596). This includes respecting the rights and dignity of research participants, ensuring informed consent is obtained, and safeguarding the confidentiality of sensitive information, particularly in everyday street settings.

Conclusion

In conclusion, while the COVID-19 pandemic presents unprecedented challenges for author, it also offers an opportunity to innovate and adapt research practices in response to changing circumstances. By prioritizing health and safety, and maintaining ethical standards, author can continue to advance their research agendas while contributing to the collective effort to mitigate the spread of COVID-19.

1.1 Thesis structure

The overall research is composed of varying chapters as follows, in order to explore and contribute insights that achieve the research aims proposed above –

Chapter I – Introduction

The first chapter demonstrates an outline of the research along with its constitute parts, starting with an introduction of general research context and rationale, which elicits corresponding research aims. Built upon this, the intention is to highlight the overall structure – Problem, Processes, and Products – of the current study, as well as research contributions. This is followed by a discussion that illustrates the streets and street edges of particular interest.

Chapter 2 – Existing trends of Chinese urban design and street edges in Chinese urban villages

Built upon the discussion from Chapter I, this chapter commences with an overview of the current state of Chinese urban design, and its influences upon the characteristics of Chinese urban villages from a holistic viewpoint. It then delves into the existing trends of streets within Chinese urban village context, particularly the socio-spatial features of streets and edges in the real world (Theme 1). Here, this section seeks to discern which facets of these unique environments are pivotal in shaping vibrant street edges, with an emphasis upon understanding the interplay between top-down (professional strategies) and bottom-up (non-professional tactics) design decision-making. Subsequently, the focus shifts to a nuanced scale – segment scale, conceived as territorially distinct socio-spatial subdivisions amenable to identification and evaluation. Then, it focuses upon the diverse activities along street edges in Chinese urban villages (Theme 2). Drawing on these dual aspects, it will explore the relationship between socio-spatial qualities and everyday activities (Theme 3). This exploration is proposed in response to the prevailing trends of Chinese urban design discourse and practical challenges at hand.

Chapter 3 – Street Edge Framework

This chapter starts by delving into the philosophical foundations of street edges as a distinctive place, examined through the perspective of phenomenology and as a result an emphasis upon people's perception and experience. It seeks to review insights in a creative way, encompassing and contributing ideas towards the development of theory-based conceptual grounding. This lays the foundations for introducing a 'Street Edge Framework', within which territorial 'segments' are intricately linked to the socio-spatial structure of street edges (Theme 1). This socio-spatial consideration permeates the research, notably in the way street edges and segments evolve as a complex interconnectivity of social actions and material / spatial qualities (Dovey, 2010; Thwaites et al., 2013). Through this, people's everyday desires and needs can be manifested through physical form and spatial organisation in response to socio-spatial qualities (Theme 2). This understanding sheds light on the interactive relationship between material / spatial qualities and everyday activity tasks (Theme 3).

Chapter 4 – Research Questions

Research questions are presented, which align with the three themes demonstrated earlier in this chapter. This section also acts as a foundation for the introduction of specific methods that will be used when seeking to answer the different questions put forward (Chapter 5).

Chapter 5 – Methodological Framework

Chapter 5 proposes methodological approaches that will be employed to empirically validate ideas forwarded in street edge framework (Chapter 3) and address the research questions presented (Chapter 4). The primary focus lies in obtaining detailed insights into the structure of street edges, and in particular their territorial segments, alongside capturing an understanding of the way people interact with these realms. The methods employed directly builds upon established techniques involving video

recording and onsite observation, with a focus upon socio-spatial features and outdoor activity classification (Gehl, 1987; Thwaites et al., 2020). Alongside this, a *Transitional Edge Framework* is used, which aims to provide a detailed analysis of the material, spatial, and social qualities of street edge segments. This analytical approach has not been used in Chinese Urban Village context before, and offers the means to thoroughly investigate the relationship between everyday activities and socio-spatial attributes. During this, the lead researcher conducted video recording in two urban villages (6 street edges and 110 segments in total). These videos not only captured the complexity of material and spatial features of the street edges, but documented the dynamic everyday activities in which pedestrians participated.

Chapter 6 – Results

This section presents findings stemming from the video recording, socio-spatial transitional edge assessment, and documenting everyday activity tasks. The insights obtained are presented and discussed directly in response to the research questions forwarded. Results are shown in three groups mirroring the three themes proposed before (Chapter 1).

Chapter 7 – Discussion

Chapter 7 seeks to contextualise study findings in response to research gaps introduced (Chapter 3). It utilises these insights to evaluate existing trends and issues in modern Chinese urban design (Chapter 2). Of particular importance is the consideration of how street edges influence people's everyday life, alongside actions that can be taken to craft distinctive realms that foster rich social engagement with street edges. The chapter concludes with a consideration of research limitations and outlines potential avenues for future research.

Chapter 8 – Conclusion

The concluding chapter provides a concise overview of the research undertaken. It emphasises the significant contribution made to the understanding of street edges within the specific context of Chinese urban villages and discusses how these insights can be extrapolated to broader urban contexts.

Bibliography

The references were cited throughout the overall research investigation.

Glossary

Key terminologies used throughout the current research

Overall, this thesis is divided into three sections – Problems, Processes, and Products (Figure 2) – with a total of nine chapters to demonstrate. It synthesises the theoretical findings to develop a fresh methodological framework for further refinement, which potentially can be translated into design practice.

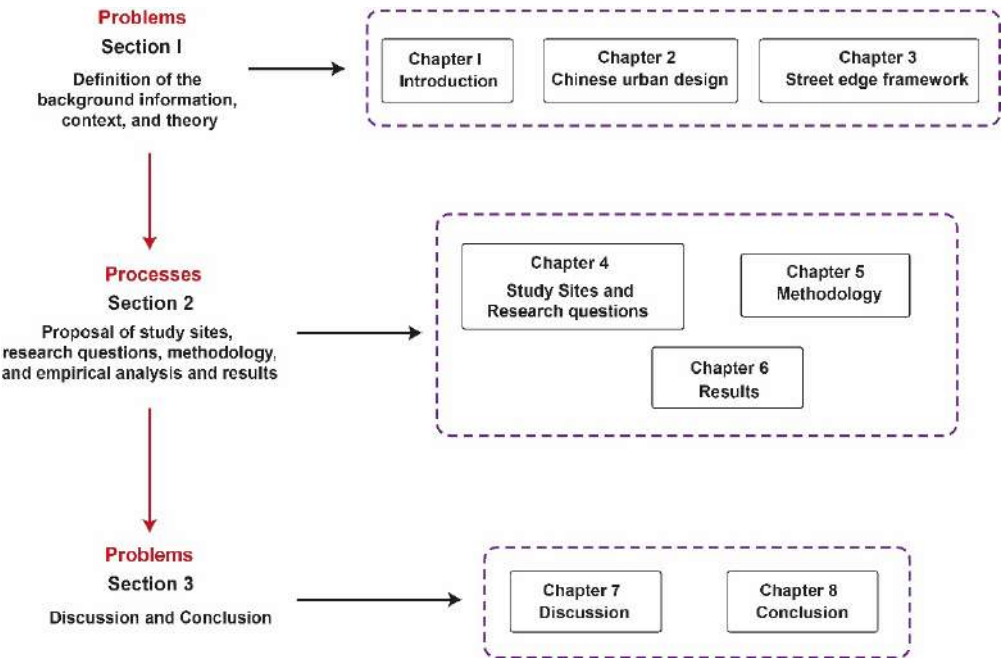


Figure 2 Thesis structure

Research relevance

This research thus seeks to fulfill the gap in three major ways:

- Employing *Transitional Edge Assessment* as a fundamental tool in this research. It has validated to be productive for evaluating the social, spatial and material dimensions of street edges and segments. This is an effective method to obtain data through quantitative analytical techniques. Besides, the concept of socio-spatial evaluation provides opportunity for presenting empirical evidence in the investigation of street edges within Chinese urban village context;
- This research advances knowledge and contributes to academic debates regarding activity tasks with street edges, with the goal of establishing socially responsive street environments. Through analysing activity engagement, this study delves into how street edge qualities influence pedestrian experience, which reflects their perceptions of street and edge conditions in Chinese urban villages;
- The approach employed in this study also establishes a foundation for the development of new methodologies that integrate the street edges and activity tasks into urban design and planning research. This expansion of research methodologies could examine the diversity and inclusivity of street spaces.

1.2 Why streets and edges are significant?

As urbanisation continues to surge, streets, as ubiquitous and easily accessible public space, continue to play a significant role in people's everyday lives (Mehta, 2019; Simpson et al., 2022). They are not merely considered as a monotonous line, or path for traffic transportation or pedestrian movement, but much emphasis upon making the street as a distinct place (Alexander et al., 1979; Gehl., 2010; Glaser et al., 2012). This had led to claim that streets, and in particular street edges, are socially significant

realms within which a balance of top-down and bottom-up interventions take place, providing opportunity to create a healthy, lively, and sustainable city. This is especially pertinent in the context of China, where urban development has been predominantly influenced by large-scale, top-down approaches driven by powerful institutions and private companies (Liu et al., 2010; Liu and Wong, 2018; Sun et al., 2019). Given this backdrop, the ground-floor interfaces of buildings, which regularly characterise streets, have emerged as a neglected yet crucial component of the built environment, requiring thoughtful design to become socially responsive and experiential (ibid). This explains the significance of street edge in enriching the engagement and experience of street inhabitants –

The edge along ground floors is also a zone in which doors and exchange points between inside and outside are located. The edges provide the opportunity for life in the buildings or immediately in front of the buildings to interact with life in the city. This is the zone where activities inside the buildings can move out into the common space of the city.

Gehl, 2010, p. 75

Numerous urban scholars have highlighted the significant role that edge environments play in shaping social value and engagement with urban settings (Gehl et al., 2006; Dovey and Wood, 2015; Kickert, 2016; Thwaites et al., 2020; Simpson et al., 2022). They determine whether public spaces like streets are engaging or not, influencing urban residents to either positively or negatively interact with these areas. This also influences social engagement of street inhabitants, who hold the power to infuse streets with vibrancy and enjoyment, bolstering their self-identity and sense of belonging (Speck, 2012; Thwaites et al., 2013). In the modern society, however, many edge settings tend to be disengaging or abrupt division across two adjacent realms, stifling opportunities for territorialisation and personalisation (Thwaites et al., 2020).

The characteristics of ground floor edges have significant influence upon pedestrian

engagement and experience (Barros et al., 2021; Simpson et al., 2022). This, in turn, greatly contribute to the street vitality and social well-being of street inhabitants (Mehta, 2019). This sentiment is echoed by Glaser *et al.* (2012) and Thwaites *et al.* (2013), who emphasised the potential of well-designed urban environments, particularly in edge settings, to enhance human interaction. They delve into the importance of how street edges can promote people's everyday lives through differing physical attributes, thus enriching the overall street environment. Similar ideas can also be found in the work of Mehta (2019) and Hassan *et al.* (2019), who emphasised the benefits of human-oriented streets and ground-floor interfaces in facilitating positive pedestrian experiences and prolonged social activities. Although such insights have been partially explored in western context, there remains a research gap in empirically investigating the interaction between socio-spatial attributes of street edges and everyday activities, in particular Chinese urban villages.

The need to enhance the sustainability and livability of urban environments, particularly in street and edge settings within Chinese urban villages, is of paramount importance. In modern urban design, the prevailing top-down decision-making processes have adversely influenced the street edges to be socially engaged and experienced, a topic that will be explored further in Chapter 2. As a transitional space spanning indoor and outdoor realms, this area warrants greater attention to ensure that it can evolve into an engaging space whilst meeting the requirements for social interaction (Hassan et al., 2019; Thwaites et al., 2020). In this context, there exists an opportunity to explore how street edge space can transform into a distinctive place that profoundly influences people engagement and their lives. And this forms the central premise throughout the current research.

1.3 Why Chinese urban villages?

Urban villages, as a manifestation of a '*village encircled by the city*' (Liu et al., 2010), are a unique social product due to urban development and expansion noticeable

across China (Hao et al., 2011; Zhou, 2014; Liang et al., 2018). They have undergone a transformative process from rural settlements to urban communities as a result of rapid urbanisation and complex land ownership policies (ibid). China's urbanisation rate reached 51.27% in 2011, which indicates that more than half country's population lived in the cities (Zheng, 2018). However, there remains substantial migrant labours who do not acquire their urban *hukou*, which is a household registration system that includes urban residency and village residency, yet they work in cities, and most of them opt to reside in urban villages (He et al., 2010; Pan and Du, 2021). As urban villages are products of the transformations of rural into urban areas, thus, over 80% of the urban villages are distributed in comparatively developed cities, where these regions that provide job opportunities for migrant workers (ChinaIRN, 2020). In terms of the *Guiding Opinions on Promoting Redevelopment of Old Urban Neighbourhoods in Cities and Towns*, reconstruction plans for the year 2020 included 39,000 old neighborhoods, affecting the settlement of seven million urban and town village households (General Office of the State Council of the PRC, 2020). This policy implementation primarily focuses upon three aspects, infrastructure improvement (building roof, and external wall etc.), essential service facility improvement (accessible facility, and public green space etc.), as well as life quality improvement (public health facilities, and convenience store etc.).

Chinese urban villages are usually characterised by high-density and low-quality housing construction, poor infrastructure, and narrow streets packed with shops, residential provision, and differing services. Although numerous urban scholars and media have negatively condemned urban villages as problematic areas with disorder and unruliness, they in fact play a positive role in urban development in China, particularly in promoting dynamic social interaction within everyday street life (Tian, 2008; Hao et al., 2011; Liang et al., 2018). To some extent, streets in Chinese urban villages shares some similarities with the western context, such as walkability, accessibility, mixed land use, and more important, neighborhood interaction (Liu et al., 2010; Lin et al., 2011; Xia et al., 2012).

The difference between urban villages in Britain and China

Urban villages are widespread in cities across the world, but no one example or story is able to comprehensively demonstrate all (Thrift, 2000). While the same kind of residential can be a commonplace feature of urban form, there exist significant differences between them (Jayne and Bell, 2017). The concept of urban villages in western context, particularly in Britain, was pioneered and facilitated by the Urban Village Group in 1980 (Biddulph et al., 2003). This urban village concept attempts to develop well-designed, mixed-use, and long-lasting sustainable urban areas, with the goal of fostering a distinct sense of place and creating pedestrian-friendly environment (Aldous, 1992; Tait, 2003). This initiative stemmed from growing concerns about the rapid urban development, which results in the erosion of neighbourhood identity, especially compared with the older and traditional areas (Talen, 2018; Carmona, 2021). Initially, the development of urban villages was primarily driven by a top-down approach, involving collaboration among professionals such as architects, urban designers, developers and investors, in a top-down way (Biddulph et al., 2003). However, during the mid- to late 1990s, it has shifted the emphasis away from merely considering urban villages as large-scale residential projects, towards promoting a more open public concept and a form of greenfield development, which could be suitable for urban regeneration at human scale (ibid). Urban villages are usually conceptualised as ideal models for community development, aiming to create self-sufficient environments that cater to the daily needs of local residents (Aldous, 1995). As Aldous (1995) claimed that urban villages is a 'working basis of common experience and common assumptions which gives strengthen to the community' (p. 24), whilst creating 'attractive environments, lively atmosphere and active, cohesive communities we associate with urban neighbourhoods which embody these characteristics' (p. 20). This emphasis upon everyday social interaction among residents and in particular the place-making of a community (Tait, 2003). In the context of Britain, urban villages have been increasingly recognised as a platform for bottom-up engagement in urban renewal efforts. They provide opportunities for residents to actively participate in

shaping their communities and have been lauded for their potential to foster everyday users' initiatives and community empowerment. This is, however, sharply different from Chinese urban villages, which are usually identified as informal settlements with a deteriorated quality, poor housing construction and extremely imbalanced social development (Liu et al., 2010; Hao et al., 2011).

Why Wuhan?

Wuhan is one of the mega-cities of China and is the capital city of Hubei Province. It has started the land redevelopment of urban villages since 2004 (Yang and Cai, 2020). Alongside this, local government had enacted substantial policies to develop land use, shifting its emphasis from villages towards cities in coordination with their surrounding rural areas. Besides, over 80% of urban villages in Wuhan have been, or are being, transformed into urban communities (Yang and Zhang, 2023). The urban village redevelopment is guided by the 'Regulations on Housing Expropriation and Compensation of Stated-owned Land' (State Council of the PRC, 2011). Preceding this regulation, in 2009, the government of Guangdong Province had carried out a policy, 'Some Opinions on Promoting the Three Old Transformations and the Intensive Use of Land', with the objective of revitalising the 'three old' areas, namely old town, old factories, and old villages (Liang et al., 2018). This policy framework has served as a model and widely applied into different cities across China, including Wuhan (Lai and Zhang, 2016). Thereafter, The *State Council's Opinions on Further Promoting New Urbanization*, launched on February 6, 2016, outlined the objective of realizing the redevelopment of shantytowns, urban villages, and dangerous houses, which collectively house approximately 100 million residents (State Council of the PRC, 2016). Accordingly, urban village development has gained traction, particularly in China's megacities (Yang and Cai, 2020).

During the period of rapid urbanisation, over 80% of urban villages in Wuhan have been transformed into new urban neighborhoods (Yang and Zhang, 2023). The

redevelopment models of urban villages often comprise two types: government-oriented model and community-driven model. In the context of land ownership, while the right of land use typically rests with local villagers (Yang and Cai, 2020), it's essential to note that the land itself is owned by the nation. Consequently, the redevelopment of urban villages often involves large-scale renovation or demolition actions (Liang et al., 2018). Regarding the community-driven model, many residents opt to augment their original houses by adding extra storeys. This practice is motivated by the desire to generate additional income to sustain their livelihoods (ibid). Unlike urban villages merely dominated by government-led in Beijing or market-oriented by Shenzhen, urban villages in Wuhan involve these two models (Li et al., 2014; Lai et al., 2017; Liu and Wong, 2018). In this way, Wuhan is a typical example that provides opportunity to explore in-depth urban village redevelopment, in particular at a nuanced scale - street edges that closely relates to peoples' everyday life. Wuhan, therefore, has been chosen as the study area in the current study, providing insights that aim to correlate with urban village development in other super cities, such as Beijing, Shanghai, Guangzhou or Shenzhen.

Chapter 2

Chinese urban design

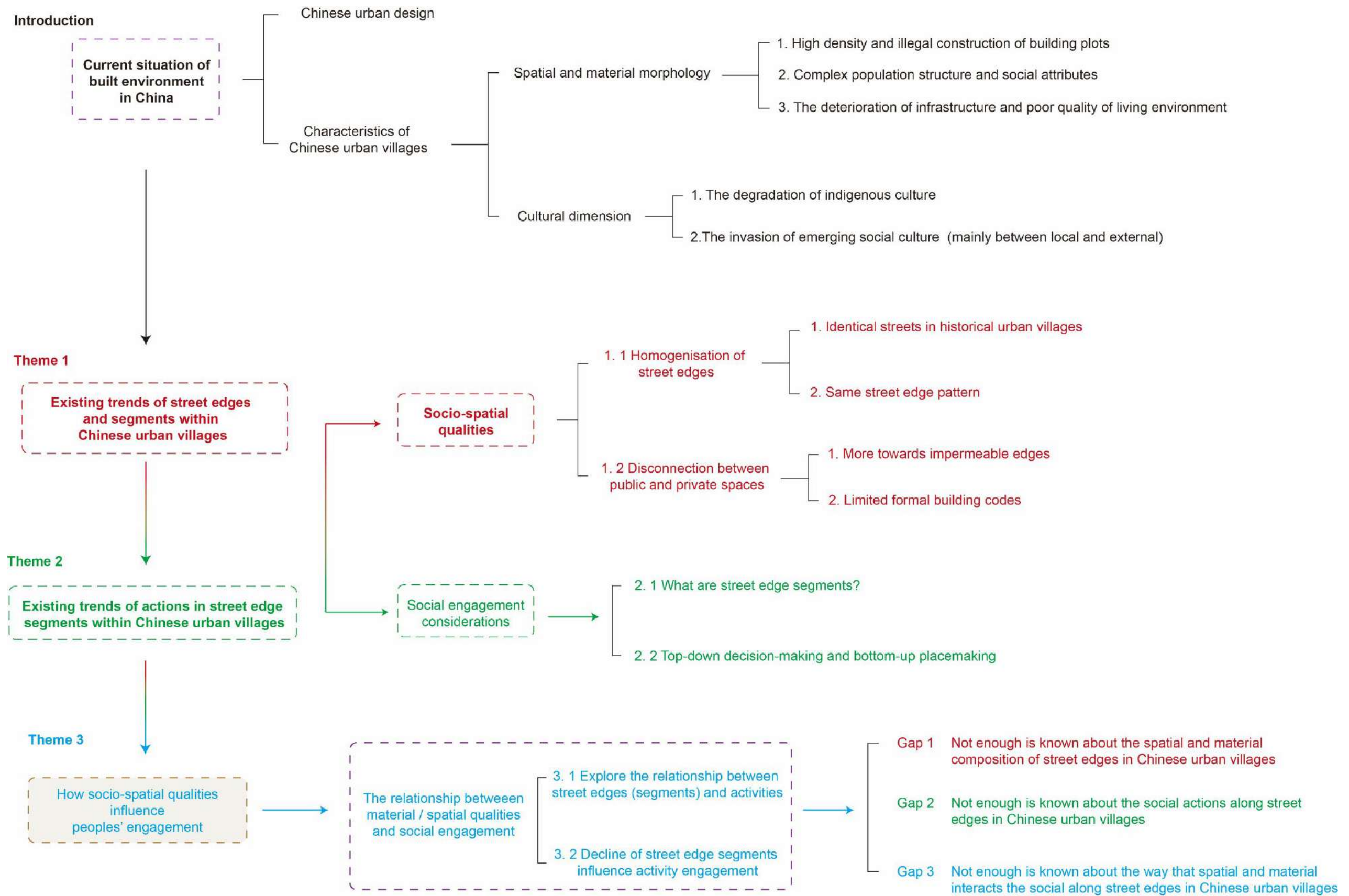


Figure 3 Overall flow map of Chapter 2

This chapter examines key characteristics of Chinese urban villages, with a specific focus on their street edges and territorial segments (Theme 2.1). It begins with a general introduction and critical review of the existing trends in Chinese urban design. This includes a discussion on the influence of top-down decision-making actions and economically driven process of urbanisation, which have significantly impacted development and environmental change in urban villages. This discussion forms the backdrop for an exploration of the current trends in street edge research within the context of Chinese urban villages. During this, particular attention is given to their spatial and material qualities, highlighting issues related to the homogenisation of street edges and the disconnection between public and private interfaces (Theme 1). Following this, the narrative moves to a more nuanced scale – street edge segments (Theme 2). The motivation for this is to explore peoples' social interaction within segments in greater detail. In the final section, the focus turns to the interplay between material / spatial characteristics and social engagement. This involves an investigation into factors that may hinder active engagement between street inhabitants and territorial segments, along with an exploration of the underlying reasons for such issues (Theme 3). These analyses will be closely tied to a broad spectrum of socio-spatial discourses, which will be explicitly discussed in Chapter 3. By approaching the subject matter from these diverse perspectives, this chapter seeks to establish a comprehensive framework of the existing discourse, setting the stage for the subsequent research undertaken.

2.1 Introduction: Current situation of the built environment in China

2.1.1 Chinese urban design

To provide a broad context, the term *urban design* originated in North America in the late 1950s, with the aim of developing an approach to perceive lived experience of urban physical settings through exploring the relationship between urban inhabitants

and public space, rather than merely focusing upon building design or its function (Dovey, 2016; Chen and Thwaites, 2018; Carmona, 2021). For a long time, the practices of urban design are considered as a professional-driven approach, and how it is differentiated from urban planning and architecture have been discussed and debated. As Gunder (2011) maintained, “*urban design is a subfield of urban planning particularly concerned with urban form, livability and aesthetics*” (p. 184). This aligns with the idea discussed by Buchanan (1988), claiming that “*urban design lies somewhere between the broad-brush abstraction of planning and concrete specifics of architecture*” (cited in Cowan, 1997, p. 20). One of the most significant elements of urban design to distinguish from others is that associated with a certain *scale*, which has been normally regarded as the intermediate scale between urban planning (city scale) and architecture (individual building scale) to strengthen spatial morphology and social relations (Carmona, 2021).

Within a Chinese urban context, it has been argued that “*urban design is defined as the design or arrangement of a city’s physical forms and spatial environment, and needs to be carried out at all levels of planning*” (Chen and Thwaites, 2018, p. 152), in line with the Chinese planning document *Standards of Terms in Urban Planning* (1998). Through this urban design processes, systems and guidance has become dominated by centralized government and large institutions (Figure 4). From the perspective of Chinese policy-makers and urban designers, contemporary urban design is commonly presented as gentrified communities, high-rise buildings and orderly-planned districts in an extremely top-down manner (Figure 5), barely taking everyday experience at human scale into consideration (Gehl, 2010; Hassan et al., 2019). In practice, most designers and planners simply regard urban development as design projects, rarely considering the essence of human-environment relations as a being and becoming manifested through regular human activity in their daily life (Dovey, 2010). Such insights mean that it shifts the emphasis away from the whole, towards nuanced components, which could facilitate potential opportunity and social dynamic, as

Tibbalds (1992) stressed *places matter most* –

We seem to be losing the ability to stand back and look at what we are producing as a whole. ... We need to stop worrying quite so much about individual buildings and other physical artefacts and think instead about places in their entirety.

Tibbalds, 1992, p. 9

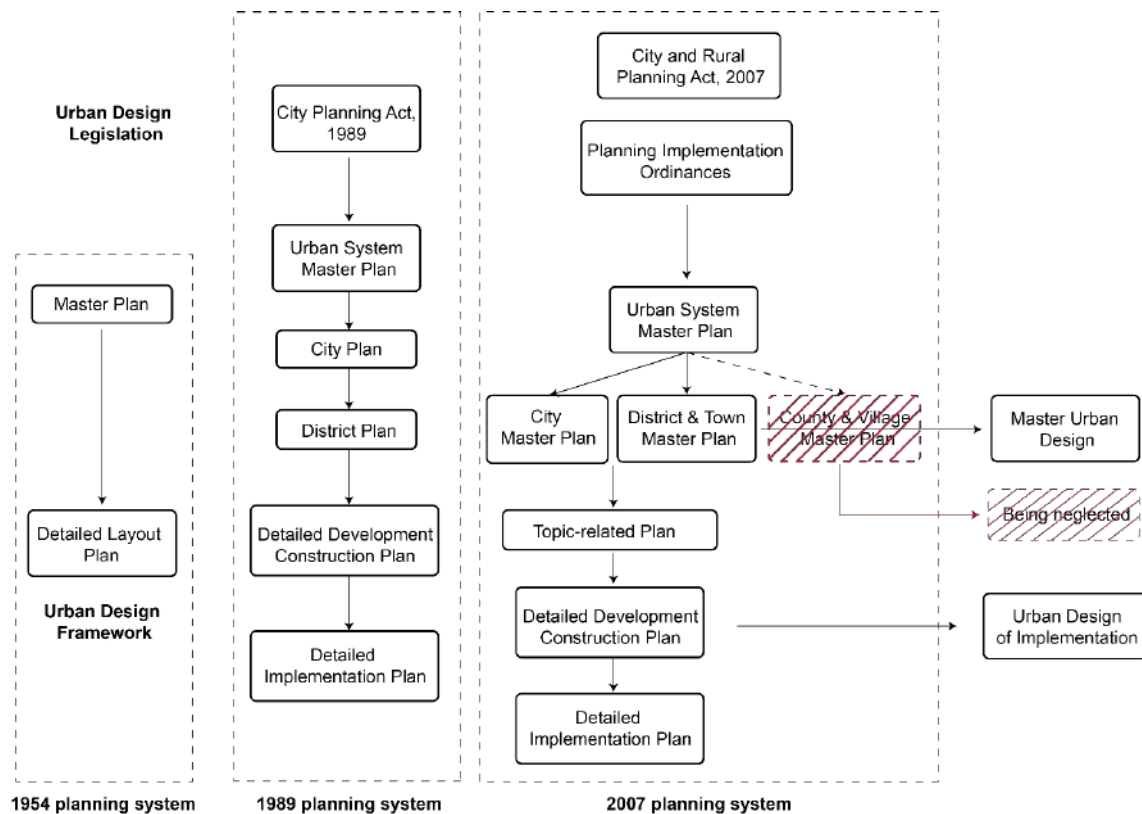


Figure 4 Chinese urban planning system process (Source: Chen and Thwaites, 2018; Re-diagrammed by author)



Figure 5 Beijing: Large-scale buildings and complexes (Source: Ethan, 2018)

Alongside the points discussed exists an ambiguity between the role of architects and planners when delivering Chinese urban design interventions. The reason for this is that both of these professionals were educated in an architecture and planning oriented approach system, which inevitably pays more attention to physical buildings or regional planning knowledge over social engagement and lived experience at a nuanced scale (Chen and Thwaites, 2018). Through this, architects and planners are often confused about their role and responsibility for government or the public, or merely in pursuit of economic growth driven by the urbanisation (Dai and Duan, 2003; Friedmann, 2005). This clearly noticeable within the fast growing Chinese urban context and particularly in their urban villages.

2.1.2 Characteristics of Chinese urban villages

Rapid urbanisation in China, fueled by economic and industrial development, has led to significant urban expansions, which have often been viewed as a measure of prosperity and growth (Lai et al., 2014). This has resulted in urban planning and management, and its spatial structures are facing new challenges, particularly heavy handed, professional-dominated and architecture-driven interventions leading to the homogenisation in city developments that do not respond to the needs of everyday

people inhabiting and using urban villages. (Mangurian and Ray, 2010; Taylor, 2011; Zacharias and Tang, 2010; Hao et al., 2013; Wang, 2018). During the process of urbanisation in China, there has emerged a unique urban pattern – urban villages (Chen and Thwaites, 2018; Levin, 2018; Wang, 2022). Chinese urban villages are a social product driven by policy design decision-making to the marketplace (Niu and Wagenaar, 2018). Due to large-scale city expansion, local governments have had to rely upon expropriation from rural land (Figure 6), in order to provide adequate space for urban expansion and development (Hao, 2012). They are generally considered as informal settlements or slums with a deteriorated quality of urban environment, poor housing construction, which lead to extreme imbalance of social economy and development (Liu et al., 2010; Niu, 2019). Furthermore, they have gradually become a ‘marginal area’ next to orderly-planned and high-rise downtown centres (Lu, 2015; Chen et al., 2016), resulting in their material morphology and spatial structure being quite different from the surroundings (Figure 7). The following discussion will provide an in-depth exploration of the characteristics of urban villages from diverse perspectives, including infrastructures and local inhabitants. By doing so, this thesis hopes to shed light on the potential reasons negatively impacting edge development and public engagement.

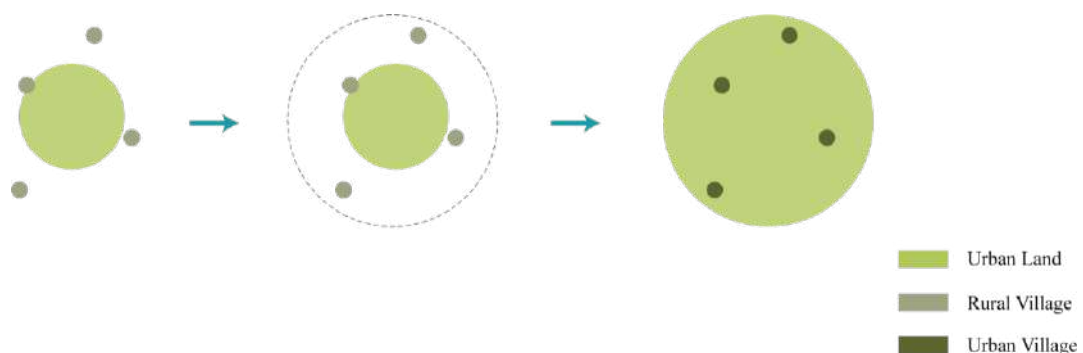


Figure 6 The transformation of rural villages to urban villages

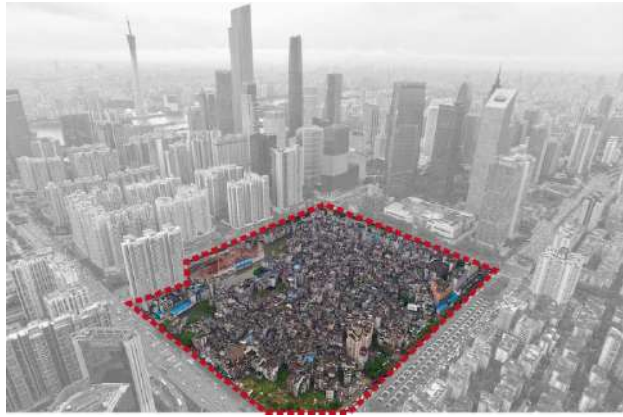


Figure 7 Guangzhou: Urban village spatial form (Source: That's Magazine, 2017), and red line highlights *the boundary of the urban village*

2.1.3 Characteristics of Chinese urban villages – Spatial and material morphology

The problem essentially comes from the same production line of space that follows the market rules and inertia. This is why the similarity between today's new settlements and industrial products occur. They are nowadays programmed and built as products for the common consumer, built-up upon average norms, similar programs and the same financial requirements.

Bobic, 2004, p. 26

The rapid development of urban areas has led to the formation of urban villages, which not only generates a series of issues relating to social and economic imbalance, but also leads a singularity of building structure alongside inadequate facilities (Liu et al., 2010; Hao et al., 2013). As a result, Chinese urban villages are gradually being marginalised in social development. The reason for this is they are market products evolved from the rapid urbanisation process and the dual-track land ownership system in China (urban land being owned by the state and rural land owned by the collective, *which means property rights belong to local villagers of each household, but centralised management by village committees*) (Hin and Xin, 2011; Chen and Jin,

2023). Besides, due to its unique physical pattern and spatial form, they are dramatically different from surroundings (Hao et al., 2013; Chen and Thwaites et al., 2018). Discourse focusing on these characteristics emphasises how marginalisation is becoming noticeable across three major aspects that potentially influence street and its edge when people engage.

1. High density and illegal construction of building plots

There is a very typical building typology within Chinese urban villages, which is a building plot composed of ground floor for business and upper floor for residential (Figure 8), also known as informal *shop-residential buildings* (Chen and Thwaites, 2018). The active ground-floor interface can be usually regarded as a transitional space between private and public (Dovey and Wood, 2015; Hassan et al., 2019; Thwaites et al., 2020; Simpson et al., 2022). However, due to a lack of professional policy and management, many building owners have illegally added multiple storeys on top of their buildings for the purpose of acquiring more indoor area (Zhan, 2018). Upper floor space is occupied and expanded by the two adjacent households, which results in limiting sunshine penetration and narrow spacing between the buildings (Figure 9), also known as '*handshake buildings*' (Bach, 2010; Pan and Du, 2021; Yang et al., 2022). This illegal construction creates a potential hazard in daily use.

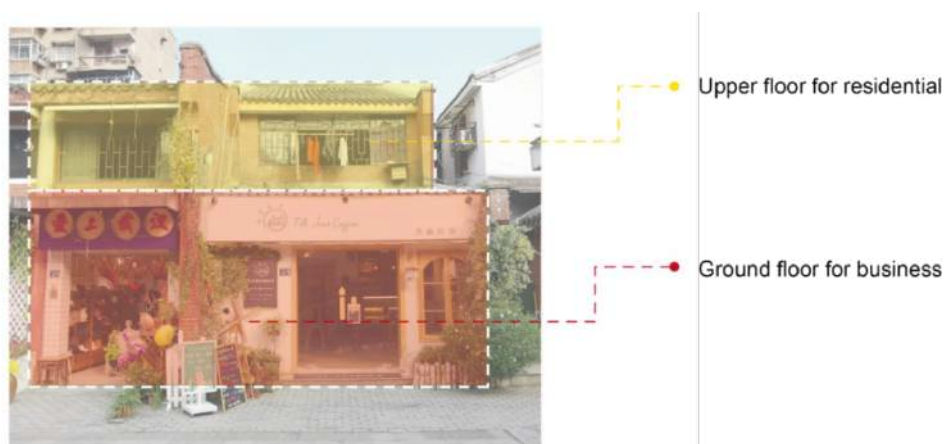


Figure 8 Ground-floor and upper floor



Figure 9 Shenzhen: “*Handshake buildings*” neighbourhood (Source: Emily Feng, 2018)

Ground floor projection is another building interface invasion that leads to the reduction of public space, in addition to spatial encroachment (Dovey, 2020; van Oostrum, 2020). As such, a lot of residents extend their limited private living space to the outside, such as Chinese laundry drying or the placing of personal products (Figure 10). Such occupation, characterised by a temporal nature, may improve convenience and comfort, but it also negatively impacts pedestrians passing through the narrow passages between buildings (Chung, 2018; Thinh and Gao, 2021). These passages, such as streets and laneways, are much narrower and irregular in comparison with city high streets (Figure 11).



Figure 10 Chinese laundry drying, and extending space outside (Source: VCG, 2013)

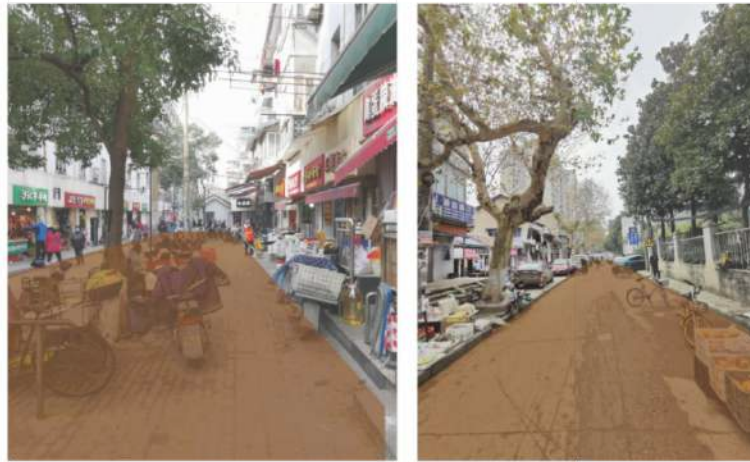


Figure 11 Narrow streets and alleys in urban villages

2. Complex population structure and social attributes

Although the population within urban villages is diverse, two different groups predominantly inhabited them (Chung, 2009, 2018; Zhang, 2014; Liu et al., 2010, 2012, 2015). The predominant group is the local villagers who have lived in such areas for generations, experiencing the transformation from rural village to urban village. Their previous agriculture lands were expropriated by the local government for urban development, which meant that the local residents lost their source of income, and have to rely upon letting to maintain their livelihoods (He and Wu, 2005, 2007; Smith, 2014; Chen and Thwaites, 2018; Niu, 2019). The second group are a migrant population, who generally come from countryside in search of jobs. Due to their limited knowledge and skills, they are usually engaged in low-income industries, and thus, the low-cost housing within urban villages is their first choice. In this way, this low rent housing can meet their requirements, resulting in urban villages gradually becoming congregated residence of this specific group. Apart from this, it is also associated with *hukou*, which is a household registration system that includes urban residency and village residency (He et al., 2010). From the perspective of social psychology (Sharma and Sharma, 2010; Zhu et al., 2012; Shekhar et al., 2019), this has partially negative effects on potential social engagement, to some extent, because of the deficiency of

neighborhood communication and lack of community activities. In the long term, alienation and indifference among residents makes it difficult to create a sense of place and belonging (Bhugra, 2004; Thwaites and Simkins, 2006; Cobbinah and Darkwah, 2016; Thwaites et al., 2020). With the increase in migration, the population structure of these two groups with different occupations, income, lifestyle and social hierarchy, therefore, has an impact upon social interaction as well (Smith, 2019; Yang et al., 2020; Xu et al., 2021; Huang, 2022; Tang et al., 2022).

3. The deterioration of infrastructure and poor quality of living environment

From the perspective of public infrastructure, due to the disorganised layout, chaotic arrangement, spatial and ground-floor encroachment of buildings, as well as immigration influx, the quality of the living environment has become a prominent issue within urban villages (Liu et al., 2010; Hao, 2012; Chen and Thwaites, 2018; Smith, 2014). Most of them lack effective management regulation, such as ageing housing structures, sewage treatment, and the deterioration of cables and wires (Figure 12). Moreover, as mentioned prior, most above ground floor stories within urban villages were illegally built by the residents in pursuit of higher rental income and seeking to maximise profit. To a large extent, such poor quality living conditions in the street environment often visibly deprives its inhabitants of a fulfilling social life. It can be noted that the profit-oriented and low-level development actions of villagers has deviated from the livable human-environment prospects. In the long term, negative impressions such as *“congested built environment, poor housing conditions, and low-quality infrastructure, and, therefore wasteful land use”* (Lai et al., 2014, p. 185) will be the stereotype and label of urban villages within the Chinese context.



Figure 12 Poor construction and aging buildings

2.1.4 Characteristics of Chinese urban villages – A cultural dimension

The impact of urbanization is being keenly felt by indigenous peoples across the world, and carries both potential serious consequences for their culture, heritage and connection to their traditional lands as well as socio-economic opportunities.

Mahimkar, 2015, p. 5

Urban village is a manifestation of urban history and culture diversity, and it is also the primary component of urban tissue in many Chinese cities. The formation and change of urban village culture predominantly occurred passively under the compulsion of the external environment, also known as social process products (Tan and Xiao, 2005). Due to the rapid urban expansion, the spatial layout and building morphology have greatly changed in order to meet local residents' daily requirements, resulting in the gradual decline of indigenous village culture, which has become an inevitable development trend. Therefore, discourse reflecting upon this aspect emphasises how the loss of village culture is becoming noticeable across varying dimensions that might have influenced street inhabitant engagement and their sense of belonging.

1. The degradation of indigenous culture

From the perspective of historical process, urban village culture is gradually disappearing, replaced by contemporary urban culture that shows economic and political advantages. During the early village construction period, many urban villages were able to manifest their distinctiveness through local buildings, streets, and cultural characteristics (Tian and Yao, 2018; Yang et al., 2020; Yuan et al., 2020; Zhang et al., 2022). With the onset of rapid socio-economic development, however, many local villagers were driven by the market (Lin et al., 2011; Hao et al., 2013; Liu et al., 2015). The environment of the original village was severely degraded as a result of spatial morphological change and singularity. Only a few historical buildings, such as churches, hospitals, or schools, have been preserved, and maintained their original patterns. The influx of diverse migrant groups along with their own culture, on the other hand, has also influenced and weakened the original local cultural attributes, whilst making the local residents gradually lose their sense of attachment (Lu, 2015; Chen et al., 2016). At the government level, it places more emphasis upon new building projects, such as gentrified communities, high-rise residential and office buildings, as well as landmark skyscrapers, in pursuit of economic growth and urbanisation (Liu et al., 2010; Chung, 2018). Due to paying less attention to or even neglecting the heritage of local culture, not only exacerbates the decline of historical environment but results in the loss of cultural carriers and images over time. This is a common issue faced by Chinese urban villages.

2. The invasion of emerging social culture

As a result of the urbanisation development process and massive influx of labourers into the city, the social groups of urban villages are mainly composed of the indigenous villagers and external migrants. They form a new urban village pattern, whilst bringing diverse social culture that potentially impacts upon local resident lifestyle (Bach, 2010;

Cilliers and Timmermans, 2014; Liu et al., 2016; Wang and Ning, 2016). However, it is difficult to harmoniously integrate these two polarised group cultures due to their different social hierarchy and status (Yang et al., 2022; Zhang et al., 2022). Due to the rare communication between them, they gradually develop their own cultural activities to acquire sense of belonging and identity. During this process, emerging socio-cultural attributes become an inevitable phenomenon and social product, which also manifests flexible materiality and temporality within the urban village context (Kochan, 2015; Qian, 2022). Although indigenous culture still exists and plays a significant role in everyday engagement, how such local culture attributes can effectively merge with new social culture that become prime concern within urban village development discourses.

2.1.5 Characteristics of Chinese urban villages – moving forwards

Urban village, as a unique component of urban development, is a typical urban typology following China's rapid expansion of urbanity. The urban villages encroached on rural land, and represented territorial transformation from villages to cities (He et al., 2010; Liu et al., 2010; Lin et al., 2011; Chen and Thwaites, 2018; Smith et al., 2019). Current discussion and evidence have specifically analysed their formation and a variety of characteristics within Chinese urban villages. During their complex evolution and development, urban villages have gradually become diverse as a result of the shift of physical and spatial form, integration of indigenous and migrant culture, and the reform of the socio-economic system. All of such morphological changes are tightly linked with the most two vulnerable populations – indigenous villagers and migrant labourers (Luo and Luo, 2007; Hao, 2012; Liu and Xu, 2018). Through this, it is challenging to facilitate social cohesion for either locals or those from outside.

Moving forwards, connected with the diverse characteristics within Chinese urban villages, the prime concern is the gradual loss of public space. Thus, the discussion

that follows will place great emphasis upon street space particularly its edges. The reason for this is that a street and its edge, as an ordinary public space that street users regularly inhabit daily, demonstrate various materiality and provide opportunities for potential everyday social interactions that are significant for social well-being (Mehta, 2019; Thwaites et al., 2020; Simpson et al., 2022). The existing research, however, shows a lack of in-depth knowledge regarding these spaces in a Chinese urban village context, and limited empirical understanding of how such space can be perceived by everyday street users, as Bahrainy and Bakhtiar state –

... urban designer should have enough knowledge of the social sciences to be able to make diagnoses about the social dynamics of the community.

Bahrainy and Bakhtiar, 2016, p. 10

In order to validate such idea, it is necessary to undertake a detailed consideration of how to shift the emphasis away from large-scale designs, such as city parks or squares as major public space, towards a focus upon small-scale projects such as streets. This is particular in street edges and their segments within mainstream urban design discourse. By doing this, the aim is to establish a comprehensive understanding of how the existing ideas and approaches are insufficient in conveying street edge concepts or being applied into design practices, particularly in Chinese urban village context.

2.2 Theme I: Existing trends of street edges and segments within Chinese urban villages

Over the past few decades, China's urbanisation has generally been characterised by extensive urban expansion, robust economic growth, and significant population influx and migration (Pannell, 2002; Liu et al., 2010; Chaolin et al., 2012; Wang, 2018; Wang et al., 2021). Such accelerated development not only played an essential role in improving social well-being and progress, but has led to transformative changes in both

cities and villages, in response to evolving societal needs for more comfortable and livable environments (Lin, 2007; Liu and He, 2010; Gehl., 2010; Ewing and Clemente, 2013). However, amidst this rapid urbanisation, one crucial aspect often overlooked is the condition of street edges within Chinese urban villages. Street edges, which sit at the interface between private and public along the streets, serve as an important transitional realm for everyday activities, social contacts and public life between human and environment relationship (Lofland, 1998; Gehl et al., 2006; Thwaites et al., 2013, 2020; Simpson et al., 2022). The following discussion seeks to provide a general exploration of the existing characteristics and issues related to street edges within the urban village context.

2.2.1 Homogenisation of street edges

Today urban planning decisions are made on the drawing board, and little time is lost between decision and realization. The speed of new forms of transport and the often massive scale of building projects pose new challenges. Traditional knowledge about scale and proportions has gradually been lost, with the result that new urban areas are often built on a scale far removed from what people perceive as meaningful and comfortable.

Gehl, 2010, p. 55

Identical streets

The homogenisation of physical space is gradually becoming a common phenomenon within China's cities due to the excessive urban expansion (Han, 2010; Hsing, 2010; Lu, 2012). During this process, unified spatial morphologies on the original rural land, such as large-scale central business districts (CBDs), landmark skyscrapers, and high-rise gentrified residential and office buildings have been created, to present their distinctive city image, or also known as *modernisation* (McGee et al., 2007; Kipnis, 2012; Sadria, 2012). Through this, such 'unique' architectures are gradually becoming

‘universal’. This aligns with an idea emphasised by Gehl (2013) that contemporary urban development has led to lost uniqueness and tends to share identical design languages into practices. One of the most striking examples, *Imitation Archaic Streets* (Fanggu jiequ) in cities, is particularly evident in historical urban villages (Liu et al., 2018). They highlight the extent to which such streets are designed based on the same pattern, and present obvious homogenisation even though they span different Chinese cities (Figure 13). This street type with similar style and function is not rooted in local customs or geographical characteristics. Instead, it is a product of commercialised behaviour, a manifestation of superficial duplication (Tao, 2016).



Figure 13 Fenghuang: Imitation Archaic Streets (Source: Dafeng Hao, 2021)

Same street edge pattern

Within a contemporary urban context, numerous scholars have argued that large-scale urban planning, high-rise buildings and broad roads have predominated urban design practice (Jacobs, 1961; Alexander et al., 1977; Glaser, 2011; Chen and Thwaites, 2018; Gehl., 2013). Regardless of the city scale or actual function, such design projects display similar appearances and morphologies as a result of the shared design pattern language, leading to a gradual loss of their identity, particularly in relation to everyday streets (Gehl, 2010). In this way, such issues relating to street environments further highlight how homogenisation is becoming universal and prevalent at the street scale that, which in turn, has the potential greatly influence street inhabitants' engagement within these spaces, especially in urban villages (Figure 14). As can be seen in the

photos, the most common example is that street space was manifested through a unified ground floor setback or projection within an overall building plot (Nooraddin, 1998; Heffernan et al., 2014; Yang and van Oostrum, 2020). Another striking example is that the streets are often disconnected spanning inside and outside, or lack of interaction between everyday inhabitants and their environment (Bobic, 2004; Zaidin et al., 2015; Mehta and Bosson, 2021; Jiang et al., 2022). As a result, such homogenisation has led to the creation of an indifferent street atmosphere due to the suppression of opportunities for social communication, whilst inhibiting street vitality and enrichment that could be beneficial to the shaping of self-esteem and cultural identity within a street environment (Jacob, 1961; Gehl, 2010; Mehta, 2013; Thwaites et al., 2013; Qi et al., 2020; Alamoush et al., 2022). As Jacobs (1961) stated that –

Streets and sidewalks, the main public places of a city, are its most vital organs. Think of a city and what comes to mind? Its streets. If city's streets look interesting, then the city looks interesting; if they look dull, the city looks dull.

Jacobs, 1961, p. 39



Figure 14 Guangzhou: Similar images of street edge in urban villages (Source: Visual China Group, 2020)

Moving down from the level of the street to its edge scale, as the photographs in Figure 14 show, along with their building plots and structures, the edges strikingly present the same design patterns and morphologies. These street edges and their constituent

buildings resemble factory assembly line objects that show overly uniform standardisation and a lack of social consideration. It shows the alienation and disconnection of a built environment, rather than being a vital component that has evolved incrementally in response to local culture and pre-existing spatial forms (Alexander et al., 1979; Porta and Romice, 2010). Within this, contemporary urban design projects shift the focus away from small-scale urban interventions towards large-scale economically-driven redevelopments (Gehl, 2013; Thwaites et al., 2013).

From the perspective of the pedestrian experience and everyday engagement, street edges, as engaging socio-spatial structures that have the potential to facilitate social interaction, are no longer the prime concern in urban design decision-making (Lennard et al., 1987; Crawford, 2008; Mehta, 2013). As shown in these photos, such street edges show as disengaging and separated interfaces due to the monotonous, *identical* building structures and morphologies, which have little attraction for the potential street users (Gehl, 2010; Barros et al., 2021). This is instead of creating an entertaining and flexible place based upon human demands and attachments which has been shown to be significant from the perspective of human health and well-being (Barros et al., 2021; Moreau, 2023).

More specifically, Thwaites *et al.* (2013, 2020) and Hassan *et al.* (2019) have emphasised the significance of street edges and ground floor interfaces for human engagement and social dynamic. Dovey and Wood (2015) provided further detail towards such discussion from an urban interface perspective to describe how this structure has the capacity to contribute to street life and urban diversity. The work of Kamalipour (2016, 2017), who primarily built upon Dovey and colleagues' work (2010, 2012, 2015), also placed emphasis upon the relationship between public/private interfaces and everyday activities, especially in informal settlements or urban villages, thus showing the coherence and overlap between the ideas of these urban scholars (Moreau, 2020). Interestingly, Pan and Du (2021) introduced a noticeable but common

example of homogenisation within Chinese urban villages in Shenzhen. The policies of the local government and design institutions “*aim to formulise, modernise, and consequently homogenise urban villages into ‘urban-like modern communities’*”. This clearly contradicts Gehl’s (2010) idea that an inhabitable and human-scale urban environment should be shaped by everyday users along with their demands, rather than pre-existing being-in-the-world then waiting to be satisfied.

Based upon the above discussion, previous discourse highlights that homogenisation has progressively become an inevitable phenomenon in current urban development, which is particularly noticeable in street edges within the Chinese urban village context. Moreover, rapid urbanity shifts the emphasis away from human-scale considerations that could stimulate collective participation, towards top-down design interventions that generate disconnection and alienation. This is largely influenced by economically market-driven factors prominent within the Chinese context of interest. As a consequence, this results in, regardless of local culture or architectural morphology, the loss of characteristics and identifiability of street edges, or what Relph (1976) called *placelessness*.

2.2.2 Disconnection between public and private spaces

Thwaites *et al.* (2013, 2020) put forward the concept of *transitional edges* whilst exploring the impact of socio-spatial quality on street edges and pedestrian engagement with them. This concept builds primarily upon previous literature relating to urban streets (Jacobs, 1961), and has been further investigated by Gehl (2010), and Simpson *et al.* (2021; 2022). These studies aimed to investigate the importance of street interfaces and their capacity for providing diverse sensory experiences, everyday activities, and public life. The reason for this is the potential for social opportunities of street users who are inhibited by the abrupt division from the indoor to outdoor realm, generally manifested through hard or opaque materiality which hinders

physical and visual engagement. Gehl (2010) detailed edge space has a positively decisive impact on everyday engagement –

The edge along ground floor is also a zone in which doors and exchange points between inside and outside are located. The edges provide the opportunity for life in the buildings or immediately in front of the buildings to interact with life in the city. This is the zone where activities inside the buildings can move out into the common space of the city.

Gehl, 2010, p. 75

More towards impermeable street edges

‘Negative’ and ‘impermeable’ street edges are establish a harsh division between indoor and outdoor realms, which greatly reduce people’s engagement and their experience, either physical or sensory (Figure 15). In this way, these passive structures drive street inhabitants away from the edge (Gehl et al., 2006; Mehta and Bosson, 2020; Simpson et al., 2022). Such insights promote the notion of *permeability* and *transparency* (Thwaites et al., 2013), which are associated with varying levels of *here-ness* and *there-ness* discussed by Cullen (1971). Such attributes attempt to soothe the abrupt division and facilitate the interaction between inside and outside through a smooth transition, rather than being two isolated spheres. As Figure 15 demonstrates, however, these street edges barely provide any active participation through tedious and disengaging structures within the built environment. As Walzer has described this upon pedestrian’s behaviour and wishes –

... open-minded space, designed for a variety of uses, including unforeseen and unforeseeable uses, and used by citizens who do different things and are prepared to tolerate, even take interest in, things they don’t do. When we enter this sort of space, we are characteristically prepared to loiter.

Walzer, 1986, p. 470–471



Figure 15 Hard and impermeable street edges (Source: Visual China Group, 2020)

With the increasing urbanisation and demand on urban public space, the street is gradually becoming a significant location for everyday public life (Gehl, 2004; Mehta, 2013; Barros et al., 2021). Inactive street edges that have no transition between internal and external domains usually restrict the variety of activities and social contacts, also noticeable in Figure 15. In these street edge examples, none of them presented diverse facilities or settings to encourage potential social interaction, or were capable of supporting lasting behaviours that might be associated with socio-spatial quality. More recently, many researchers also explore this idea to validate how public and private interface adaptations play a significant role in affecting people's experiences and perceptions, as Dovey and Wood (2017) emphasising that –

Interface adaptations are an important mode of innovation in urban design where an underlying potential becomes actualised; new connections are formed between production, exchange and consumption; new forms of urban intensification become possible with a greater utilisation of urban space.

Dovey et al., 2017, p. 159

Limited formal building code

From the perspective of van Oostrum (2020), formal building codes, guidance and regulation of building construction, are ambiguous and absent in Chinese urban village

in the process of urbanisation, which is a representative type of informal settlements. This results in street interfaces that are recklessly over-occupied or entirely neglected by local dwellers, and therefore explains why there are so many inactive edges or abrupt interfaces within an urban village context. Hassan *et al.* (2019) have investigated the relationship between the ground-floor façade and activity patterns, and confirmed that ground-floor frontage characteristics contribute to the facilitation of diverse activities, which is similar to the work of van Oostrum (2022). Exploring and mapping the laneway appropriation within China's urban villages of Beijing and Guangzhou, they found insights that resonate with the transitional edge framework explored by Thwaites *et al.* (2013, 2020). Of particular significance, ground-floor interfaces are harshly disconnected from the two adjacent realms, presenting failures of social engagement and street life (Figure 16). This issue is not only related to the unique urban-rural system in urban villages, but heavily influenced by socioeconomics and spatiality (He et al., 2010; Yang and van Oostrum, 2020). As van Oostrum (2022) stated, self-regulatory appropriation of laneway space plays a crucial role in the liveability within urban villages, whilst promoting social capacity for people engaging with public and private thresholds –

Through the daily use of public space, residents automatically partake in a tactile form of monitoring whereby 'using' and 'appraising' public space are collapsed into the same activity. When residents are confronted with new appropriations that impede or limit their ability to move, socialise and exchange in public space, they either adjust their own daily rhythm, or they challenge the new appropriation.

van Oostrum, 2022, p. 101



Figure 16 Wuhan: Blank and opaque territorial segments, built in the early twentieth century, but renovated by the current shop owners

2.2.3 Existing trends of street edges within Chinese urban villages – moving forwards

Based upon the information introduced, it becomes evident that factors regarding the same appearance of street type and street edges, and the disconnection between public and private interfaces have led to the formation of disengaging street edges, thereby adversely influencing the liveability of public life within Chinese urban villages. Although such elements have caused a range of street edge issues, existing research studies highlights a predominant focus upon large-scale projects driven by local authorities and prestigious firms, often neglecting the nuanced development of street edges where pedestrians frequent. There remains a limited understanding of how inhabitants of urban villages interact with this subtle yet crucial component of the urban environment, as Lang advocates –

What the Modernists failed to understand was the richness of human needs, the richness of environment, and the complexity of the relationship between people and environment – that is the fundamental process of human behavior... We need to understand the complexities of life, human behavior, and the way the built environment should be constructed to respond to the more elaborate

understanding of people and the environment that we now have.

Lang, 1994, p. 16

To validate this assertion, it is fundamental to delve deeper into the process of highlighting and integrating street edge segments into practical designs within the context of contemporary urban village development, whilst taking into account the relevant challenges. Such an inquiry holds the potential to offer an understanding of the reasons behind the shortcomings of prior studies, and concepts in formulating guidance for street edge design, particularly at a localised scale – territorial segments.

2.3 Theme 2: Existing trends of actions in street edge segments within Chinese urban villages

2.3.1 What are street edge segments?

Territorial segments, as a distinct component of building structure manifested through materiality and spatiality, span public and private interfaces with regards to a ground-floor façade or building frontage along the street edge extent (Thwaites et al., 2020; Simpson et al., 2022). Importantly, they significantly influence behaviours and perceptions of street inhabitants (Gehl, 2010; van Langelaar and van der Spek, 2012; Dovey and Wood, 2015; Simpson et al., 2019). For a long time, architects, along with the guidance and help from urban designers, are generally considered as the people who dominate the creation of physical structures and spatial morphology for streets and buildings (Habraken, 1998; Bobic, 2004; Gehl et al., 2006; Mehta, 2013). The reason for such a problem is, to some extent, high-rise buildings and gentrified blocks have gradually become prevalent in current urban development, while less attention is paid to the localised expression from the perspective of human-scale experience. This also aligns with ideas explored by Thwaites *et al.* (2013), Carmona (2015), Dovey and Wood (2015) and Simpson *et al.* (2022) from street edge interfaces and territorial

segment views. This results in an extreme imbalance and fragmentation between top-down decision-making and bottom-up placemaking, which echoed the notions of sense of place –

If places are to be more thoroughly understood, one needs a language whereby we can identify particular place experiences in terms of the intensity of meaning and intention that a person and place hold for each other.

Seamon and Sowers, 2008, p. 3

Reflecting upon the points discussed, it is challenging to precisely demarcate or define who is primarily responsible for the street edge segment development. The reason for this is that such overlapping realms regularly refer to complex socio-spatial features associated with flows of desire and possibilities (Dovey, 2010; Thwaites et al., 2020), rather than a structure that is easily overlooked or a monotonous line dividing inside and outside spaces (Alexander et al., 1977). Such considerations aim to emphasise that street edge segments could achieve a balance between experts (urban designers and architects) and non-designers (segment owners) in a certain way. Romice *et al.* (2017) argued –

It is important at this scale that we are able to feel most in control of our settings: to participate in their making, use and adaptation, and not merely receive what professional agencies provide.

Romice et al., 2017, p. 27-28

Given such thinking, it would be conducive to develop a comprehensive and practical understanding of how street edge segments can promote social engagement and experience, particularly for the everyday users inhabiting Chinese urban villages. Through developing such consideration, thus, the following part will focus on how top-down and bottom-up interventions could impact territorial segment development and pedestrian behaviour.

2.3.2 Top-down decision-making and bottom-up placemaking

In addition to the detailed discussion of who is responsible for the territorial segments, such idea also lays the foundation to further investigate how top-down decision-making and bottom-up placemaking influence street edge structure. Within current urban development, top-down actions primarily carry out professional guidance and policy to conduct large-scale design projects, in cooperation with local authorities and design firms (Chen and Thwaites, 2018). This is largely different to bottom-up actions, which commonly adopt small-scale and fine-grained forms of intervention that could have a significant long-term impact at the localised level (Gehl et al., 2006; Thwaites et al., 2013; Stevens and Dovey, 2019). Within modern urban design discourse, it has often been challenging to balance the relationship between these two decision-making groups when seeking to create a socially responsive built environment, particularly at segment scale in Chinese urban villages. As a result, it has constrained the diverse possibilities and desires of flow through bottom-up interventions, and such insight has resonated with many urban scholars (Franck and Stevens, 2006; Thwaites et al., 2013; Dovey and Wood, 2015; Dovey, 2016; Kamalipour, 2017), as Stevens and Dovey (2019) describe –

Spontaneous, or bottom-up, urbanism is often praised for bringing innovation and agility to urban design practices that are typically constrained by context, convention, regulation, high cost, long timelines and complex stakeholder roles and needs.

Stevens and Dovey, 2019, p. 323

Top-down and bottom-up actions within built environment are explored by many professionals into different urban context and scale (Franck and Stevens, 2006; Cheshire, 2019; Carmona, 2021). This is noticeable in the plight of territorial segments of street edges in urban village context, which are becoming heavily building-driven

due to professional design strategies and approaches (Figure 17). Through this, the potential social interaction and opportunity, regularly manifested through bottom-up small-scale interventions, are gradually disappearing.



Figure 17 Guangzhou: Building-driven street edge segments (Source: Sohu, 2018; diagrammed by author)

More recently, the design decision-making between top-down and bottom-up has increasingly attracted public attention in urban realms, noticeable through various urbanism types such as everyday urbanism (Kaliski, 1999), bottom-up placemaking (PPS, 2007, urban acupuncture (Casagrande, 2010), DIY urbanism (Iveson, 2013; Douglas, 2014), as well as tactic urbanism (Lydon et al., 2015). It thus affords potential for individuals or groups to express territorialisation and ownership within the environment that was built through professional-driven actions (Thwaites et al., 2013). Within the Chinese urban village context, however, there are few in-depth studies or practices that carefully take street edge segments into consideration that could facilitate socially-oriented pedestrian engagement.

2.3.3 Existing trends of street edge segment within Chinese urban villages – moving forwards

Reflecting upon the points explored, it is evident that street edge segments within Chinese urban villages are fraught with a multitude of issues. Moreover, it is essential to recognise that these segments constitute intricate socio-spatial structures, surpassing their superficial identification as mere retail spaces. Notably, there exists limited research that investigates how territorial segments are perceived and engaged with by everyday street users in their everyday activities within a Chinese Urban Village context. Specifically, segments are used as an academic concept to understand the structure of street edges. Street users do not focus their attention on ‘segments’ but more the functions of a segment and the characteristics of them. Through this, it emphasised the crucial role of territorial segments in shaping street experience and fostering a more engaging streetscape combined with theory-oriented research. Such insight has resonated with the idea argued by Dovey and Pafka (2016), arguing that –

The problem with urban design knowledge is that there are no controlled conditions and very little urban design theory has emerged from the inductive logic of empirical science.

Dovey and Pafka 2016, p. 8

2.4 Theme 3: How socio-spatial qualities influence peoples’ engagement

2.4.1 Explore the relationship between street edges (segments) and activities

Previous work by Kamalipour and Dovey (2020) revealed that existing urban design discourses, which usually focus upon normative rules in response to spatial forms or building codes, has failed to explore the relationship between activity patterns and

public/private interfaces that is where the most socially responsive along street edges. Through this, the focus upon interface typologies and ground-floor façades along with functions highlights the way in which urban design theory and practice shift the emphasis away from an architecture orientation towards a human engagement dimension. In this way, this contributes to the potential opportunity for social engagement within a more nuanced scale – street edge segment, an insight advocated by many urban experts (Glaser et al., 2012; Thwaites et al., 2013; Hassan et al., 2019), as Simpson *et al.* (2022) arguing that –

Overall, in combination, to encourage pedestrian interest and engagement, priority should focus towards the creation, manipulation and management of ground floors so that they sustain higher numbers of territorial segments.

Simpson et al., 2022, p. 14

Based upon the points discussed above, it has echoed the similar ideas in-line with many urban scholars, whilst reflecting the failure and negligence of street edges and segments as socio-spatial assemblage that is greatly significant for pedestrian engagement. Through this, the rigid, homogenised, and disconnected street edges have inevitably become a serious problem within modern urban development and practice. Consequently, street edges not only constrain the potential richness of ground floor functions that could be engaging, but hinder social interaction and participation of street users' public life within such identifiable realm, particularly *segments* in Chinese urban villages (Gehl, 2010; Thwaites et al., 2013, 2020; Simpson et al., 2022).

2.4.2 Decline of street edge segments influence activity engagement

Territorial segments, as a localised expression in relation to socio-spatial quality (Dovey, 2010; Thwaites et al., 2020), are manifested as subdivisions along the street extents and demonstrate diversities of functions and facilities, in mostly retail (Karssenberget

al., 2016; Simpson et al., 2022). Recently, however, they have been massively shut down due to the Covid-19 pandemic, either in Chinese or Western contexts (Donthu and Gustafsson, 2020; Fairlie and Fossen, 2022), leading to the decline of urban street environment. Through this, social interaction of street inhabitants has also been influenced by closing retail shops or blank ground-floor interfaces (Figure 18). This means that such segments are incapable of providing potential opportunities for people engagement or socialisation along street edges (Gehl et al., 2006; Ellard, 2015).



Figure 18 Wuhan: decline of street edge segments

With the development of urbanisation, street edge segments have been relentlessly occupied by vehicles due to the absence of relative management mechanisms or design decision-making principles (Jacobs, 1961; Song and Zhu, 2011; Mehta, 2013), which negatively impact their function and safety, thereby inhibiting street life and various activities. This is because streets are being swallowed up and diminished by heavily vehicle-oriented urbanity processes, resulting in poor features of streetscapes in cities or urban villages, and decline or even closure of street edge segment accordingly (Figure 18 and Figure 19). Besides this prevalent phenomenon, the decline of street edge segments is also associated with the negligence of material form and spatial organisation that fails to effectively provide services or meet user requirements (Thwaites et al., 2013; Zordan et al., 2019; Simpson et al., 2022). They present less diversity and disengagement over time (Speck, 2012), and subtly influence pedestrian perception within the built environment (Mehta, 2011). This in turn explains why small-

scale business with bottom-up diverse interventions make a greater contribution to social vitality and sense of place (Thwaites et al., 2020; Mehta and Bosson, 2021), which is challenging to reflect upon large-scale facilities –

...compared to larger chain store, small businesses possessed social and spatial qualities that made Main Street environment more user-friendly, interesting, attractive, and conducive to social interaction.

Mehta, 2011, p. 286



Figure 19 Wuhan: Vehicles occupy street space

Connected to the issue scale that is causing a decline street edges, the failure of segment to stand out through personalisation and territorialisation. Through this, it explains why street edge segments lack adaptability and flexibility, which would limit the potential social opportunity for the expression of function and facility within a street edge locality. Although some of these localities opened and closed according to the daily rhythms and flows of everyday needs, this also accelerates the decline of the street edge as a result of the impermeable, hard and dead edge structures with scarce opportunity for social vibrancy (Bobic, 2004; Gehl, 2010) (Figure 20). Under these circumstances, the notion of *loose space* or *looseness* was explored by Franck and Stevens (2007), and Thwaites et al. (2020) who argued the significance of this spatial feature to peoples' identity and in-line with their desires and needs. Lynch and Carr

(1979) maintained –

When others act more freely, we learn about them, and thus about ourselves. The pleasure of an urban space freely used is the spectacle of those peculiar ways . . . It is an opportunity for the expression of self and group, unfettered by routine constraints of workplace and home.

Lynch and Carr, 1979, p. 415



Figure 20 Wuhan: Scarce opportunity for social vibrancy

Based upon the points discussed above, a series of perspectives support the argument that territorial segments with complex socio-spatial qualities are capable of providing opportunities to smooth the abrupt division between two adjacent realms, which is beneficial to social engagement (Gehl, 2010; Evans, 2014; Feliciotti et al., 2016; Thwaites et al., 2020). However, until now, such insights have failed to be applied or taken into consideration in the Chinese urban village context. Specifically, street edge segments without any material configuration or spatial depth provide limited social value that are crucial to inhabitants' well-being (Taylor, 2011; Iranmanesh, 2012; Lauwers et al., 2021). This also evidences why street edge segments gradually declined due to the loss of territorialisation and personalisation within the *form* of built infrastructure, negatively influencing a shared *understanding* to achieve a balance between street inhabitants and experts (Habraken, 1998), as Thwaites *et al.* (2013) describing –

Professionals and occupant influences must then become inclusive and mutually informative, and structural and design decision-making must cross the boundaries between material, spatial, social and psychological considerations.

Thwaites et al., 2013, p. 32

2.4.3 Socio-spatial dimensions of street edges within Chinese urban villages – moving forwards

This chapter delineates key trends in Chinese urban design and introduces the focal point of interest—Chinese Urban Villages, specifically, their street edges. This lays a comprehensive foundation for the forthcoming research. It also highlights a significant research gap concerning the human-scale aspects of street edges in Chinese Urban Villages, encompassing their physical, spatial qualities, and associated social uses. To address this, the current research aims to offer an in-depth exploration of the dynamics of street edges in Chinese Urban Villages. It places particular emphasis on understanding the interconnected material, spatial and social attributes of territorial segments along street edges, alongside user engagement with such environments. To structure this exploration, the research will revolve around three thematic topics, aligning with the research themes introduced earlier –

Gap 1 Socio-spatial qualities – Not enough is known about the spatial and material composition of street edges in Chinese urban villages;

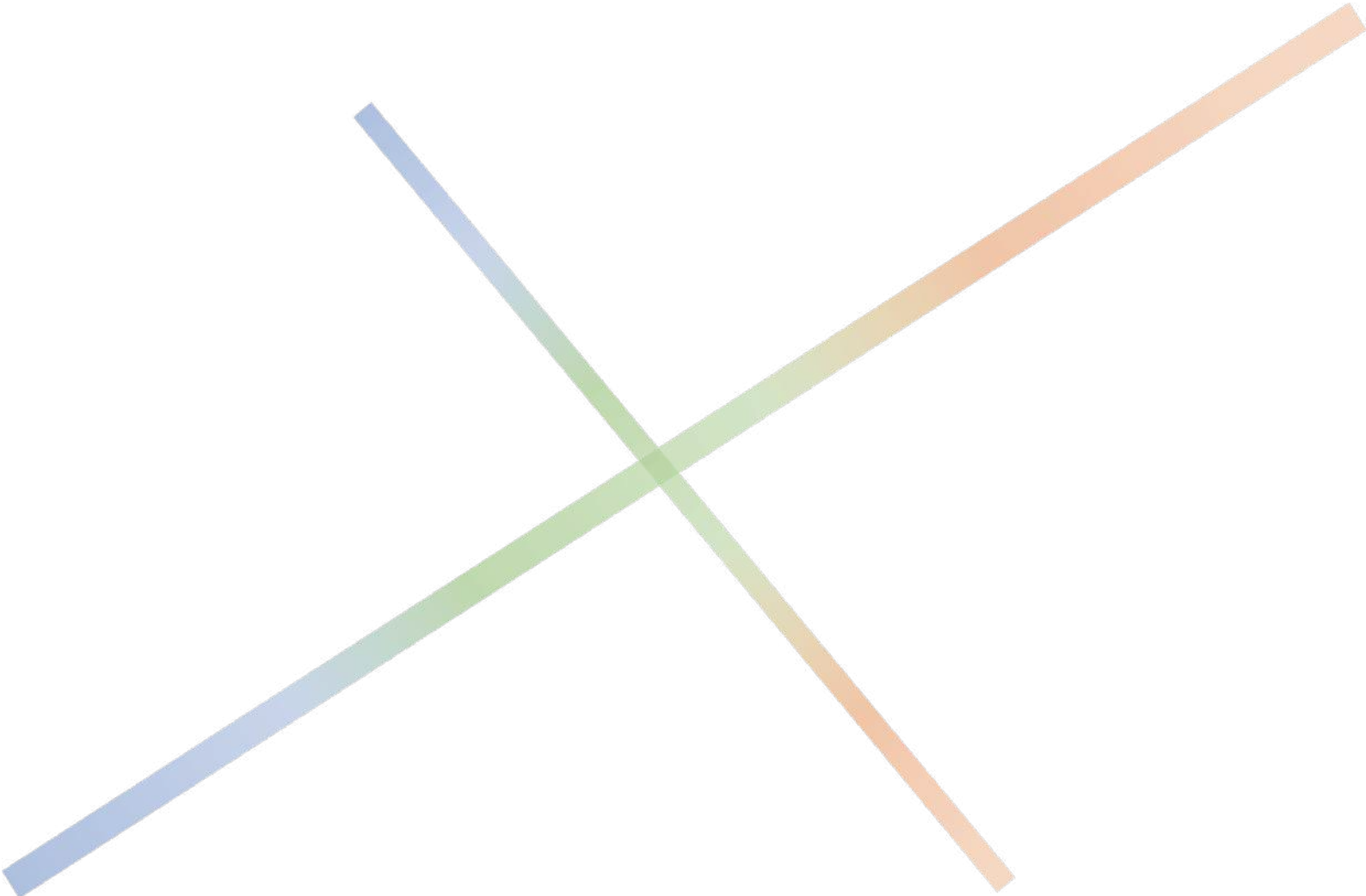
Gap 2 Everyday activities – Not enough is known about the social actions of people along street edges in Chinese urban villages;

Gap 3 Socio-spatial qualities and everyday activities – Not enough is known about the way that spatial and material interact with the everyday social activities of

people along street edges in Chinese urban villages.

The upcoming chapter will introduce a framework for understanding street edge and territorial segment. Drawing from a wide range of built environment literature, it aims to elucidate these key social, spatial, and material attributes of street edges, and explore peoples' activities and engagement. Through this, it paves the road for examining the relationship between socio-spatial attributes and users' activities.

Chapter 3



Street edge framework

Chapter 3

Introduction Understanding place as a socio-spatial assemblage

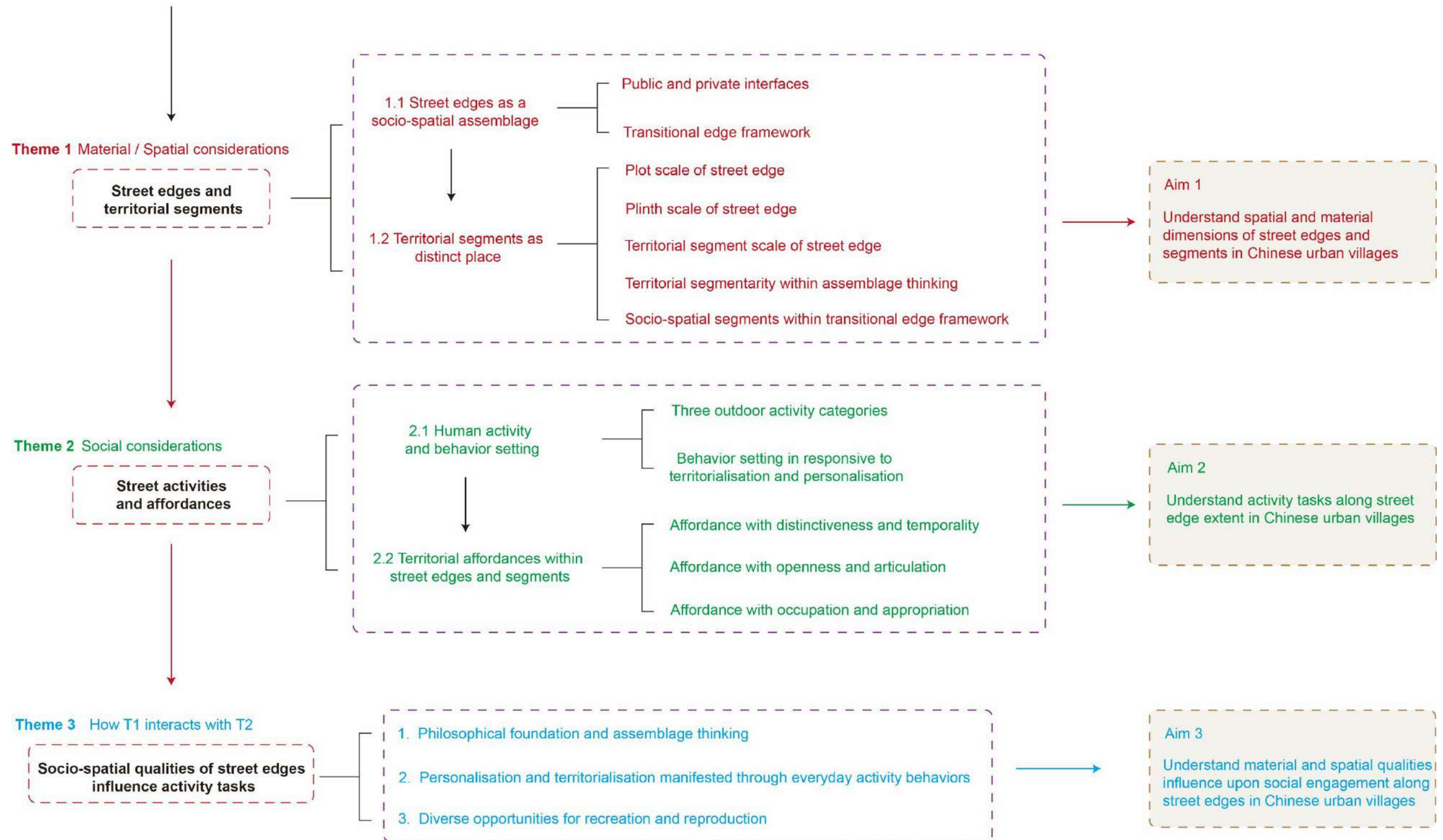


Figure 21 Overall flow map of Chapter 3

This research is dedicated to uncovering the impact of socio-spatial attributes on street edges, especially their segments, and people's engagement with these spaces. To date, these spaces have been relatively unexplored, particularly within the context of Chinese Urban Villages. Unlike a mere reiteration of existing urban design discourse, this investigation is firmly rooted in the theoretical insights of urban scholars across various area of expertise. In line with this, the current chapter starts with an exploration of how street can be considered as a complex *place* from a philosophical perspective (Introduction). This helps underpin that street edge are distinct socio-spatial assemblages, in a state of becoming and forever-developing process (Theme 1). Building upon this foundation, the research examines various scales - from the building plot and plinth scale to the nuanced territorial segment scale, all informed by existing socio-spatial discourse. In focused detail, it zooms in to explore the interplay of social, spatial and material dimensions with extent, laterality and locality that makes street edges as a multi-dimensional place, far exceeding their spatial structure and social use as linear pathways for movement. Theme 2 introduces ideas at the intersection of everyday activities and the materiality of street edges and segments. It dissects three outdoor activity classifications and behaviour settings, demonstrating how segments can be personalised and territorialised by street inhabitants. This is closely tied to territorial affordances, particularly the manifestation of material (distinctiveness, temporality), spatial (openness, articulation) and social (occupation and appropriation) affordances. Theme 3 subsequently examines the intricate relationship between socio-spatial qualities of street edges and pedestrian activities. This involves a thorough analysis of how material and spatial attributes influence human engagement along street edges. Within current study, the existing framework of 'Transitional Edges' Framework was employed as is not a novel approach but a fundamental underpinning theory. The research seeks to, which translates this theoretical framework into practice, paving the road for further investigation examining the relationship between socio-spatial attributes and everyday activities.

3.1 Introduction

Understanding place as a socio-spatial assemblage

Assemblage is a philosophical concept to understand the conception of place as entity that is continuously in the process of becoming and thus directly relates to human-environment relations, also known as socio-spatial cluster (Dovey, 2010, 2012; Kamalipour and Peimani, 2015; Muminovic, 2015; Dovey and Pafka, 2017). The essence of assemblage is a whole “*whose properties emerge from the interactions between parts*” (DeLanda, 2006, p. 5). These constituent parts are interconnected with each other wherein the attributes and identities of these components emerge from the flows of desire among them (Dovey, 2010, 2012). Assemblage is not a structured setting of pre-given parts that are systematically arranged to operate in an expected way. Instead, it is an integrated property that manifests identity of social, spatial and material attributes, whilst proclaiming the territory to deliver a sense of place and placeness (Relph, 1986; Thwaites et al., 2013; Dovey, 2014). From the perspective of assemblage, thus, it helps reconsider the notion of place as a ‘state of affairs’ in a state of forever-shifting, rather than as an isolated or static thing (Dovey, 2010). The central assertion of assemblage thinking allows for further investigation of socio-spatial connections and thus the essential attributes of human-environment relations (Dovey, 2012; Thwaites et al., 2013; Wood and Dovey, 2015).

Built upon this, assemblage, as inherently socio-spatial expression, is thus a means of interaction and engagement with the lived-environment more than a normal theoretical framework (Dovey, 2010, 2012). It primarily strengthens the connections between sciences and humanities, objectivity and subjectivity, which attempt to facilitate the interplay between places, people and objects (Thwaites et al., 2013, 2020). Essentially, assemblage thinking highlights the interconnection between things, instead of regarding each object as an isolated existence (Dovey and Wood, 2015; Simpson et al., 2018). Assemblage is dynamic and it is the flows of life spanning social, spatial and material dimensions that give its intensity and sense of place (Dovey, 2012).

3.2 Theme I: Street edges and territorial segments as a socio-spatial assemblage

3.2.1 Street edges as a socio-spatial assemblage

Public/Private Interfaces

Streets play an importance role in the structure of urban form, which primarily serves societal functions through providing physical affordances for everyday activities (Simpson, 2011; Mehta, 2019; Simpson et al., 2022). These physical properties, provided by different users, are mainly distinguishable and manifested through objects or settings. In doing so, affordances play a significant role in bridging the connection between human and environment (Gibson, 1979). As Maier et al. (2009, p. 397) maintained, *'Individual properties of either the artefact (color, density, size, etc.) or the user (strength, age, height, etc.) are not in and of themselves affordances, but taken together can determine whether a specific affordance exists'*. A successful street, as a place that people regularly inhabit and visit, not only encourages everyday social interaction but is conducive to individual well-being and social cohesion (Gehl et al., 2006; Mehta, 2013; Barros et al., 2021). Of particular significance is the way street edge space, also known as *public/private urban interfaces* (Dovey and Symos, 2014; Dovey and Wood, 2015; Muminović, 2023), impact pedestrians' engagement when walking through streets (Gehl, 2010; Karssenberget al., 2016). Although the importance of street edges is well-illustrated by numerous urban scholars (Gehl, 2010; Dovey and Ristic, 2017; Thwaites et al., 2020; Simpson, 2022; Moreau, 2023), there is limited in-depth investigation of how street edge structure has explicitly impacted on people's activity from socio-spatial dimensions, particularly in a Chinese urban village context. Reflecting upon street edges in this way also projects onto insights with assemblage thinking as well as wider human-environment relationship theory, as Dovey and Wood (2015) emphasised the point that –

To study only the larger assemblage of the city or neighbourhood and its planning framework is to ignore the ways that conceptions of place, urban character and creative clustering are emergent effects of a multitude of small-scale adaptations.

Dovey and Wood, 2015, p. 4

In existing urban design discourse, street edges have been studied by many urban scholars and identified as diverse terminologies. They can be understood as '*in-between spaces*' that connect between internal and external areas (Bobic, 2004; Can, 2012). Besides, they have been known as '*soft edges*' and '*active edges*' that facilitate human engagement possibilities along the edge realms (Franck and Stevens, 2007; Gehl, 2010). Similarly, they have been identified as '*transitional edges*', which aim to establish a conceptual framework for understanding socio-spatial attributes in urban street edges (Thwaites et al., 2013, 2020). Also, Dovey and Wood (2015) and Moreau Miza (2020) considered such ideas as '*public/private urban interfaces*' to make private territories plug into public networks. Within these notions, although projecting street edge ideas to a variety of spheres in relation to a philosophical mind-set, the central assertion of edge space should be regarded as dynamic assemblage spanning social, spatial and material dimensions. As Bobic (2004) suggested –

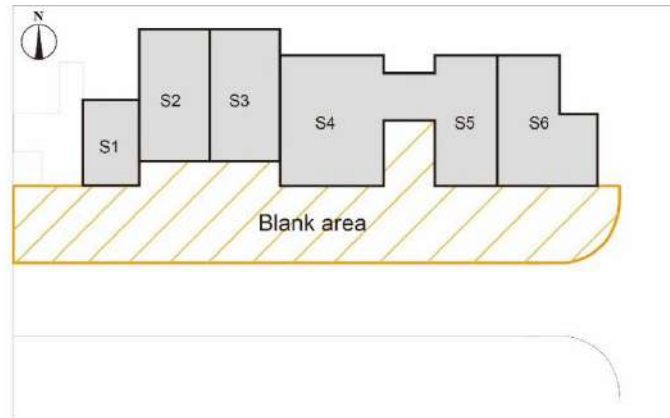
... only by observing interrelationships between different entities and scale levels, the knowledge about the character of city structure can be learned. How it is composed, balanced and integrated, where do conflicts occur and what are the driving forces? Answers to these questions could be at best found at the place where different entities and scales become juxtaposed. That place is on the edge.

Bobic, 2004, p. 54

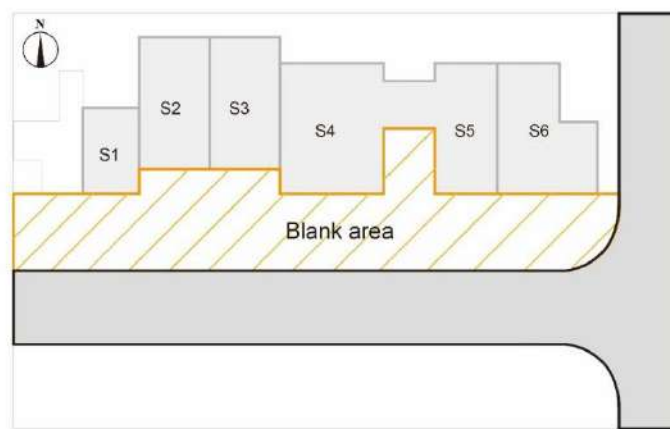
Mehta (2019) emphasised that streets should not only functionally perform as a path for movement or vehicle-orientation, but also as a place that provides everyday social interaction along with various activities, rather than a mundane public space.

Significantly, street edges are gradually being considered as distinctive places with human interaction and forever-shifting materiality (Whyte, 1980; Gehl and Gemzoe, 2004). Central to such insight is an explicit reflection upon the relationship between public and private interfaces, the ways in which public territories seamlessly connect with private realms, presented as *link* and *place* (Jones and Boujenko, 2009; Dovey and Wood, 2015). However, the significance of public/private interfaces in relation to human engagement has not been fully explored in current mainstream urban design discourses (Cresswell, 2009; 2014; Carmona, 2021).

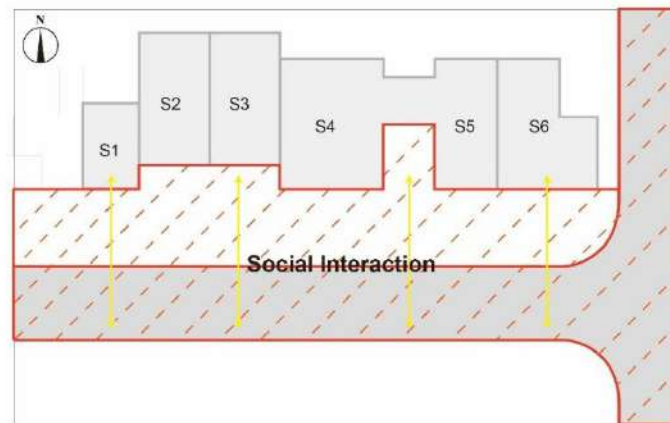
The investigation of public and private interfaces between buildings and streets primarily refers to spatial access mediation, which is related to the spatial *porosity* (Wolfrum et al., 2018). In recent years, spatial porosity has become a common conception in urban design discourse, regularly understood as *permeability*, involving the interaction between two adjacent realms (Whyte, 1980, 1988; Bentley 1985; Neal 2003; Biddulph, 2007; Thwaites et al., 2013; Kamalipour, 2017; Pafka and Dovey, 2017). It primarily strengthens the ways that spaces of internal and external production are mediated through loose transitions in built form (Dovey and Wood, 2015). Similarly, Thwaites *et al.* (2013) explicitly highlighted the notion of permeability, stating that such an attribute differentiates socio-spatial qualities of two adjacent realms from a simple façade that merely represents abrupt divisions of a building. This implies that the two adjoining territories are not isolated but are interconnected through the public and private interfaces along the streets (Franck and Stevens, 2007; Gehl, 2010). It makes the public/private interface as a realm for promoting the intensity of public engagement and collective understanding. Such insight has also resonated with assemblage thinking that all of the street components are interconnected to influence the wider environment (Figure 22).



Scope of segment use



Scope of street use



Proposed interconnectivity as integration

Figure 22 Interaction of street components

Apart from this, the public/private interface can also be understood as *physical accessibility*, while also relating to visual, olfactory and audible elements, such as sensory permeability (Thwaites et al., 2013). For instance, the indoor activities can be

noticed through the window, the smell from a bakery can also be perceived even though standing outside, or the music of a café can be heard when passing by the street. Numerous scholars have suggested that the more permeable the adjacent spaces are, the greater influence they can have upon human activity and spatial absorbency (Newman, 1973; Bentley et al., 1985; Gehl, 2010). Thus, it is evident that the level of permeability is flexible and greatly dependent upon the spatial negotiation. This is reminiscent of the *control* conception studied by Lynch (1984), who explicitly demonstrated the rights of presence, operation, occupation and transformation etc. Similarly, this insight has also projected to *levels of control – form, place, understanding* – explored by Habraken (1998), where place is manifested through everyday occupation and maintained through shared understandings, which will be further discussed in the following part – *Transitional Edge Framework*. Whilst permeability as an important spatial connection, the significance of how human engagement is influenced by public/private interface still needs to be further explored, as Gehl (1996) articulated –

...activities concentrate in places where there is high transparency (looking in windows) and where there are niches and opening and other opportunities for stopping (stationary activities).

Gehl, 1996, p. 39

Based on the above discussion, the study of public/private interface resonates with the transitional edge framework proposed by Thwaites et al. (2013, 2020), who have established a comprehensive account of what comprises street edges. They investigated how edge space across internal and external realms can be conceptualised as integrations of their social, spatial and material dimensions through assemblage foundation. The work explores the relationship between street and building primarily from the perspective of human-orientation, which is built upon the work of numerous outstanding urban scholars, prominently Jacobs (1961), Bobic

(2004), Gehl (2010) and Dovey (2010), amongst others. Within this work, although their research is not strictly limited to the street itself, the ideas they produced pave the roads to further explore street edges at a nuanced scale – segments. Through this, it can be realised that street edges and segments are essentially built upon socio-spatial assemblage grounding, which goes beyond the consideration of land property or retail functionality, but towards human existence and social engagement within lived-environment. However, the way in which socio-spatial attributes of street edges and territorial segments influence upon people's engagement is still not fully explored within the existing street study. The next part will thus place more emphasis upon this idea, as Alexander *et al.* (1979) argued that –

If the edge fails, then the space never becomes lively.

Alexander *et al.*, 1979, p. 600

Transitional Edge Framework

The concept of *transitional edges* provides a framework to improve understanding of social value of urban street edges, which contributes to the creation of a more socially inclusive environment (Thwaites *et al.*, 2020). Transitional edge framework is differentiated from other frameworks through it primarily focuses upon social, spatial and material dimensions and their composition as assemblage of a collective of segments. Through highlighting socially relevant properties of transitional edges that act along them (extent), across them (laterality) and within them (locality), this framework aims to enhance understanding of the social value of urban street edges. This framework is primarily developed from the work of Habraken (1998) through *The Structure of the Ordinary*, which emphasises the interplay between human habitation and material form within the built environment. Through this, transitional edges can be conceptualised as “*coherent holistic socio-spatial realms integrating spatial and social dimensions of urban form*” (Thwaites *et al.*, 2013, p. 78), which is conducive to the generation of social engagement, behaviour, and exchange (Newman and Kenworthy,

1999). Unlike public/private interfaces, transitional edge framework is explicitly built upon socio-spatial understandings of urban realms, providing a foundation to explore how edge structure can be recognised as an assemblage, instead of a flat, continuous frontage (Thwaites et al., 2020; Muminović, 2023). Within this, transitional edges can be considered as a conjunction between building (internal) and street (external) realms, whilst expressing a balance of coherence and adaptability with stabilisation, territorialisation and personalisation in response to an overall coordination, or 'shared understanding' (Habraken, 1998; Thwaites et al., 2020). This has evidenced the insight stressed by Alexander *et al.* (1979) that edge space is a place with volume to it, and Dovey (2010) re-underpinned this point –

Place is an inextricably intertwined knot of spatiality and sociality. In this context there is a clear need for approaches that cut across the sociality/ spatiality divide.

Dovey, 2010, p. 6

Human-environment relationships, as integrated system manifested through material form, spatial organisation, and human function, play a significant role in understanding transitional edge framework. Essentially, street edges differentiate the interface from 'façades' or 'frontage' that merely represent the aesthetic or function (Thwaites et al., 2020). Within current research, transitional edge development predominantly lie at eye level in relation to socio-spatial structures (Cassiers and Kesteloot, 2012), with particular focus upon the process of human behaviour and occupation (Dovey, 2010; Glaser, 2012; Ewing and Clemente, 2013; Simpson et al., 2019; Carmona, 2021). The essence of transitional edges is therefore to emphasise their intrinsically dynamic shifting within the built environment, in order to manifest its continuous state of *becoming* (Dovey, 2010; Dovey and Wood, 2015), as Thwaites *et al.* (2013) maintained that –

Transitional edges are formed and transformed as much by patterns of occupation

and use as their spatial and material properties.

Thwaites et al., 2013, p. 297

This framework is essentially built upon Habraken's idea (1998), who demonstrated the structure of ordinary built environment provides a crucial foundation to explore the development of the transitional edge framework, which attempts to strengthen the balance of control between human interaction and material structure. *"In short, we are interested in the overlapping relationship between physical form and territorial control"* (Habraken, 1998, p. 127). Habraken proposed a tripartite taxonomy to construe the interplay of such control – *form*, *place* and *understanding* – that impacts upon human-environment relations. *Form*, regularly considered as top-down actions, is what structurally establishes an organised and stabilised infrastructure that is able to be occupied by stakeholders. Of particular significance is to understand how space is put together and materials are used, which become a *place* that can be controlled by occupants of the spaces they built (Thwaites et al., 2020). During this process, it also demonstrates the segment owners' personalisation and ownership. This can be manifested through diverse materiality, such as plant settings or billboards. Through the expression of territorial occupation, people's engagement with spaces greatly contributes to the generation of place attachment and implication through a bottom-up way. As Spivak (1973, p. 44) stated, *"It is what people do in a space that turns that a space into a place"*. As for the *understanding* level, this develops from the form and place levels, which is culturally dimension-oriented that people can resonate with others via collective participation and common interests. Through this, understanding is thus essentially rooted in social dimension driven by collective territorial expression and broader needs for individuality and collectivity to achieve a *sense of ours* (Thwaites et al., 2022). In this way, such control relationships show the numerous opportunities for collective placemaking and public engagement through street infrastructure that can optimise territorially socio-spatial expression (Figure 23).

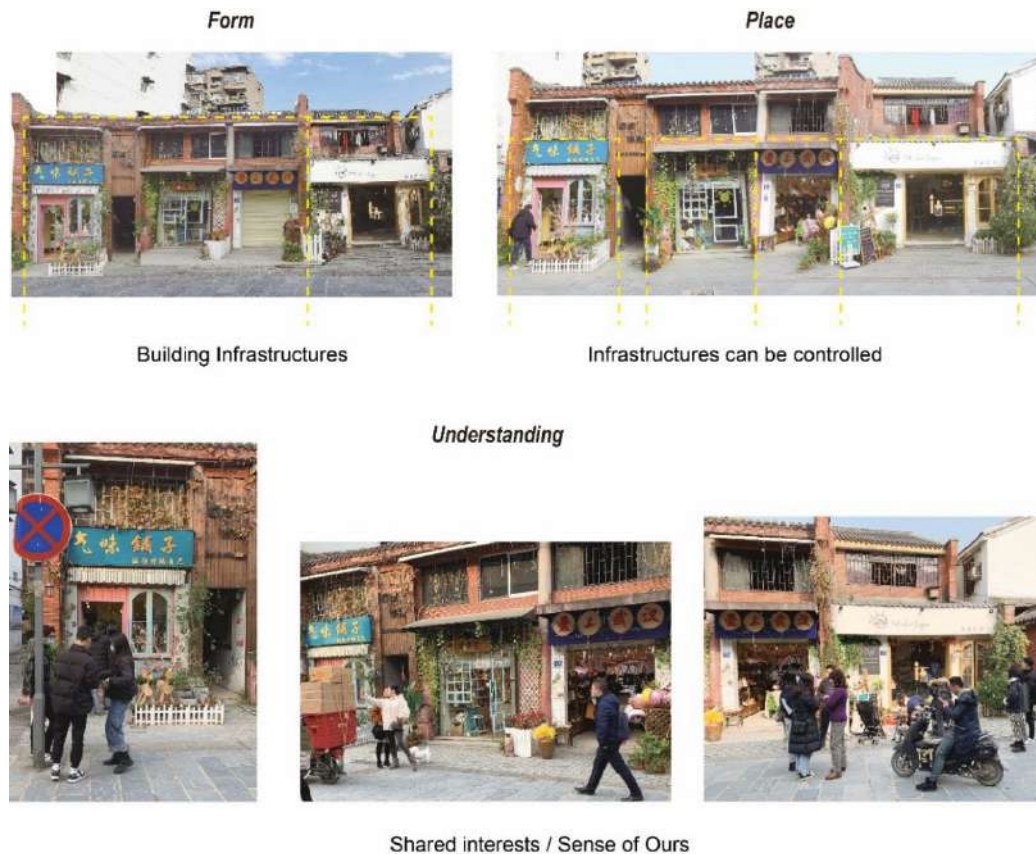


Figure 23 Habraken's levels of control, it means the process of occupation, segment owners and users can recreate the space through their intentions and desires

Through the discussion of Habraken's levels of control is provided a foundation to apply this thinking into the socio-spatial nature of transitional edge focus. Thwaites *et al.* (2013, 2020) conceptualised a tripartite framework of transitional edge structure – *extent*, *laterality* and *locality* – for understanding how levels of control can be interwoven with material, spatial and social dimensions of street edge experience. Regarding Figure 23, control level of *form*, as a top-down infrastructure of urban form, is primarily connected with physical components along the street edge to define its holistic organisation, also understood as *extent*. In order to be more socially engaged, occupants can provide such material affordances by to deliver richness and express creativity through human intervention (Gehl, 2010; Glaser et al., 2012; Mehta, 2019). As for the *place* level, it is related to territorial occupation and appropriation along the street edge *extent*, demonstrating how such actions can be reflected upon spatial

quality to provide opportunities for bottom-up placemaking (Thwaites et al., 2020). Through such placemaking actions, abruptness of division between public and private can be soothed via a certain degree of spatial depth, emphasising the importance of transitional edge *laterality* across the overall street edge extent. *Localities* within the transitional edge, thus, are the performance of social negotiation and collective desire in human everyday actions, whilst greatly being influenced by physical construction and spatial arrangement. Through this, it can be acquired that *form*, *place* and *understanding* such levels of control are closely intertwined with *extent*, *laterality*, and *locality* of the transitional edge framework (Figure 24).

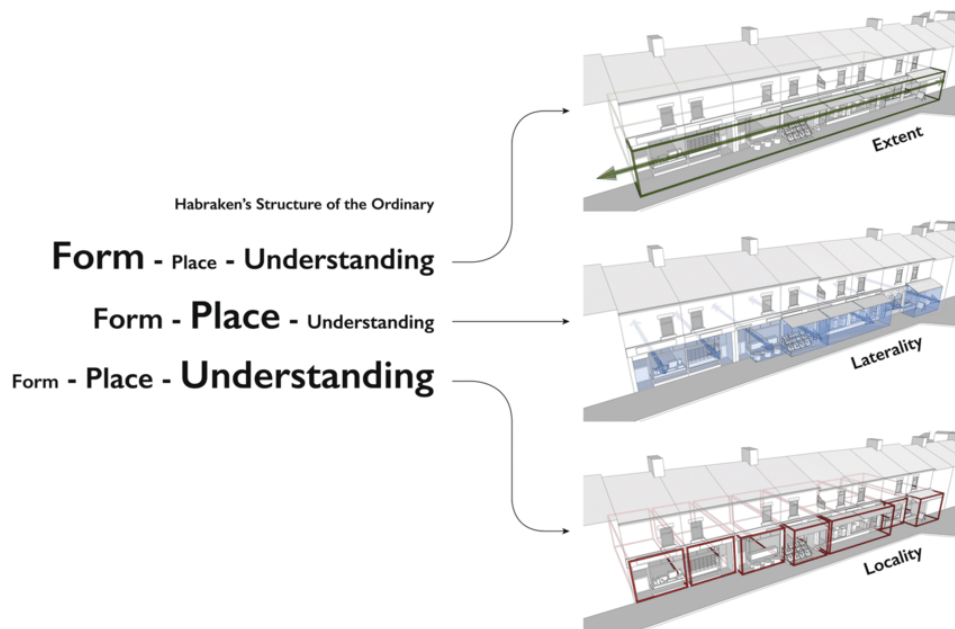


Figure 24 Transitional edge structure interweaving of Habraken's levels of control (Source: Thwaites et al., 2020)

In terms of the figure demonstrated above, transitional edge structures in combination with levels of control establish a conceptual framework for understanding the integration of material, spatial and social qualities of street edge experience. Through this, it also provides the foundation to explore a more nuanced scale: territorial segments amenable to socio-spatial attributes of street edges. Such attributes are fundamentally composed of segment *material* dimension (*distinctiveness*, *temporality*),

segment *spatial* dimension (*articulation, openness*), and segment *social* dimension (*appropriation, occupation*). This will be further discussed in the following part to highlight how segmentarity in relation to building structure plays a significant role in promoting everyday social interaction.

3.2.2 Territorial segments as human-scale place

Plot scale of street edge

On the basis of the above discussion, it is worthwhile realizing that the issue of scale has been easily neglected in existing urban design discourse, particularly regarding streets and edges that significantly impact pedestrian perception and experience (Marshall, 2004; Glaser, 2012; Karssenberget al., 2016; Carmona, 2021). When talking about scale, people usually consider this as somewhat abstract or professional perspective, such as city or district planning in a very strict hierarchy that is far beyond people's everyday life (Figure 25). However, the focus in current study is upon 'people', or what is known as *human scale* (Ewing and Clemente, 2013), which emphasises scales that can be perceived by the human body. Human scale generally refers to physical structures such as building size, articulation and street furniture that match human proportions, whilst being conducive to pedestrian's psychological and experience (Ewing and Handy, 2009). This resonates with Hedman's (1984) idea, who stressed the significance of transition space and scales between articulated building and street space. Such point has also validated by the work of Ewing and Clemente (2013) –

The size or proportion of a building element or space relative to the structural or functional dimensions of the human body. Used generally to refer to building elements that are smaller in scale, more proportional to the human body, rather than monumental (or large scale).

Ewing and Clemente, 2013, p. 11



Figure 25 Urban planning (diagrammed by author)

An insight of human scale critiqued by Ewing and Clemente (2013), does emphasised that small spaces are capable of creating intimate and engaging environments in daily life compared with large spaces. As Alexander *et al.* (1977) argued, alienation and disconnection will be generated if buildings are over four stories tall. Built upon this is, plot, also known as *lot*, which Kropf (2018, p. 3) defined as a “*physical form with buildings and open space when we live in it*”, is an important building morphology that links with street space (Scheer, 2016, 2017), which can be seen in Figure 26. Such plot scale in relation to plinths and street edges has been taken up by numerous scholars who emphasise the significance of plot as a physical entity (Marshall, 2009; Talen, 2012; Kropf, 2014, 2018; Thwaites et al., 2013; Dovey et al., 2020).

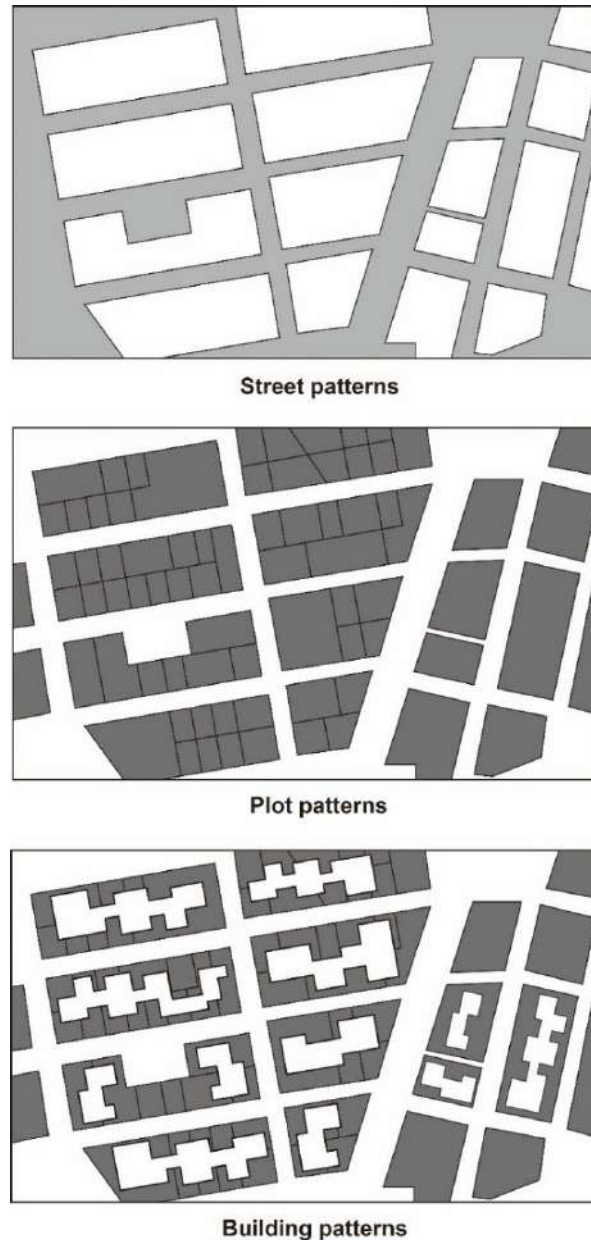


Figure 26 Relationship between Street, Plot, and Building

A fine-grained structure of plots plays a crucial role in street edges that potentially promote informal participation to generate and thrive, whilst showing its capacity to accommodate diversity and adaptability in response to street resilience with regards to varying functions (Wood and Dovey, 2015; Feliciotti et al., 2016). As Feliciotti et al. (2016, p. 4) have argued, “*series of one or more plots served by the same street form the street edge*”. Such small-scale plots, demonstrated in Figure 27, are considered more flexible to change of use and occupation over time. Built upon this idea, the

flexible building infrastructure of these small plots has evidenced that such areas are capable of providing opportunities to adapt to a variety of creative industries, which are conducive to facilitating street life (Simpson, 2011; Mehta, 2013; Thwaites et al., 2013). Of particular significance in relation to socio-spatial consideration is the way building plots manifest territorialisation and ownership, so that place character of plots can connect with street and edge for public engagement (Romice et al., 2017), as Porta et al. discussed –

... the 'importance' of a place will be reflected in the density of the development and the physical form it takes, through the street that traverses it, and the plot sizes and the building types that bound it, in a coherent, variable, appropriate manner.

Porta et al., 2018, p. 4



Figure 27 Built plot structure of street edge

In terms of the above discussion, it is noticeable that building plots play a significant role in facilitating urban resilience and adaptation in relation to function change over time, particularly in street spaces that attract pedestrians who engage with them (Wood and Dovey, 2015; Feliciotti et al., 2016; Porta et al., 2018). Although they have provided in-depth understanding and shown the significance of plot as a morphological structure that connects to chances of accessibility, few studies have been further investigated at a more nuanced scale, such as plinth (building ground floor, introduced in the next section) or territorial segment in detail. Through this, it affords an opportunity to delve

into how these nuanced building scales can be organised to influence dynamic social actions from an assemblage perspective, as Feliciotti *et al.* (2016) claimed that –

... the urban landscape of cities is the object of urban design intervention, then urban design can enhance the resilience of such system by manipulating configuration and relationships between these elements.

Feliciotti *et al.*, 2016, p. 11

Plinth scale of street edge

When physically inhabiting streets along with edges, people's engagement to a significant extent is facilitated by human-scale building structure in relation to socio-spatial qualities (Dovey, 2010; Mehta, 2013; Thwaites *et al.*, 2020; Barros *et al.*, 2021). Other nuanced building scales embedded within plots might also be conducive to promoting social interaction, such as the *plinth* (Gehl *et al.*, 2006; Glaser, 2012; Karssenberg *et al.*, 2016; Carmona, 2021). As Karssenberg *et al.* (2016, p. 14) described, "*a plinth is the ground floor of a building*". This is also graphically portrayed in Figure 28. The plinth, as a smaller-scale building structure, or also understood as *ground-floor façade*, is not only a part of building but the street edge profile, which in turn shows the diversity of function and facilities (Glaser, 2012; Hassan *et al.*, 2019; Simpson *et al.*, 2022). Through this, the morphological plot is spatially broken down into plinth, providing further insight into thinking how such building subdivision can influence upon everyday social interaction. These ground floors are predominately function-oriented ground floor subdivisions, such as retail, cafés, and restaurants, to initiate activity and sustain liveliness by providing diverse physical affordances and social capacity along the street edge (Gehl, 2010; Hassan *et al.*, 2019; Simpson *et al.*, 2022). Within such a situation, the number of functions potentially plays an indispensable role in determining pedestrian engagement with the diversity of facilities along the street edge (Karssenberg *et al.*, 2016). As Gehl *et al.* (2006) suggested, an engaging and lively street should comprise 15-20 differing units or 20-25 doorways

every 100m. Significantly for this, plinths not only act as physical accessibility to connect space between street and building, but more as interconnectivity spanning two adjacent realms (Karssenberget al., 2016; Thwaites et al., 2020), either physical or sensory, which echoed the point that –

The ground floor may be only 10% of a building, but it determines 90% of the building's contribution to the experience of the environment.

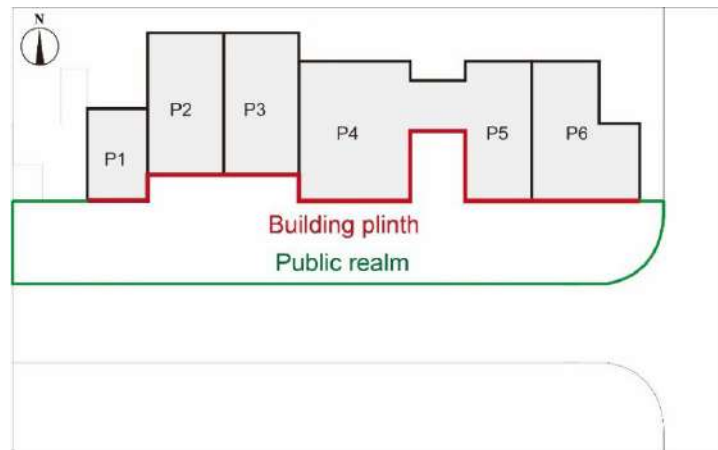
Karssenberget al., 2016, p. 16



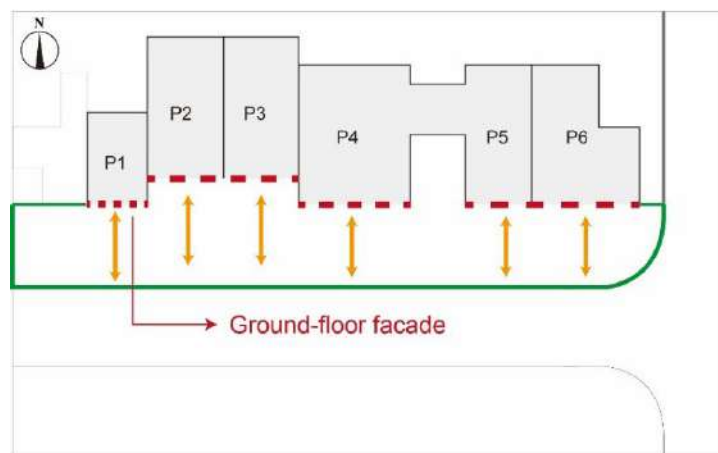
Figure 28 Built plinth structure of street edge

Within current research, however, the emphasis of building plinth solely upon its function will constrain in-depth exploration of street edge engagement. Taking plinth as a subdivision of street edge into consideration, it provides an opportunity to understand how ground-floor façade can be perceived and engaged at human eye-level in responsive to everyday street life, particularly in relation to its complexities of the built environment (Mehta, 2009; Kickert, 2016; Hassan et al., 2019). This is associated with the levels of ambiguity and accessibility within street edge, particularly in relation to spatial and social dimensions (Thwaites et al., 2013). By softening the abruptness of the division between public space and building edge, a semi-public/-private space can be generated to present a high sense of *looseness* and *enclosure* (Thwaites et al., 2020). During the exploration of ground-floor façades, *looseness* is identified by its flexibility and adaptability in response to unexpected rhythms, they are generally

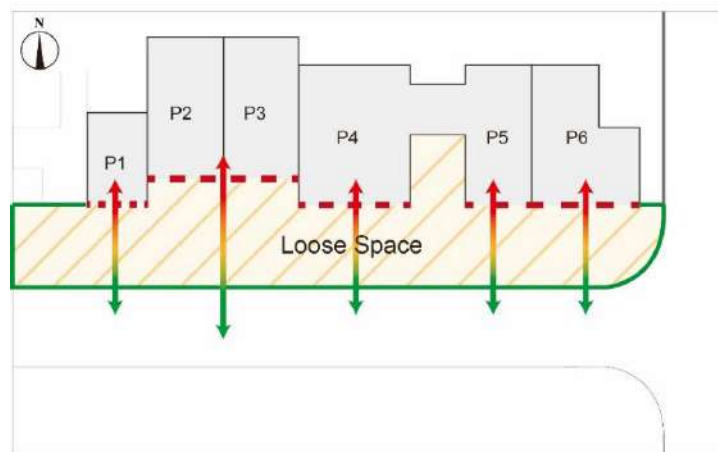
characterised by ambiguous, flexible, and unexpected uses, which has the capacity for undertaking different forms of engagement with two adjoining realms. looseness is in turn linked with the relations between ground-floor structure and form. Through this, there is a variety of activities and behaviours that can be generated within these in-between loose spaces, and that these can be forever-shifting/-developing (Can, 2012) (Figure 29). The nature of ground-floor façade thus is loose and susceptible to a wide range of behaviours over time.



Building plinths and public realm
as two individual entities



Interaction between these two entities



Loose Space between ground-floor
facade and public realm

Figure 29 Looseness between ground-façades and public realm

Enclosure, manifested through space between interior and exterior, is concerned with the boundary line to create and frame a semi-public/-private space along the street edge (Thwaites et al., 2020). It is also associated with the degree to which buildings and public space can be physically and visually defined by diverse physical affordances, such as fences, hedges, or natural features (Voltolini, 2006; Thwaites et al., 2013; Hassan et al., 2019). Although the edge setting is a crucial component, it is greatly dependent upon the continuity of building lines (Thwaites et al., 2013). Such an idea has been practically evidenced by the Department of Transport, “*Continuous building lines are preferred as they provide definition to and enclosure of the public realm*” (2007, p. 57). However, Frank (2010) conducted an experiment to find out that ordinary pedestrians prefer a building boundary with crenulated edge space, presenting a certain degree of setbacks or projections (van Oostrum, 2020). Through this, it clearly demonstrates that a varied building line is far more popular than the continuous one, as it provides more opportunities to attract pedestrians engaging with the edge, while further making contribution to an increased sense of enclosure. Street edge with a crinkled enclosure feature produces a *semi-enclosed space*, which can be more easily identified through such distinctive sub-spaces, whilst giving people a sense of attachment (Gehl, 2010; Thwaites et al., 2013; Heffernan et al., 2014; Kickert, 2016), as Thwaites et al. stated that –

Spatial expansion implies recognisable levels of enclosure, which is usually created by a building façade or a strong continuous line of definition. The most successful enclosure is not a hard continuous building line, or a loose and unidentifiable juxtaposition of random setbacks and projections, but a subtle balance between the two.

Thwaites et al., 2013, p. 91

As briefly discussed, these two qualities intrinsically have an influence on multi-dimensional emphasis upon the street edge, particularly in response to personalisation

and territorialisation through lateral articulation and localised manifestation (Thwaites et al., 2013, 2020). Crucial here is the way plinths shift focus away from the original building shape but orientate towards the socio-spatial connection between indoor and outdoor realms (Glaser, 2012; Karssenberg et al., 2016). This manifests how this in-between space can be perceived and engaged as an interconnected entity that identifies its spatial organisation and physical complexities, which can be noted in Figure 29 and Figure 30 (Gehl, 2010; Can, 2012; Thwaites et al., 2013).

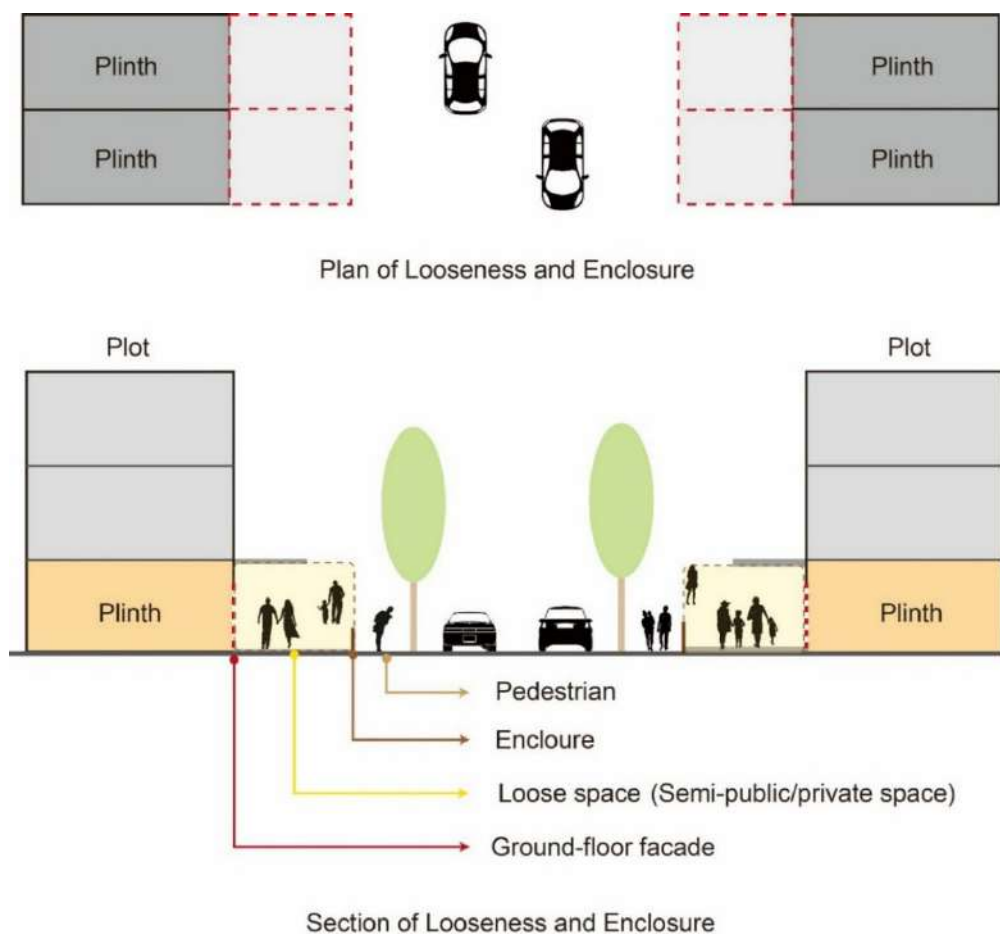


Figure 30 Combination of looseness and enclosure

However, even though it has been evidenced that building plot and plinth, more or less, contribute to edge engagement, there is limited studies that explore a more nuanced scale with regards to socio-spatial attributes that potentially influences upon activity patterns in greater detail. In order to get in-depth investigation, the following part will

predominantly focus upon a further street edge structure that is niched in plinth scale – street edge segment.

Segment scale of street edge

The above discussion primarily introduced the scale of plot and plinth in relation to street edge built morphology, and how they are considered as transitional structures between building boundary and street space. The current section will break plinths down into the segment scale in greater detail, highlighting its distinctive socio-spatial quality in response to its territorialisation and personalisation. Through this, it is possible for plinths to be composed of multiple street edge segments, or also understood as a *sub-division* nested in plinth (Simpson et al., 2022) (Figure 31). This is also reflected in the ideas raised by Thwaites et al. (2013), with regards to the manifestation of social interaction to further explore the interplay of street edge form and its socio-spatial complexities. Similarly, the development of street edge segments also aligns with the consideration of *assemblage* (Dovey, 2010), whilst reflecting upon the notion of *levels of control* (Habraken, 1998) as well as *sense of place* or *placeness* (Relph, 1976), as Thwaites et al. described –

Inherent in this general idea of segment are qualities we wish to capture in developing transitional edges as holistic socio-spatial components of urban form. The key significance here is that segments are experiential components which are both complex and socially optimal.

Thwaites et al., 2013, p. 104

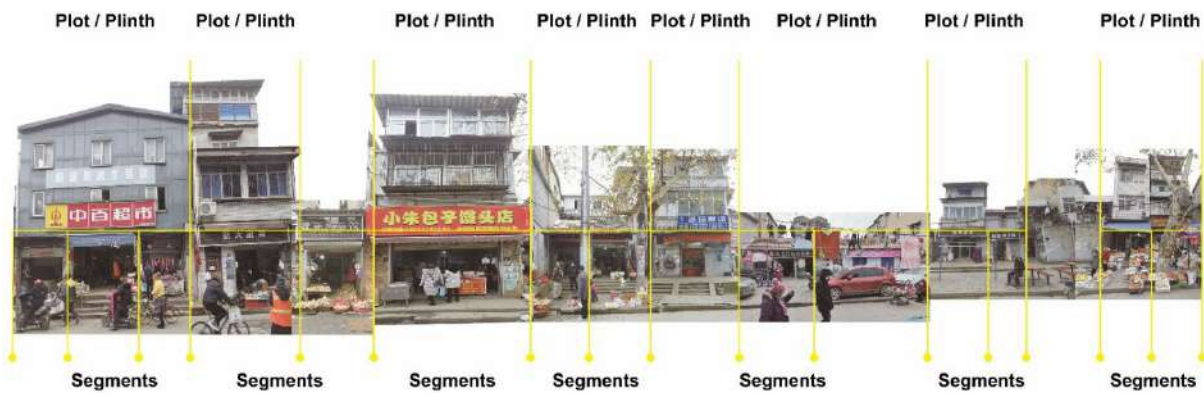


Figure 31 Built segment structure of street edge, it emphasises street edge component, including structurally building plot, morphological plinths and territorial segments

According to such fundamental groundings, the exploration of street edge segments will be primarily established through two essential notions, which are associated with philosophical and theoretical perspectives within the current section. The first dimension is built upon philosophical *segmentarity*, in relation to assemblage thinking (Dovey, 2010), laying the foundation for the investigation of Chinese urban village context. Such segmentarity within assemblage provide further insights into thinking about how material thresholds can be removed to strengthen social and spatial emphasis, whilst manifesting how street life can be socially and spatially segmented (Deleuze and Guattari, 1987), which connect with *territorialisation* and *re-territorialisation* (Dovey, 2010). Alongside this, the second dimension focused upon *transitional edge framework* (Thwaites et al., 2013, 2020), taking explicit socio-spatial attributes into account. This predominantly refers to segment *material* dimension (*distinctiveness* and *temporality*), segment *spatial* dimension (*open-ness* and *articulation*), as well as *social* dimension (*appropriation* and *occupation*) (ibid). And these segment's socio-spatial features have potentially contributed to the pedestrian experience with a more fine-grained and human-scale thinking in contrast to the scale of plot or plinth. The notion of segment, thus, has been applied to comprehend street edge complexities in respect of material, spatial and social dimensions, as Thwaites *et*

al. describe –

Segments can be understood as distinguishable socio-spatial building blocks of transitional edges through the extent to which they exhibit consistency in their materiality, their social characteristics and spatial organization.

Thwaites et al., 2020, p. 303

Segmentarity within assemblage thinking

From the perspective of pedestrian experience, segments that are associated with ground-floor façades are regularly identified through their diversity of function along with various material attributes (Bobic, 2004; Hassan et al., 2019). Within the current investigation, a segment's function is not the focus, instead, such materiality in relation to social and spatial influences is the primary concern of how this distinct realm can be manifested and engaged through territorialised actions along the street edges. This has resonated with Deleuze and Guattari's (1987) idea that segmentarity within assemblage relates to the balanced manipulation of a complex socio-spatial quality in pursuit of territorial stabilisation. Such stability of territorialisation can be reflected through material form and spatial organisation to stimulate social interaction, either passive, fleeting or enduring (Dovey, 2010; Mehta, 2013; 2019). As Dovey (2010, p. 17-18) maintained, *"territory is a stabilisation of the assemblage, establishing a zone of order that keeps chaos and difference at bay"*.

Territorialisation, manifested through capacity for occupation, appropriation and expression, is associated with socio-spatial changes that generate territorial ownership and awareness, which make segment as a distinguishable realm or place in its own right (Altman, 1975; Simpson, 2018; Thwaites et al., 2022). Such territorial practices, to some extent, reflect Habraken's (1998) conception of *control levels*, particularly *form* control that conveys the desires and needs of those who manage this area. As Moreau (2023, p. 15) argued, *'Needs and desires are not mutually exclusive but rather mutually*

constitutive'. For instance, segment owners of a café or restaurant could provide chairs and tables for people's temporary occupation, which can be noticed that how such space transform into place (Spivak, 1973) (Figure 32). They also perform as an integrated manifestation of flows of desire that people have generated in conformity with everyday territorial practices, as Tardiveau and Mallo (2014, p. 461) noted, "*expressions of assemblages outlive the permanence of physical outcomes*". Through this, such space within the street edge can be territorially personalised and segmented in an experiential manner, which promotes self-esteem, social cohesion and human well-being (Altman, 1975; Jacobs, 1993; Thwaites et al., 2013; Mehta, 2019; van Oostrum, 2020). Such idea, similarly, has described by Dovey (2010) that –

Territorialisation is a synthetic process that enables wholes to form from parts identities from differences.

Dovey, 2010, p. 18

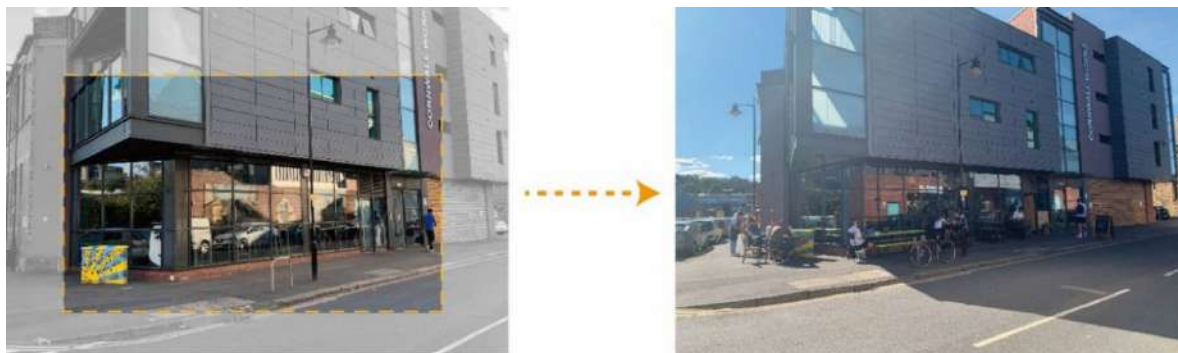


Figure 32 Sheffield: Territorialisation control level. Left picture aims to highlight how ground-floor interface was occupied by segment owners to manifest its territorialisation

Alongside the points raised above, another major insight exploring the street edge as assemblage emphasises upon how territorialisation is closely associated with *segmentarity* (Deleuze and Guattari, 1987). The form of segmentarity, in relation to diverse complexities of socio-spatial manifestation, is predominantly stabilised through

territorialised practices to achieve a balance of control levels (Deleuze and Guattari, 1987; Habraken, 1998; Dovey, 2010). Such manifested segmentarity is primarily undertaken by those who own and operate a given segment, which not only expresses its function to the pedestrians, but makes this realm able to be distinguishable from its surroundings. For instance, it provides visual engagement through eye-catching materiality within a segment, which allows pedestrians to linger and look through windows, either active or passive (Mehta, 2013), see Figure 33. Or, it affords an opportunity for people to physically engage with two adjacent realms through physical affordance within a segment, which can be seen in Figure 34. Segmentarity considerations, thus, are manifested in an experiential orientation to illustrate how people engage with street edges and segments far beyond its functions, which also provides greater possibility for exploring social complexities.



Figure 33 Wuhan: Segmentarity in relation to visual engagement (Left)



Figure 34 Wuhan: Segmentarity in relation to physical engagement (Right)

Territorial segments within transitional edge framework

In addition to segmentarity previously discussed, Thwaites et al. (2013, 2020) have conceptualised a framework of transitional edges to enhance understanding of socio-spatial attributes from the pedestrian perspective, particularly at street edge scale in

relation to segments. Significantly for them, segments are territorially rooted in social, spatial and material qualities in response to localised expression between building interface and street space, which is connected with assemblage thinking from the philosophical perspective. The point here is shifting focus away from its physical or morphological considerations, towards its socio-spatial complexities that influence upon people engagement, as Thwaites *et al.* (2013) describe –

... underpinning transitional nature: an essentially experiential, rather than physical, conception. ... nature of transitional edges as realms characterised by change and adaptation, reflecting the interface where social and spatial dimensions of urban form come together.

Thwaites *et al.*, 2013, p. 102

Segment *material* dimension, firstly, regularly refers to the quality of *distinctiveness* and *temporality* of a segment (Thwaites *et al.*, 2020). Such materiality of a segment is expressed through its physical manifestation. This essentially means that segments can stand out from others, or how ‘distinguishable’ segments present themselves against their immediate surroundings, reflecting their transitional and flexible nature. This implies the extent to which such distinctiveness is associated with the time attribute to demonstrate its material and/or spatial adaptability and conformity within a forever-developing context, also known as *temporality* (*ibid*). Building upon such an idea, a segment’s distinctiveness is usually manifested through the degree of territoriality and enclosure with regards to its material affordances, which facilitate social activity generation. A segment’s temporality attempts to demonstrate its capacity for diverse possibilities and uses sustaining across time: *looseness* (Franck and Stevens, 2007; Thwaites *et al.*, 2013). Therefore, distinctiveness and temporality of a segment have a great impact upon the extent to which it is engaging primarily as a recognisable place. As such, material dimension can be applied as a strategy to identify distinguishable segments along the overall street extent.

The way in which segment material dimension has been articulated and presented prominently provides territorial opportunities of how space can be transformed into place. This elicits a further dimension to strengthen segment's identification and placeness, which is the combination of material expression and social actions, also known as segment *social* dimension (Thwaites et al., 2020). Through this, it has evidenced that *appropriation* and *occupation* of a segment can also be considered as characterised qualities. These two features are essentially territorial in nature, as Habraken stressed that "*territory is defined by acts of occupation*" (1998, p. 128). As for how a segment can be appropriated, it might also be linked with territorial looseness to facilitate social interaction. And built upon this, such a feature can also be projected to occupation quality, which is manifested through enclosure of a segment. This holds implications for social activity and availability of opportunities for hide and reveal to consolidate sense of place through acts of human occupation and appropriation.

Beyond relating to material and social dimension of a segment, it also correlates with *spatial* dimension. These territorial attributes, such as distinctiveness, appropriation and occupation, are the form of material manifestation and social practices that make segments become a distinguishable place. It primarily emphasises that space as existence is essentially dynamic and forever-shifting, instead of static or invariable (Thwaites et al., 2020). And this manifests *open-ness* and *articulation* of a segment. In terms of Thwaites *et al.*'s (2020) idea, open-ness is often construed as the permeability and transparency features that could influence upon public-private gradient, and such the impact this has on social interaction. Following this, such social interaction can also be reflected on the spatial expansion within a pronounced segment, which in turn may provide opportunities for articulation of public-private gradient and hide and reveal. Based upon this, territorial segments can be considered as a distinctive socio-spatial place within the building plot, which demonstrate the coherence and integration of material form, social capacity and spatial organisation (Figure 35). Understood in this way, segments provide another perspective by which these theoretically socio-spatial

principles are able to be applied via practical evaluation.

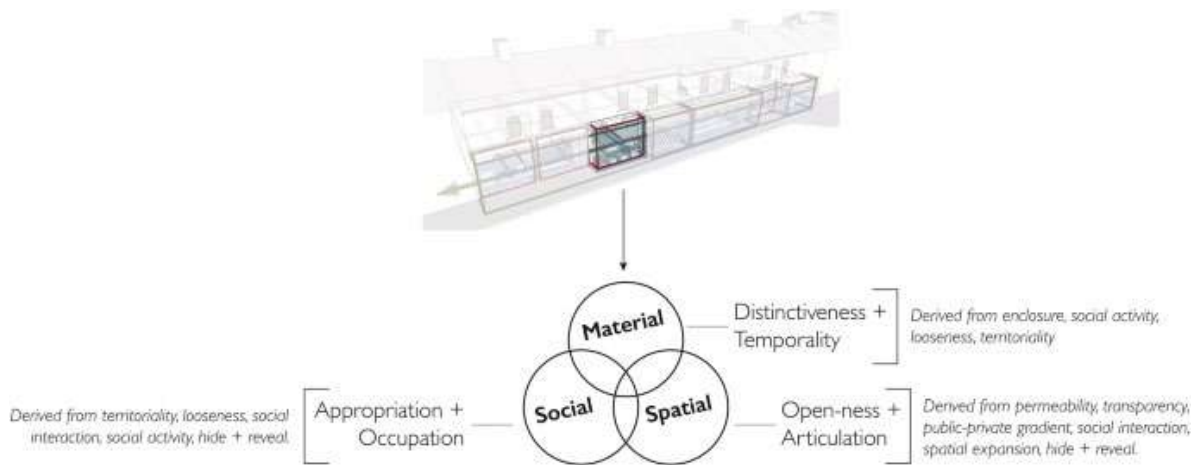


Figure 35 Integration of material, social and spatial dimensions (Source: Thwaites et al., 2020)

Building on the discussion regarding social, spatial and material dimensions, it can be understood that segments generally sit at the overlap between inside and outside realms (Thwaites et al., 2013, 2020; Simpson et al., 2022). Such attributes characterise segments as a place with unique identity and transitional implications, whilst providing greater capacity for social absorbency (Thwaites et al., 2013). Following this idea, there are two factors that are significantly related to this, which are *directional sensation* and *social depth*. The first is the influence of segments upon the degree to which *directional sensation* is strengthened or weakened (ibid). This resonates with Cullen's (1971) idea, which discussed 'here' and 'there' to manifest a sense of place. For instance, music from the café can be sensually engaged when people are walking on the streets; or benches provided by segment owners create a looseness between building and street to stimulate the chance of social interaction within such in-between space (Figure 36). Through this, it is noticeable that the emphasis of attention is upon the realm where building interface and street space are socially connected and interactive, which creates certain looseness and transition within it, see Figure 37 (Franck and Stevens, 2007; Thwaites et al., 2013; Muminovic, 2014).



Figure 36 Wuhan: Directional sensation of segment, the picture aims to highlight how ground-floor interface was occupied by street users to manifest its directional sensation

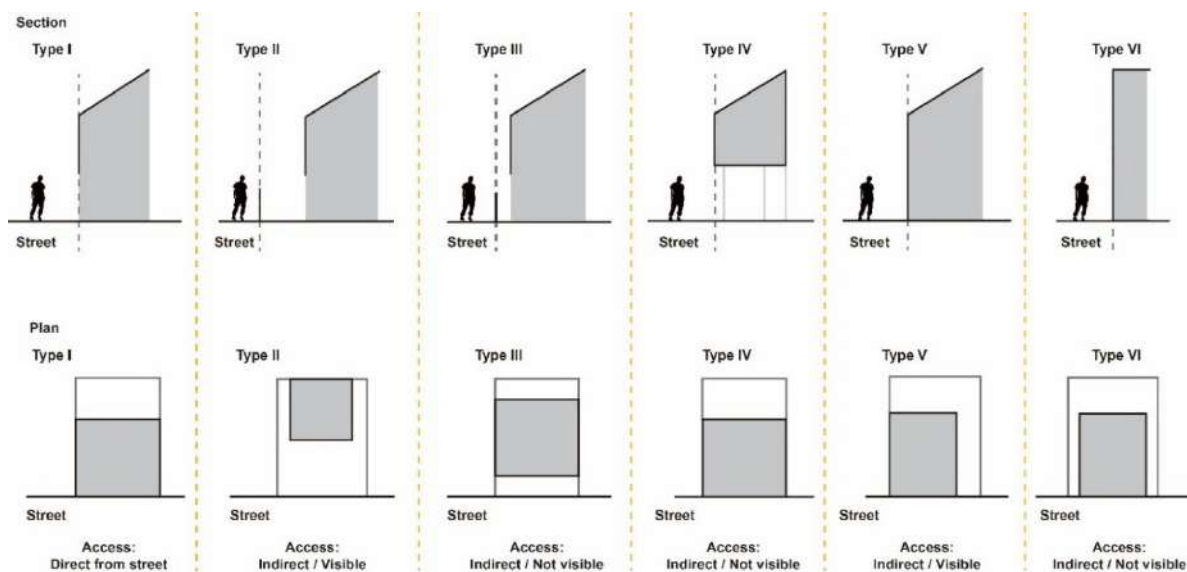


Figure 37 Typology of public/private interface (Source: Muminovic, 2014), it illustrates how public/private interfaces either positively or negatively influence pedestrian engagement

Understanding segments in a manner considerate of directional sensation can generate an idea that they afford opportunities for diverse experience and engagement with street edges, particularly at eye-level. This shifts the focus away from simplistic linear routes along the overall street extent, but towards a crinkled façade that creates

a variety of niches as sub-spaces, which can be occupied and appropriated (Alexander et al., 1977; Gehl, 2010; Thwaites et al., 2013). In turn, such sub-spaces are able to stimulate higher levels of social activity and communication in response to territorialisation and personalisation (Gehl et al., 2006; Thwaites et al., 2013), whilst heightening the directional importance (*here-ness* and *there-ness*) of segment considerations within street edge context. For Thwaites et al. (2013) argue that –

... directional sensation is heightened where the predominant awareness is towards a 'there', rather than 'here'... Segments can be classified in part, then, in relation to their capacity to decrease predominant directional sensation by emphasising awareness of 'here'.

Thwaites et al., 2013, p. 105

Alongside the directionality raised, social depth has also associated with territorial segments (Thwaites et al., 2013). Generally, segments sit where adjoining realms overlap, which indicate they encompass features of both realms, whilst developing their own attributes (ibid). Although it has been evidenced that the extent to which overlap is noticeable, this takes place through socio-spatial features in relation to *extent* along the street edge, *laterality* across street edge, as well as *locality* within it, which enable an understanding of territorial segments at a nuanced scale (Thwaites et al., 2013, 2020). Significantly, this provides great potentials for rich and complex social interactions within segments.

The extent, as an integration of segments along edge space, presents a complex and holistic street realm, particularly in relation to looseness and enclosure (Thwaites et al., 2013). It helps develop an understanding that street edge extent should be manifested as overall coherence whilst allowing diverse changes, instead of invariable uniformity. Such coherence is formed in a certain way to convey varying enclosures that might be expressed through a variety of crinkled edges. Along street edges, this makes a great

contribution to the nature of *stability*, which performs as an important quality to consolidate the establishment of local identity and sustain a relatively enduring sense of coherence across space and temporality (Dovey, 2010; Thwaites et al., 2013). This indicates that such stability should be ideally achieved through a degree of *flexibility*, allowing localised adaptability and evolution to reflect upon patterns of occupation and territorial negotiation. Thus, such innate looseness stimulates people's adaption and engagement, which in turn reflect its forever-developing composition, rather than being static or unvarying. This understanding has further evidenced that complex edge structure is established through its holistic extent (wholeness of edge), whilst emphasizing the assemblage significance of a series of territorial segments along it (Figure 38).



Figure 38 Extent of segments along street edge

The laterality spanning the public/private interface is also an important property to express territorialised segments, manifested through experiential intertwining between adjoining spaces (Thwaites and Simkins, 2006; Thwaites et al., 2013). Such a characteristic not only has the capacity to deliver a transitional experience from indoor to outdoor, but is also crucial to accommodate flexible adjustments from public actions gradually through to private, whilst being capable of social interactions at these conjunction points of in-between spaces (Gehl, 2010; Can, 2012; Thwaites et al., 2013). Such lateral quality can be socially responsive to two adjacent realms that present a

level of flexibility and ambiguity (Bobic, 2004; Gehl et al., 2006; Franck and Stevens, 2007; Thwaites et al., 2020). Such a feature makes merging areas between street space and segment interface experientially and spatially interweaved as a *wholeness* (Alexander, 1979; Thwaites et al., 2013). In relation to the complex street edge structure, the laterality breaks the edge extent into a nuanced scale, *segments*, shifting the emphasis away from overall a linear-dominated spectrum, towards the potential for engagement across the internal-external realm of the street edge (Gehl, 2010; Thwaites et al., 2020). Through this, the lateral articulation of plinth structure, manifested via building projections or setbacks (van Oostrum, 2020), can be formed through crinkled sub-spaces between segment and street (Franck and Stevens, 2007; Thwaites et al., 2013; Karssenberget al., 2016). For instance, a series of segments that engage with the street provide opportunity for human occupation in response to personalisation and territorialisation, whilst significantly projecting to spatial articulation based upon *laterality* structure (Figure 39).



Figure 39 Laterality of segments across street edge

Built upon the laterality structure across the street edge, it has to a greater degree influenced the point of localised expression that is nested in the building plinth along the street edge (Glaser et al., 2012; Thwaites et al., 2013). For Thwaites et al. (2013), this is an important socio-spatial factor that attempts to slow down the linear experience along the street edge extent, aiming to emphasise locational and staying significance.

Through this, it can also project to the capability of *social absorbency*, which affords diverse opportunities for street inhabitants to conduct territorialised practices, manifested through occupation, appropriation and personalisation (ibid). This understanding further highlights interaction with *hereness* and *thereness* within a segment (Cullen, 1971), whilst forming a complex socio-spatial integrated area across adjacent realms (Figure 40).



Figure 40 Locality of segments within street edge

Territorial segments along street edges – moving forward

Collectively, segments, as socio-spatial assemblage structures, are nested in ground floor interfaces, plinth scale and building plot along the street edge extent. Territorial actions and practices, developed from segmentarity (Deleuze and Guattari, 1987; Dovey, 2010), greatly influence the material and spatial expression of segments, which in turn reflect the progress of ownership and personalisation. The materiality in everyday space is not provided in advance then waiting people to use it, instead, it is what people do in a space that turns that space into place. Significant for this, such transition spanning indoor-outdoor realms establishes complex socio-spatial manifestation and provides multi-directional sensation, either along, across or within the street edge (Thwaites et al., 2013) (Figure 41). It is, therefore, expected that this distinctive socio-spatial infrastructure can be performed as a platform for street

inhabitants inhabiting and engaging, resonating with the significance of phenomenology mind-set and assemblage thinking.

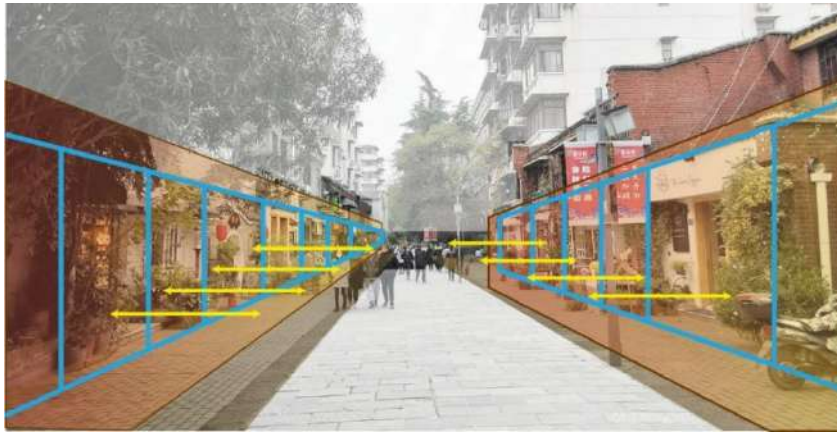


Figure 41 Combined (Extent + Laterality + Locality) segments along street edge

3.3 Theme 2: Street activities and engagement

Through explicitly exploring the street edges and segments, it provides an in-depth understanding of their complex qualities in relation to material, spatial and social dimensions. The following section aims to place emphasis upon the everyday activities take place, and how they are undertaken by street inhabitants. Everyday activities play a crucial role in promoting social engagement and interaction, and such social processes, in turn, provide opportunity for edges and in particular segments to attain territorial significance. This will also contribute to the development of personal well-being and sense of belonging.

3.2.1 Human activity and behaviour setting

Three outdoor activities

Urban scholars agree that the range of activities in everyday streets are of importance to inhabitants engaged in social relationships, and a significant component of social order (Putnam, 2000; Mehta, 2013, 2019). This range can be construed as *intensity of*

contact (Gehl, 2011), spanning from being alone in public space to being close with others. In order to better understand public life, one of most practical and widely used activity frameworks is the three outdoor activity classification proposed by Gehl (2011) in which he categorised activities into three types – *necessary*, *optional* and *social*. *Necessary activities* refer to those that are manifested as compulsory, which means occur in spite of the environmental conditions, such as going to work or school. Due to its necessary attributes, its occurrence is barely influenced by material forms and throughout the year, implying that there is no room for participants to choose the spatial context within which it takes place. *Optional activities*, on the contrary, are quite different. They only occur when the quality of the environment is compatible and favourable, such as taking a leisurely walk, sitting to relax or sunbathing. Those pursuits are encouraged by people's willingness and a comfortable atmosphere. Compared with necessary activity, this activity is particularly connected to external physical settings. *Social activities*, developed from the previous two activities, usually require higher level of environmental condition, such as public activities or greeting and conversations. Building upon such taxonomy, it further demonstrated the significance of everyday activities that are greatly pertinent to pedestrian experience and social cohesion (Thwaites et al., 2013; Mehta, 2019), while echoing the *sidewalk ballet* notion proposed by Jacobs (1961), who described as –

Most of it is ostensibly utterly trivial but the sum is not trivial at all. The sum of such casual, public contact at a local level ... is a feeling for the public identity of people, a web of public respect and trust, and a resource in time of personal or neighborhood need.

Jacobs, 1961, p. 37

Behaviour settings

In terms of the classification of the three outdoor activities, it implies that everyday activities play an important role that potentially contributes to influence upon social

engagement. Within the context of street edges along with segments, this has also resonated with the *behaviour setting* conception raised by Barker (1968). It predominantly focuses upon the relationship between human behaviour patterns and physical settings that might occur in their everyday life through a small-scale social system. According to his work, a behaviour setting is mainly composed of a *milieu* (a specific configuration of environment), a *standing pattern of behaviour* (a repeated and periodic activity), and a *synomorphy* (congruent relationship between milieu and behaviour) (Barker, 1968; Schoggen, 1989; Liu, 2012). Human behaviours are usually compatible with unexpected milieu, instead of randomly taking place in any disconnected or meaningless realms (ibid). The existence of behaviour settings manifests how people generate dynamic interactions, promoting possibilities within the everyday living environment among different participants (Barker and Schoggen, 1973). This idea is reminiscent of thinking that emphasises the importance of an integrated perception of the built environment and human actions, which is the basis of shaping life and experience. Through this, human-environment relations should be considered as an integration of philosophy, psychology, materiality, and sociology, rather than solely focusing upon these aspects individually, as Seamon (1993) described –

This quality is perhaps one of the most precise ways to express the special 'togetherness'...

Seamon, 1993, p. 177

The behaviour setting was created to support daily behaviours and contact is of vital significance, relating to individual desires and needs, whilst reflecting how the built environment influences social behaviour (Liu, 2012). As an interactive and synomorphic pattern involving recurrent activity into particular milieu, behaviour setting also acts as a form of non-verbal communication that delivers the sense of place through physical manifestation and diverse actions (Rapoport, 1990, 2005). The more synergic relationship between the specific configuration of environment and activity

pattern, the better the behaviour setting can be presented that stimulates daily human behaviours and desires (Mehta, 2006). Building upon such an idea, Wicker (1979) further emphasised the significance of behaviour settings as a medium to balance the physical environment and people's activity, what he maintained as '*behaviorally significant, human environment*'. Through this, such a system contributes to the understanding of how people conduct their behaviours, whilst exploring the social influence and change in the environment, as Rapoport (1990) argued –

They all communicate identity, status, and the like and through this they establish a context and define a situation... the environment helps people behave in a manner acceptable to the members of a group in the role that the particular group accepts as appropriate for the context and the situation defined.

Rapoport, 1990, p. 56

Such consideration is closely related to the practices of territorialisation and personalisation. The territorialisation of street edge segments, primarily manifested through personalised occupation and physical affordances, is capable of creating a built environment that provides multiple sensory and interaction with street inhabitants (Mehta, 2010; Thwaites et al., 2013; Barros et al., 2021). For Dovey (2010), this implies that built environment is a socio-spatial assemblage *place* identified by its interconnectivity, which fulfils people's needs and flow of desires in their daily lives, rather than solely as a physical *form* (Habraken, 1998). Such thinking aligned with Dovey's idea: "*desire is the primary force of life; it is immanent to everyday life and not limited to the human world*" (Dovey, 2010, p. 15). Building upon this idea, Thwaites and colleagues (2022) have developed a conceptual framework, *Microenvironments*, in response to human territorialisation – *MYTO* (*mine, yours, theirs, ours*). This framework primarily emphasises the needs of physical affordances that stimulate territorial formation of *mine* and *ours* – a place that people can occupy, engage and build connections to generate a sense of attachment (Thwaites et al., 2020). This is in

contrast to the experience of *yours* and *theirs* – a place that people cannot manipulate or inhabit to provide a sense of engagement (ibid). Reflecting upon such thinking in relation to street edges and segments, it enables the exploration of small-scale interactions that contribute to inclusively territorial significance. Meanwhile, this framework allows the opportunity to identify and understand the difference between positive and negative segment territorialisation (Figure 42). In light of this, it provides further insights into thinking how territorialised practices and actions are dominantly manifested through physical *affordances* within the street edge, especially at the territorial segment scale in a bottom-up manner.

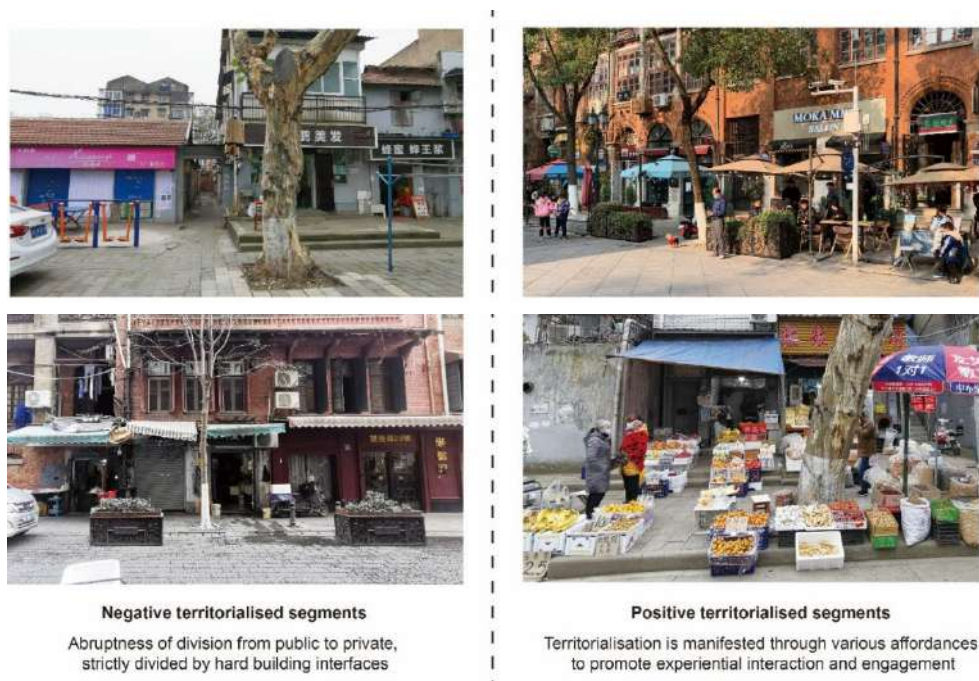


Figure 42 Wuhan: Negative and positive segment territorialisation

3.2.2 Territorial affordances within street edges and segments

Affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. ... It implies the complementary of the animal and the environment.

Gibson, 1979, p. 127

The concept of *affordances* proposed by Gibson (1979) was an attempt to understand how physical objects can be used to effectively encourage human activity and engagement within everyday life. Such physical properties are mainly distinguishable and manifested through objects or settings, which not only provide behaviour opportunities but also social experience and well-being (Mehta, 2006; 2019). It reflects that inhabiting a place acts as an assemblage of complex affordances in relation to socio-spatial practice and process, rather than dominantly top-down design tactics (Fusco, 2016). Building upon this idea, it has been shown that the establishment of certain physical and spatial structures is usually the priority to be demonstrated in the environment, which provides the potential opportunities for social engagement (Maier et al., 2009; Simpson, 2018). In light of this, segments nested in the street edge, encompassing material and spatial affordances, should be provided and personalised prior to being socially engaged, as Maier et al. (2009) argued that –

The affordance of visibility through a window is one type of interaction, while the behavior of a person looking through the window is a different type of interaction, but the two are related because the window must (first) afford visibility before it can (second) ever actually be gazed through.

Maier et al., 2009, p. 397

Inhabiting place, such as territorial segments along street edges, has been considered as a dynamic integration of socio-spatial affordances instead of a pre-given setting for a specific function (Dovey, 2010; Thwaites et al., 2013). This has shifted the emphasis away from function-oriented of a segment towards a more socially responsive-oriented thinking, which provides in-depth insights into understanding how such affordances and settings can be engaged and developed to promote a sense of belonging. Significantly, such an idea also aligns with assemblage mind-sets, and the way in which physical affordances can be territorially manifested in multifaceted ways. Street edge segments, identified as distinctive socio-spatial realms, are capable of comprising a

variety of physical and spatial affordances that facilitate street vitality and vibrancy through inhabitants' behaviours and actions (Gehl, 2010; Thwaites et al., 2020; Barros et al., 2021). The following sections thus explicitly focus upon segment affordances from the perspective of material (*distinctiveness*, *temporality*), spatial (*openness*, *articulation*) and social (*occupation*, *appropriation*) dimensions.

Affordances with material dimension (distinctiveness and temporality)

A segment's *distinctiveness* refers to its potential to be outstanding and be identifiable from the surroundings, which has also resonated with the notion of *imageability* (Lynch, 1964). Although imageability is not a term regularly used in a street edges context, recent studies have highlighted that this factor plays a significant role in contributing to pedestrian engagement in relation to physical affordances (Gehl et al., 2006; Thwaites et al., 2020; Barros et al., 2021). Moreover, these characteristics make territorial segments become an engaging place that provides great potential social opportunities. Through this, it highlights that such affordances, either high-level or low-level, work together as an assemblage to make segment distinctive (Borji, 2012; Simpson, 2018). High-level affordances are usually associated with eye-catching objects that attempt to manifest their function and features, and through this, they can stand out to attract pedestrians' attention, either visually or physically (Borji, 2012). Segments with these affordances are remarkably prominent and recognisable compared with their surroundings, as can be seen through Figure 43. Low-level affordances, in contrast, relate to those materials or components that are relatively less prominent, and are incapable of stimulating any vibrant activities or generating interactions between place and people. Significant for this, the way in which certain segments fail to manifest itself to the street identity or image through its simplistic parts, which can be manifested through texture, impermeability, colour and light (Figure 44).

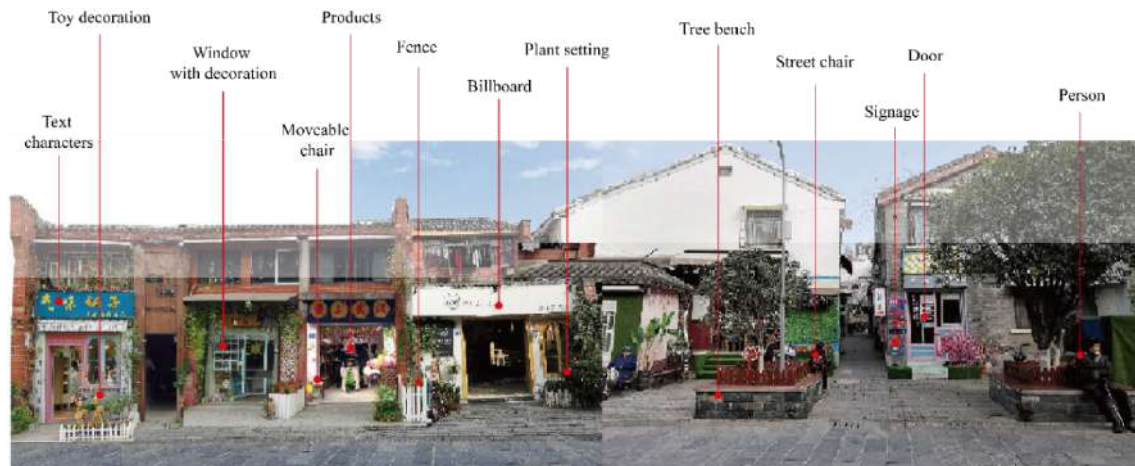


Figure 43 High-level physical affordance

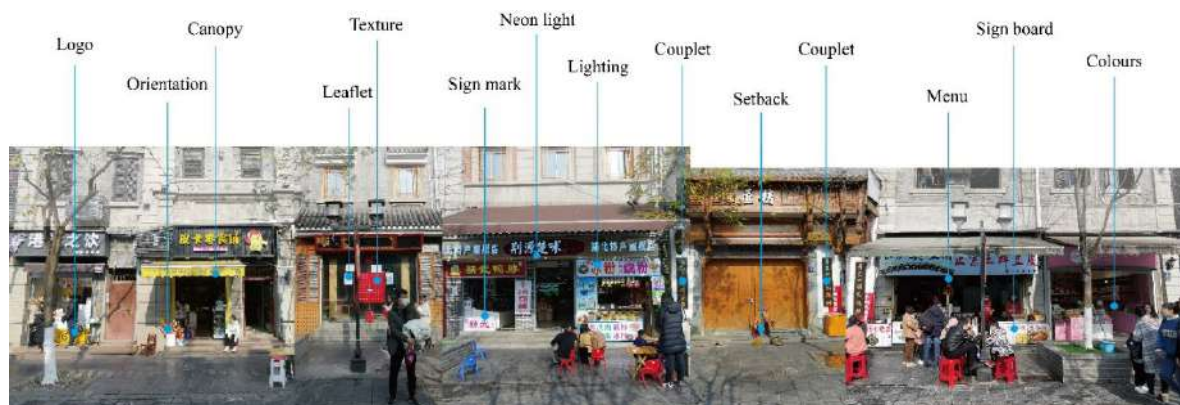


Figure 44 Low-level physical affordance

The *temporality* of affordance is closely related to often-regular rhythms, and in line with everyday flows and tempos of opening and closing segments (Bobic, 2004). To some extent, such affordances with temporal features respond to the adaptability and flexibility within a segment, whilst demonstrating how temporal affordances influence upon people's engagement. For instance, a cloth segment is manifested through a product display to highlight its identity and temporality, such as with T-shirts or jumpers. Similarly, the posters for food segment are periodically updated to publicise promotions, as can be seen in Figure 45. This highlights how segments can be positively re-territorialised through varying temporary affordances to encourage human engagement, which in turn further strengthens the distinctiveness of the segments. In this way, the dynamic nature of territorial segments can influence the wider context

(Gehl, 2010).

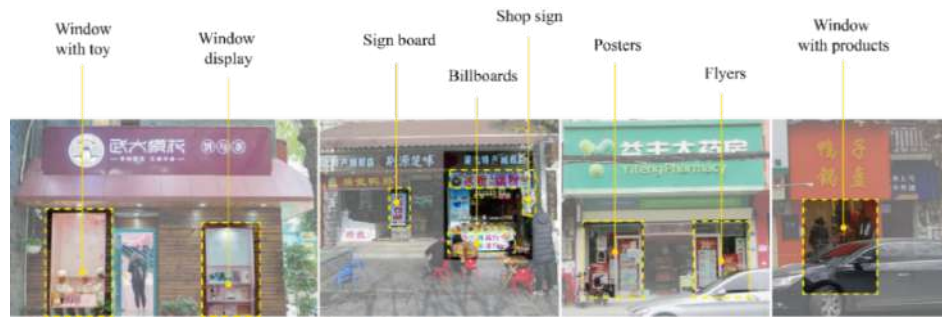


Figure 45 Temporality affordance

Affordances with spatial dimension (openness and articulation)

The *Openness* quality of edge segments, across the two adjacent realms of the outdoor street and indoor buildings, is usually associated with *transparency* and *permeability* (Ewing and Clemente, 2013; Thwaites et al., 2020). *Transparency* is usually associated with a visual experience that enables the interaction between ‘here-ness’ and ‘there-ness’ (Cullen, 1971; Thwaites et al., 2013), primarily expressed through windows. For Porta and Renne, ‘*Transparency is a measure of the amount of window space/area that fronts onto the street, allowing viewing into and out of the building*’ (2005, p. 8). This makes street inhabitants aware that nearby settings can be temporarily occupied and engaged. Transparency is thus a beneficial feature that could promote visual activity for outside street pedestrians (Project for Public Spaces, 2008), whilst allowing inside users to perceive their external realm, see Figure 46.



Figure 46 Transparency affordance

Permeability refers to the connectivity of two adjoining realms that are mediated by edges, which is more related to physical accessibility and occupation (Thwaites et al., 2013). This is a crucial quality to link the space between street and edge, and strengthens lateral depth from inside to outside. For Madanipour (2010), this is not only a process of access but a complex semi-permeable space that has an impact upon social activity along the edge and the way in which inhabitants experience such realms far beyond visual communication. Such thinking further evidenced that high permeability is ambiguous and dependent upon spatial negotiation between street users and agents (Thwaites et al., 2013), see Figure 47. Through this, street edge engagement can be stimulated in response to social experience and human habitation.



Figure 47 Permeable affordance

The *articulation* of a segment relates to the transitional space with a smooth *public-private gradient*, rather than the abruptness of division between indoor and outdoor realms (Franck and Stevens, 2007; Gehl, 2010; Thwaites et al, 2020). In this way, it is possible to have different degrees of intimacy through such gradient settings, which provides opportunity for people to be exposed or have privacy (Alexander et al., 1979). In addition, such exposure and privacy are directly associated with *hide and reveal* (Thwaites et al, 2013), which greatly influences social interaction. As Martin (1997) maintained, people have rights when they decide to be private or sociable. The settings they occupied are able to afford readily condition for people choice. Having understood

these two qualities potentially in relation to a building extension or setback, a semi-public/-private space is thus generated in such transitional realms, whilst showing the capacity for diverse affordances within two overlapping zones (Figure 48).



Figure 48 Articulation affordance

Affordances with social dimension (occupation and appropriation)

Street edge segment is manifested through practices of *occupation* to express its territoriality (Habraken, 1998). Occupation is mainly associated with *enclosure* features along the building threshold, creating sub-spaces through various affordances to articulate an interior and exterior (Thwaites et al., 2013). Such sub-spaces can be formed through crinkled building façades or other continuous boundaries, such as fences, canopies, or street furniture (ibid), which deliver a strong sense of enclosure and protection. Numerous urban scholars have evidenced that such articulated façades with niched spaces are readily occupied (Cooper-Marcus and Francis, 1997; Dovey and Wood, 2015; Thwaites et al., 2020). Such spatially crinkled façades, or *pockets of semi-enclosed spaces*, make segments identifiable and the users feel protected (Thwaites et al., 2013). In this way, a great opportunity to have a higher level of social interaction via varying affordances is provided, which responds to personalisation and territorialisation (ibid) (Figure 49). Essentially, a rich building interface facilitates the practices of enclosure while encouraging human engagement.



Figure 49 Occupation affordance

Appropriation is more socially flexible than occupation, which is usually characterised by its *looseness* attribute. It is more related to physical and social possibilities and fulfils such possibilities through everyday human needs and actions. Within the street edge context, this is the manifestation of transitional and temporary nature to afford opportunity for appropriation. Such loose space usually acts as ambiguous, open-ended and adaptive to accommodate diverse activities and affordances (Thwaites et al., 2013). To some extent, the use of the term loose space / looseness can be associate with different meanings, often due to its inherent openness as a term. The use of the term in this research does not draw directly from its use by Franck and Stevens (2007) but builds upon subsequent interpretations of the term within a street edge context (Thwaites et al., 2013; 2020). For Thwaites et al. (2013), looseness is also associated with temporality, changing over time in line with daily rhythms of territorial segments. For instance, segment owners appropriate the edge space through placing products to demonstrate its function and looseness in the daytime, and collect the items at night, as shown in Figure 50. This shows that a variety of behaviours and activities can be generated in these threshold spaces at different time periods. Looseness edges thus allow for the establishment of a socially active interface that is conducive to social interaction and human habitation.



Figure 50 Appropriation affordance

Combing the affordances with socio-spatial attributes

Street edges along with segments embedded within them, which people have the potential to manipulate and change the territory they regularly inhabit, provide opportunities to explore everyday activities from a nuanced socio-spatial perspective. Such territorial practices not only create complex socio-spatial structures within street edges through personalization, but also make street inhabitants actively engaged. This also aligns with the significance of affordances that contributes to the establishment of segments, and this shifts the emphasis away from *built form* towards the *shared understanding* in response to collective ownership and engagement (Habraken, 1998; Thwaites et al., 2013). Exploring the thought of territorial segments in relation to varying affordances provides detailed insights into thinking about how such theoretical contributions can be applied in practice to create a more engaging street edge and segments, particularly in a Chinese urban village context.

3.4 Theme 3: Socio-spatial qualities of street edges influence everyday activities

The emphasis of this part within the current chapter emphasised the interplay between socio-spatial qualities of street edge and activities they host in Chinese urban villages. It examines how these realms can be personalised, territorialised and occupied

through everyday activities. This interaction has been a focal point throughout, prominently featured in the philosophical foundations and woven into the concept of assemblage (Dovey, 2010; Thwaites et al., 2020). This implies that without lived-world physical settings such as street edges or segments, they would not obtain significance as identifiable and recognisable places. In essence, various materiality manifested in street edges and segments would not identify or exist without people occupying or engaging actions.

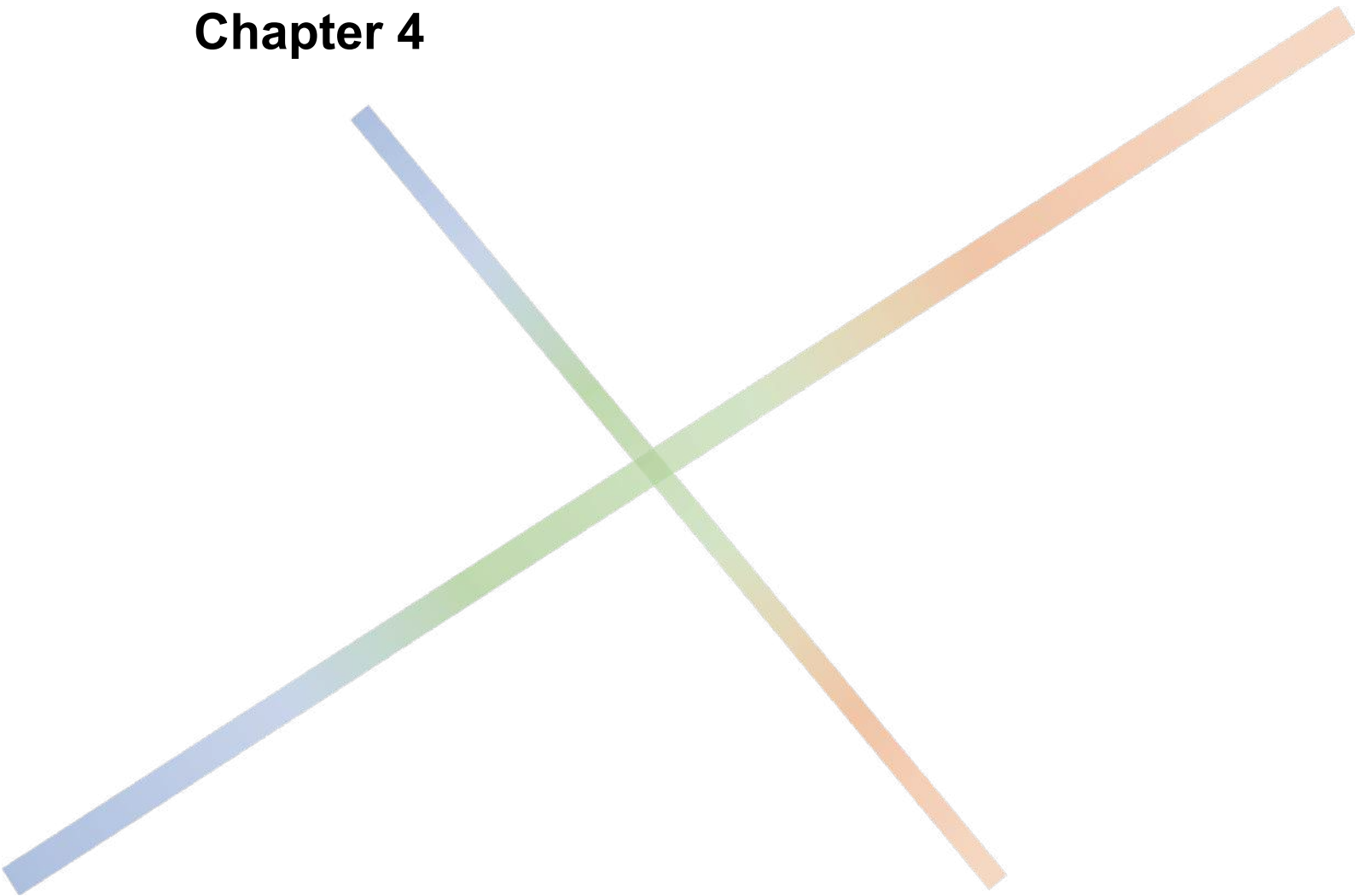
The way in which street edges and segments are territorialised in relation to material, spatial and social dimensions has been considered in response to activities inhabitant engaged in (Mehta, 2013; Thwaites et al., 2013). Understanding how such complicated and developing socio-spatial processes influence everyday human activities that has been challenging in urban design discourse (Thwaites et al., 2020; Carmona, 2021). Through this, it prompts a consideration of how street settings are occupied and personalised through necessary, optional and social activities to deliver socio-spatial manifestation. This thinking emphasises the significance of street edges and segments and their influence upon activity engagement, particularly in Chinese urban villages.

Regarding the classification of three outdoor activities, this distillation allows for an in-depth exploration of the relationship between social-spatial attributes and activity tasks. Necessary activities pertain to specific tasks that regularly require focused attention and intention. Choices of such activity are very limited, which means the material affordance, arrangement, and location for territorialisation are repeatedly defined. As for optional activities, they usually do not focus upon a specific goal or intention for territorialised actions, such as enjoying the sunshine, or standing observing. These activities are greatly dependent upon outdoor physical conditions (ibid), where personal preference and inclination play a significant role in determining where territorialisation occurs. This can also be influenced by spatial and material affordances provided by street edge segments. Lastly, social activities built upon optional activities

and require optimal environmental conditions, such as sitting talking, or greeting friends on the streets. Through these activities, territorial habitation becomes diverse and flexible for occupation and personalisation. In terms of street edges, social activities are collective understanding oriented as street inhabitants can acquire sense of belonging (Thwaites et al., 2020).

These varying activity classifications are characteristic and unpredictable, particularly optional and social activities that emerge unexpectedly, enriching street life in response to socio-spatial manifestation. Consequently, street edges and segments can be, therefore, recreated and reproduced through occupation and territorialisation to facilitate activities either fleeting, passive or enduring (Mehta, 2013; 2019). Central to this understanding is the notion that people play a vital role in endowing these distinctive realms identifiable and recognisable through their differing activity engagement (Whyte, 1980; Gehl, 2010). These considerations evidenced that pedestrian experience of street edge is closely related to material, spatial and social qualities. As a result, street edges and segments, as socio-spatial assemblages, are territorially engaged by street inhabitants, who imbue them with material and spatial affordances to foster social interaction, particularly in the context of Chinese urban villages which are the focus of interest during the current study.

Chapter 4



Study Sites and Research questions

Prior to discussing specific research questions, a detailed introduction of study sites will be provided first, which gives a comprehensive understanding of site areas. Subsequently, research questions are primarily structured in a series of parts aligning with the three themes discussed earlier (Chapter 2). Each part aims to focus upon specific themes and points outlined within the street edge framework (Chapter 3). This approach acknowledges that street edge segments can be assessed through understanding socio-spatial attributes, and everyday activity tasks can be quantitatively examined through exploring their duration and engagement (methods to be introduced in Chapter 5). These aspects are captured and presented through recording techniques and associated analytical ways. Each individual theme begins with a brief introduction derived from the street edge framework discussed above. Following this, a set of detailed sub-questions were formulated based upon the different thematic contents within each section.

4.1 Study sites

4.1.1 Selecting study site areas in Wuhan (China)

In the realm of Chinese urban design, numerous urban village regeneration projects are economically driven by local authorities through heavily top-down tactics (Liu et al., 2010; Lai et al., 2014), they regularly adopted large-scale renovation or demolition aimed at reshaping urban tissue (Hao et al., 2011; Niu, 2019). Moreover, streets in urban villages, as frequently inhabited public space for dwellers, are solely used as a path for movement or mostly overlooked by regular users to a large extent. A study of streets and edges within Chinese urban villages reveals these ubiquitous everyday spaces are capable of accommodating a certain ambiguity and looseness, allowing for a greater manifestation of desires and needs (Franck and Stevens, 2007; Dovey, 2010; Thwaites et al., 2020). Specifically, it closely relates to the potential of the street, who the stakeholders are, and what kind of activities they can generate (Mehta, 2019). In recent years, street edges and territorial segments play a significant role in contributing

to urban vitality, driven by various bottom-up strategies and small-scale interventions (Mehta and Bosson, 2021; Simpson et al., 2022). Such insight resonated with Louis Kahn's idea, who maintained that –

In a city the street must be supreme. It is the first institution of the city. The street is a room by agreement, a community room, the walls of which belong to the donors, dedicated to the city for common use. Its ceiling is the sky. From the street must have come the meeting house, also a place by agreement.

Louis Kahn, The Street

The current research primarily focuses upon two urban villages (Tan Hualin and Si Menkou) in Wuhan (Figure 51) (Masterplan). Each of these urban village comprises one leisure street and two everyday streets, six streets with 110 segments in total (Figure 52). These two urban villages are predominantly identified as residential communities with culture, entertainment, and daily needs created for businesses and other uses on everyday commercial streets. The decision to focus upon two cases within a single city is motivated by the fact that these projects have developed under the same urban policy and regulation, which minimises variations between different cities. Besides, there are a lot of similarities and commonalities throughout Chinese urban villages, particularly in their pattern (low-rise buildings and narrow streets) and building structure (ground-floor for business and upper floor for residential). Lastly, from a pragmatic standpoint, it saves abundant time, especially in the light of the Covid-19 pandemic, and is more cost-effective.



Figure 51 Wuhan: Two urban villages (Source: Wuhan Municipal Bureau of Natural Resources and Planning)

Tan Hualin Urban Village



Leisure Street 1 - Street edge on both walk side (right and left)
Street edge structures - Plinths = 13, Segments = 20



Everyday Street 1 - Street edge on walk side (left)
Street edge structures - Plinths = 10, Segments = 18



Everyday Street 2 - Street edge on walk side (right)
Street edge structures - Plinths = 5, Segments = 13

Si Menkou Urban Village



Leisure Street 2 - Street edge on walk side
Street edge structures - Plinths = 8, Segments = 24



Everyday Street 3 - Street edge on walk side
Street edge structures - Plinths = 7, Segments = 14



Everyday Street 4 - Street edge on walk side
Street edge structures - Plinths = 10, Segments = 21

Figure 52 Six street edges of two urban villages

4.1.2 Tan Hualin Urban Village

Tan Hualin urban village is a vibrant and lively community with rich history and culture, which has formed distinctive urban fabric and street pattern in the city. As urban development has surged forward, this area has gradually evolved into a mixed-used

neighborhood. Within this area, three streets – Leisure Street 1 and Everyday Street 1 and 2 – were selected as the major research objects, and a myriad of functions can be found in this urban village. For instance, Leisure Street 1 is the main street located in this community, which is primarily composed of souvenir shops, animal cafés, clothing stores and flower shops (Figure 53). It primarily serves as entertainment-oriented activities. For the other two Everyday Streets (1 and 2), moreover, they are daily life-oriented with diverse commercial establishments. They mainly consist of different types and scales of ground-floor retail, like vegetable stalls, meat shops, barbershops and other essential functions, as well as a wide range of private households (Figure 54).



Figure 53 Leisure Street 1 of Tan Hualin Urban Village

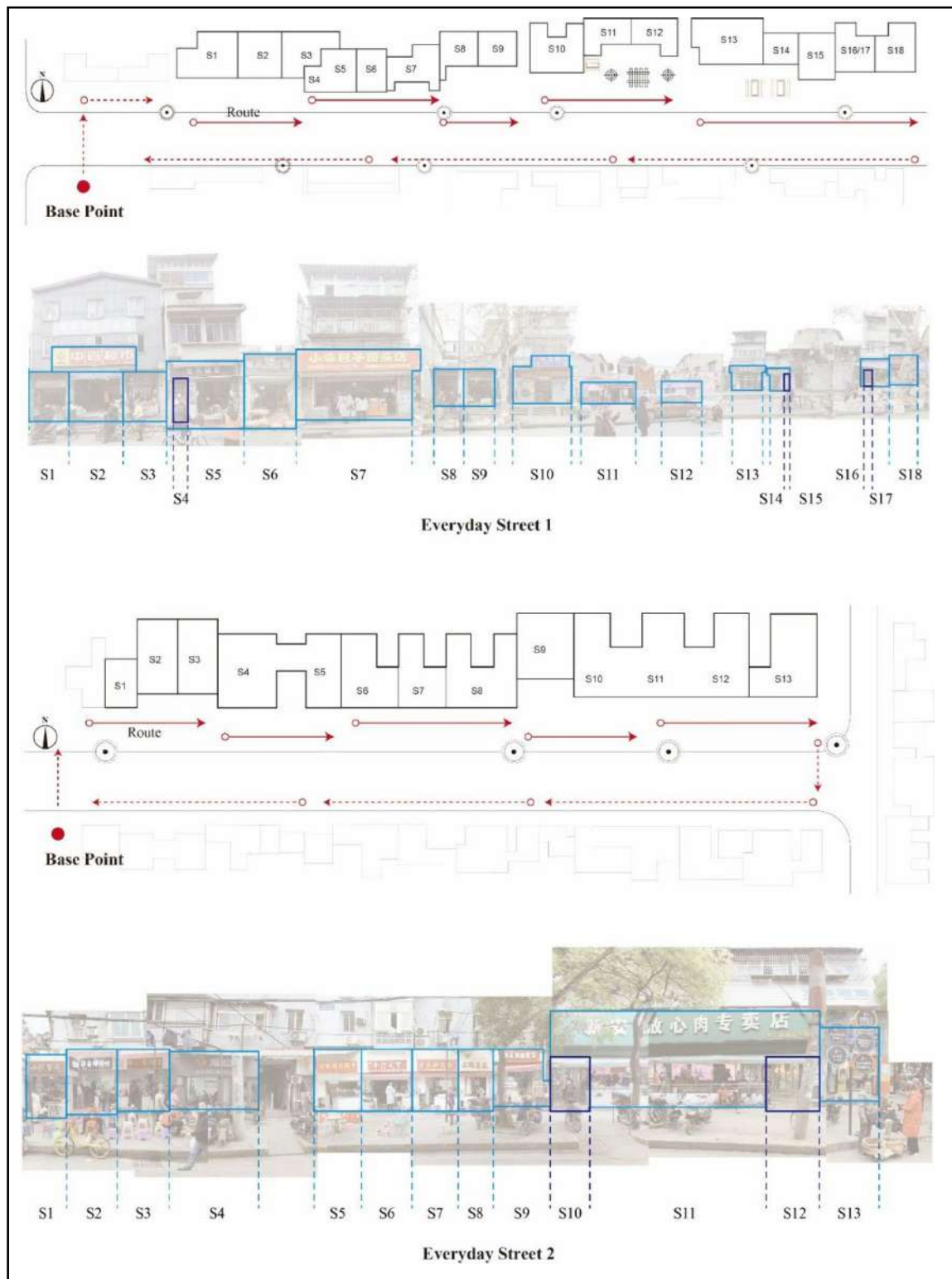


Figure 54 Everyday Street 1 and 2 of Tan Hualin Urban Village

4.1.3 Si Menkou Urban Village

Si Menkou urban village is another diverse and dynamic community with some historical footprints, which also support a variety of functions in this area. Likewise, within this neighborhood, three streets – Leisure Street 2, Everyday Street 3 and 4 – were also selected as the primary research objects, and a mix of uses can be found in this urban village. For example, Leisure Street 2 is dedicated to amusement, featuring numerous snack stores, toy shops and other entertainment facilities (Figure 55). It stands out as the liveliest street among the six street studies. Everyday Streets 3 and 4, besides, are composed of independently owned stores with a variety of commercial actions that are closely related to daily life. This includes an integration of pharmacies, restaurants, grocery stores, convenience stores, food shops, among others (Figure 56).

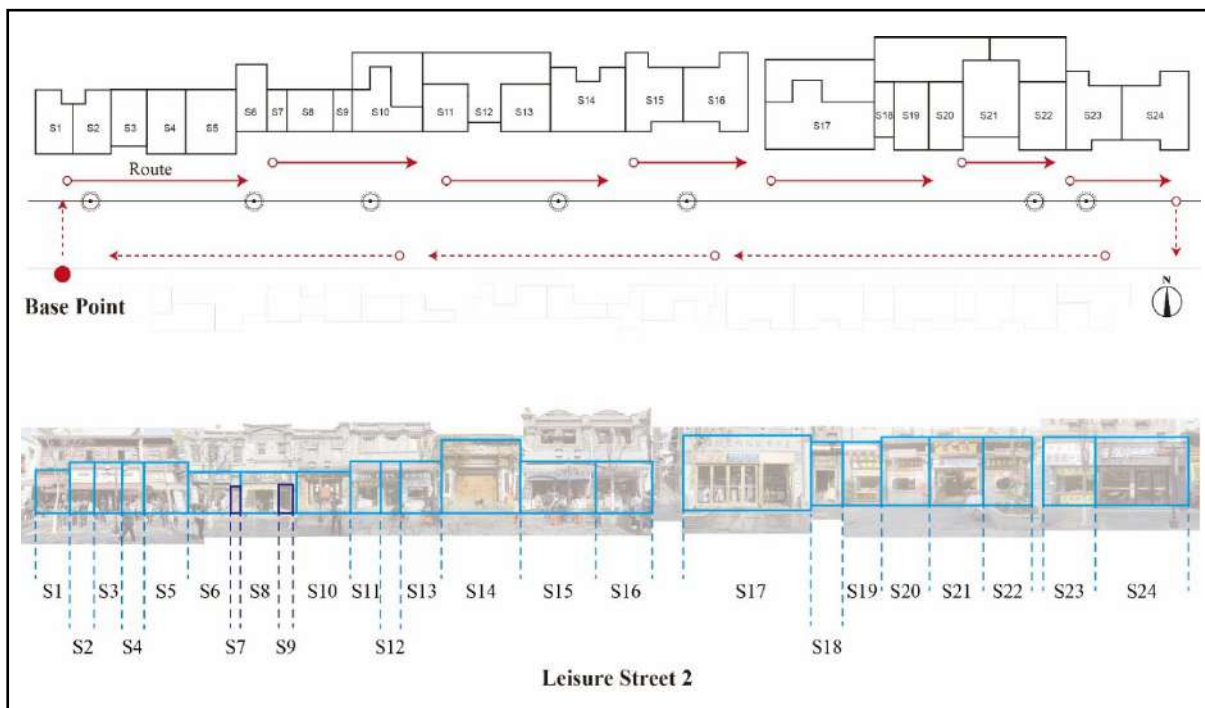


Figure 55 Leisure Street 2 of Si Menkou Urban Village

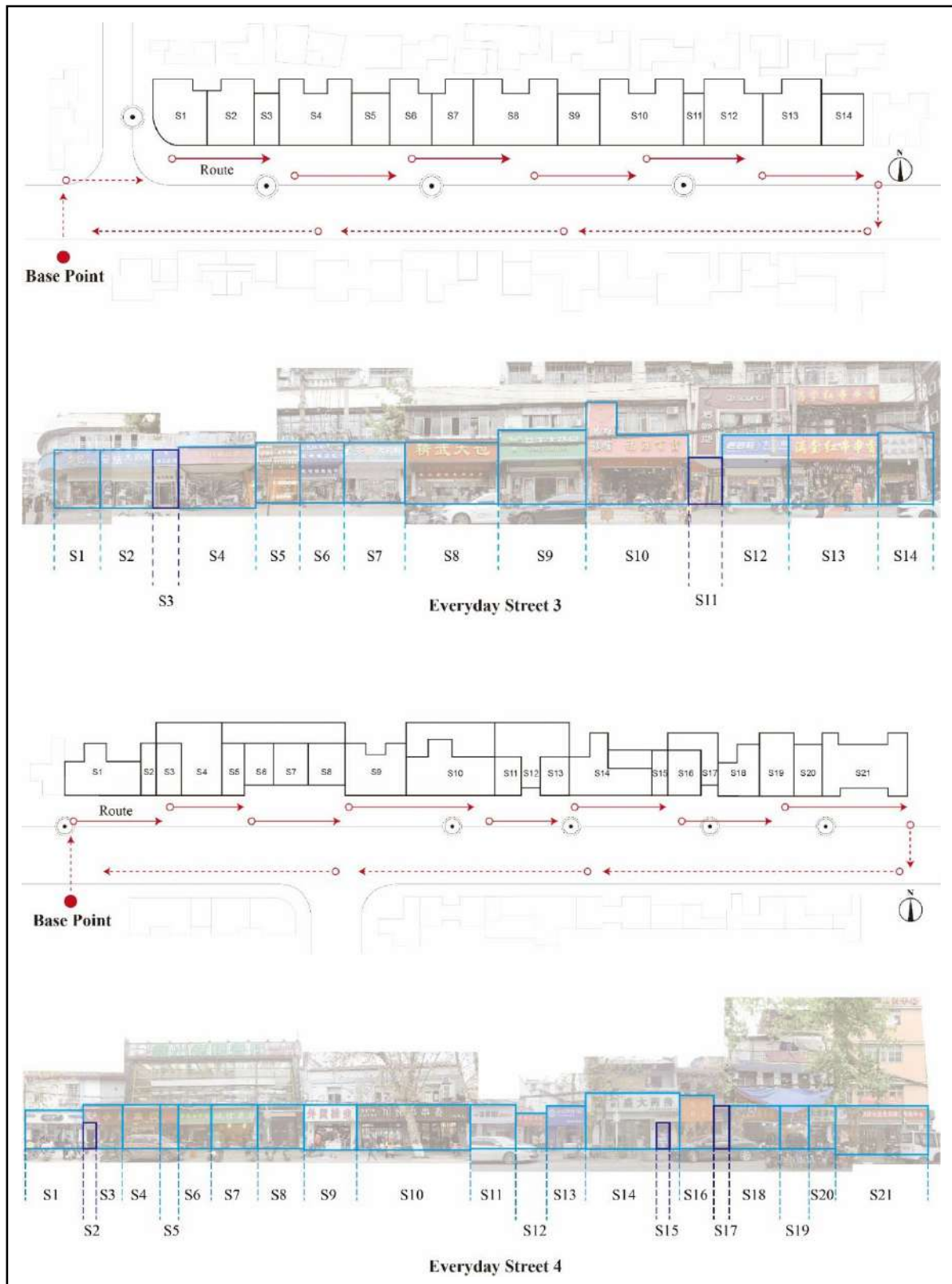


Figure 56 Everyday Street 3 and 4 of Si Menkou Urban Village

On the other hand, however, the disadvantage of merely focusing upon cases in a one city might limit the applicability of the data to a broader context. Analysing cases in different urban contexts affords opportunities to explore various potential variables through qualitative research, such as local culture, custom or topography, among others. Within current research, these two urban villages, as historical blocks, are exemplary in presenting a wealth of material forms and spatial organisations influenced by cultural factors and urban evolution. They comprise not only leisure-oriented commercial streets that have been renovated and regenerated in recent years, but residential-oriented everyday streets that support daily life of local inhabitants. These street spaces serve diverse functions, facilitating social interaction and cohesion (Mehta, 2019; Barros et al., 2021). This makes the city as a suitable site for selecting six streets that demonstrate how diverging socio-spatial properties of street edges are considered as primary factor to stimulate people activities and behaviors.

4.1.4 Selection criteria for street edges

Physical characteristics and affordances of the built environment have long captivated the attention of urban designers and everyday users (Mehta, 2010; Heffernan et al., 2014; Kickert, 2016; Barros et al., 2021). In recent years, by combining knowledge of public space with social environment and behavior psychology, urban scholars have evidenced a variety of street qualities that influence peoples' perception and selection (Mehta, 2011; Ewing and Clemente, 2013; Dovey and Wood, 2015; Thwaites et al., 2022). In contemporary urban discourse, an increasing number of characteristics are considered as significant in identifying environmental quality, and its impact on daily life. One widely acknowledged notion is *Transitional Edge* framework, particularly concerning socio-spatial attributes (Thwaites et al., 2013; 2020), expounded upon in Chapter 3. It primarily zeroes in on six qualities – *distinctiveness, temporality, appropriation, occupation, openness, articulation* – that bear relevance to engagement with street edges. And it also emphasises the social significance of street edges via small-scale change and adaptation within built environment (ibid). Built upon this, it is

revealed that a variety of characteristics impact the way in which the streets and edges are perceived by people's preferences, selections, and decisions.

Built upon this thinking, urban villages in Wuhan emerge as the focal point of this research. This choice is motivated by the fact that Wuhan has witnessed a series of urban regeneration policies and redevelopment projects over the last two decades (Cheng and Zhou, 2015; Liu et al., 2022). In 2010, Wuhan government launched the '*Wuhan City Master Plan (2010-2020)*' that urban development in Wuhan primarily focused upon the main city renewal and new city expansion (Liu et al., 2022). However, few of them have taken urban villages, particularly street edges, into account. This provides an ideal case study to consider the significance of street edges along with territorial segments in shaping the street life and behaviors of inhabitants. And it affords a platform for empirical study on street edge environment, which contributes to supporting social activity and interaction through attracting people to everyday streets. Thus, the selection of streets and edges for exploration and evaluation is built upon a wide range of criteria, as following:

- Urban context: emphasis in current research is mainly upon territorialised segments nested into street edges within urban village context;
- Programme of mixed-use street edges: diverse functions in the case study sites that include retail, residential business lead to a varied range of street users;
- Diversity of material properties: a variety of physical characteristics and affordances of territorial segments to demonstrate its distinctiveness;
- Variations in spatial features: manifested through a certain degree of spatial porosity and lateral depth to strengthen its spatial capacity, such as segment setback or projection;
- Variety of street stakeholders: characterised by complex social interaction between a varied of street stakeholders, such as street inhabitants and segment owners;
- Measuring liveliness: street inhabitants generate a variety of dominantly necessary,

optional and social activities, including stationary, sustained and lingering.

In terms of these selection criteria, six street edges have been determined after detailed consideration of street vitality and social capacity within two urban villages in Wuhan. These case studies serve as pertinent examples aligning with research gaps and themes (such as a wide range of socio-spatial expression and diverse activities of street inhabitants). Besides, a few remarks in relation to the other selection criteria are in place. Firstly, two urban villages bear the imprint of both Eastern and Western cultures. Since the 1911 Revolution, Western countries had established churches, schools, and hospitals to make it known as '*historical concession area*' (Cheng et al., 2017; Chen and Yang, 2018). Although the architectural style and street pattern were diversified due to western culture infiltration, local authority have preserved the traditional building morphology, particularly in Leisure street 1 and 2. With the rapid urbanisation in China, these streets have gradually embraced a mix of uses, including a wider range of commercialisation, different scales of retail, and cultural amenities (Chen and Thwaites, 2018). Secondly, these two urban villages have retained their unique physical characteristics, socio-economic pattern and local lifestyle, contributing to the socio-spatial complexity of the area. Lastly, these two selected cases offer valuable insight into different managerial approaches in this specific context, in order to achieve the balance between top-down tactics and bottom-up strategies in modern Chinese urban design discourse. This is attributed to their commonality in political system and local policy, coupled with involvement in engaging street inhabitants.

Based upon the relevant literature investigation and introduction of study sites, a series of research questions have been proposed in relation to three themes. They primarily focus upon the exploration of 1) material, spatial and social dimensions of street edges, 2) people's activities and behaviors, and 3) the intricate dynamics between socio-spatial attributes and people's activities. These questions aim to comprehensively explore if physical environment influences activity engagement.

4.2 Theme I: Transitional edge attributes manifested through segment territorialisation

Theme I aims to explore the foundation of socio-spatial attributes of transitional edge in regards to material (distinctiveness and temporality), spatial (articulation and openness), and social (appropriation and occupation) dimension of territorial segments' manifestation in Chinese urban villages.

Theme I. 1

Do the segments along the street edges vary in transitional edge attributes along their length?

Theme I. 2

How does each territorial segment vary broadly in its composition of material, spatial and social attributes?

Theme I. 3

How do street edge segments vary in their **Material** dimension, manifested through **Distinctiveness** and **Temporality** attributes?

Theme I. 4

How do street edge segments vary in their **Spatial** dimension, manifested through **Openness** and **Articulation** attributes?

Theme I. 5

How do street edge segments vary in their **Social** dimension, manifested through **Appropriation** and **Occupation** attributes?

4.3 Theme 2: Understanding variation in activities within territorial

segments along transitional edges

Theme 2 places more emphasis upon activity engagement of street inhabitants, exploring what, when and where different activities were distributed along street edges, as well as their duration in Chinese urban villages. Besides, it also investigates whether user engagement was influenced by two different scales, which are street edges and territorial segments. This aims to understand how inhabitants are physically engaged along street edges, with regards to three differing social tasks – necessary, optional and social.

Theme 2. 1

- **What** Necessary, Optional and Social activities take place within the study streets?
- **When** do Necessary, Optional and Social activities take place within the study streets?
- **Where** Necessary, Optional and Social activities take place within the study streets?

Theme 2. 2

Do the segments along the street edges vary in engagement along their length?

Theme 2. 3

Does activity type (necessary, optional, social) affect engagement with segments along street edges?

Theme 2. 4

Does time of day (morning, afternoon, evening) affect engagement with segments along street edges?

4.4 Theme 3: Exploring socio-spatial attributes of transitional edges in relation to diverse activity engagement

Theme 3 is the integration of socio-spatial qualities of street edge segments (Theme 1) and user activity (Theme 2). It aims to explore whether diverse activity engagement is influenced by socio-spatial qualities of street edges forwarded within socially responsive street edge framework, particularly in relation with distinctiveness, temporality, appropriation, occupation, articulation and openness such attributes in Chinese urban villages.

Theme 3. 1

Does ***distinctiveness*** attribute affect user's activity duration?

Is distinctiveness influential across ***necessary / optional / social*** tasks?

Theme 3. 2

Does ***temporality*** trait affect user's activity duration?

Is temporality influential across ***necessary / optional / social*** tasks?

Theme 3. 3

Does ***openness*** trait affect user's activity duration?

Is openness influential across ***necessary / optional / social*** tasks?

Theme 3. 4

Does ***articulation*** trait affect user's activity duration?

Is articulation influential across ***necessary / optional / social*** tasks?

Theme 3. 5

Does ***appropriation*** trait affect user's activity duration?

Is appropriation influential across ***necessary / optional / social*** tasks?

Theme 3. 6

Does ***occupation*** trait affect user's activity duration?

Is occupation influential across **necessary** / **optional** / **social** tasks?

Chapter 5

Methodology

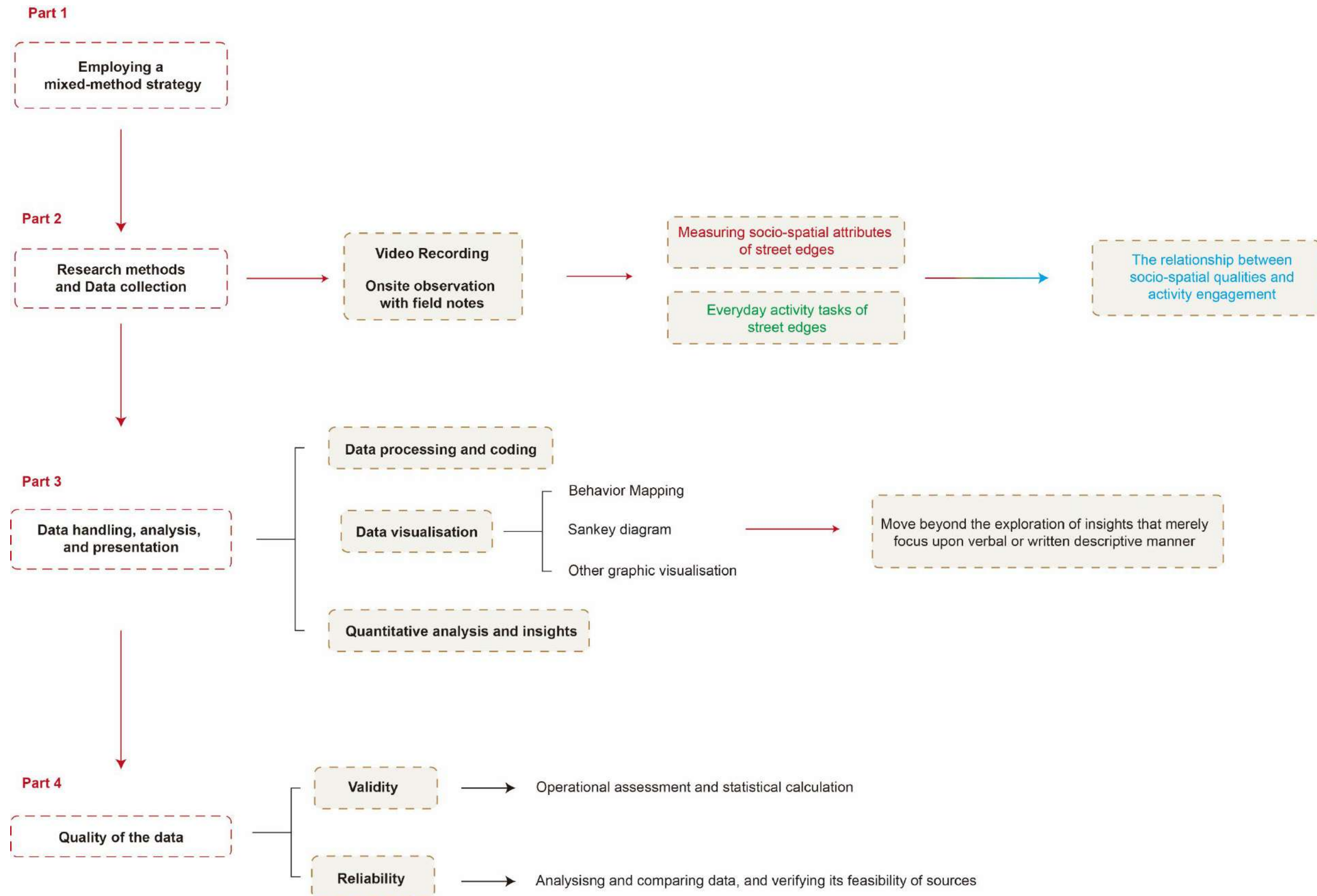


Figure 57 Overall flow map of Chapter 5

This chapter introduces research methods to be employed to capture, analyse, and visualize the composition of street edges and how people engage with them within a Chinese urban village context. Part I of the current chapter articulates the transformation from top-down to bottom-up design decision-making, illustrating how users can get involved in the everyday space they inhabit. This partially resonated with idea discussed in Chapter 2. The aim of this is to subsequently highlight the methodological limitation of prior research, followed by the corresponding problems that restrict an in-depth exploration of street edges and human engagement with them (Part 2). This serves as the basis for establishing the methodological framework in the Part 3, which primarily focus upon video recording to explore how human engagement are interconnected with socio-spatial qualities of street edges. Such considerations form the theoretical grounding for the selection of data analysis approaches – *video recording* and *observation* – along with the technique of data visualisation and statistical model tools to articulate how street edges can be engaged by inhabitants (Part 4).

5.1 Employing a mixed-method strategy

This current study attempts to develop a way of exploring socially responsive street edge approach. The research process mainly involves gathering information of street inhabitants' activities, whilst probing the ways into which human engagement is related to socio-spatial attributes of street edges. Drawing from the discussion of Chapter 2 and 3, three major themes for achieving the research aim are to apply socio-spatial properties (theory) into Chinese urban village context (practice), particularly street edges and territorial segments. Although existing literatures have measured street quality from various aspects (Ewing and Clemente, 2013; Kickert, 2016; Thwaites et al., 2020; Mehta & Bosson, 2021), few have explicitly measured how socio-spatial attributes interact with pedestrian activity along street edges. Given the concurrent mixed-method research strategy, consisting of video based data collection alongside

segment evaluation using *Transitional Edge Framework* and documenting of street user behaviours. Data collected in analysed using data visualisation techniques as well as statistical analysis to provide a detailed understanding that is able to answer the research questions posed (chapter 4). (Figure 58), the data gathered will be merged in the process of analysis to explore multiple dimensions of findings.

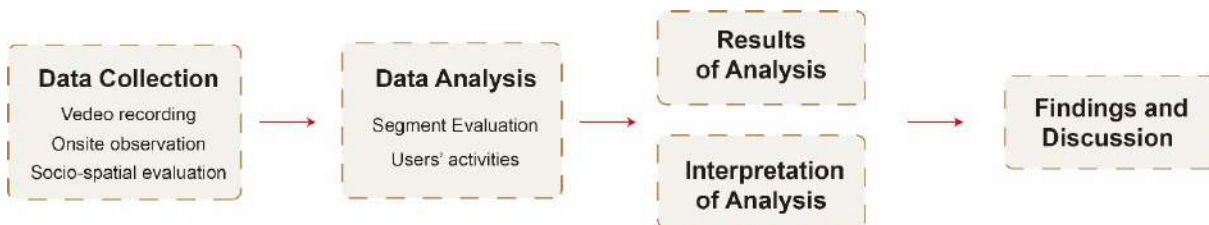


Figure 58 Mixed-method strategy

For Miles and Huberman (1994), qualitative research, as a method to explore case study analysis, is able to produce the generalities through the particularities, not the reverse (Mehta, 2006). As Steckler et al. (1992, p. 2) argued that, “*The goal in collecting qualitative data is to elicit an insider’s view from the group under study*”. Likewise, quantitative research aids in arriving at these generalities by summarising extensive amounts of statistical analysis. Hence, it is evident that qualitative analysis excels at providing narratives that describe real-life situations, laying the interactive foundation for analysing quantitative results from statistical perspective (Padgett, 2016; Trochim, 2001). This insight echoed Steckler et al.’s idea that (1992, p. 2), “*The goal in collecting quantitative data is also to generate measures that are reliable, generalizable, and unbiased*”. Overall, by integrating qualitative and quantitative methods, the research results could be explorative, inductive as well as deductive.

5.2 Research methods and data collection

Case studies regularly require multiple methods and data sources to validate research feasibility and result, enabling the acquisition of in-depth insights and understanding.

The data for this study has been sourced from various channels, each demanding distinct approach for data collection, processing and coding. In this research, empirical data primarily comprises three types of information: video recording, onsite observation with filed notes, and quantitative assessments obtained by measuring socio-spatial attributes of street edges. This corpus of data encompasses both qualitative and quantitative components. Prior to conducting data collection, an ethical approval was authorised by Department of Landscape Architecture, The University of Sheffield (Reference Number: 036596). During the ethics review process, consideration was given to the process of using video recording to capture peoples' everyday use of urban streets and their edges. At no point was personal data (names / ages / demographics) collected of study participants (street inhabitants observed / videos recorded of their activities, which are methods detailed in the following sections). Due to the study aims there was not a need to collect personal data of street inhabitants. Like similar methodologies, such as Whyte (1980) and Gehl (2010) no permission for video recording of pedestrian behaviours was sought (ethically approved in application Reference Number: 036596). This was due to i) with the number of participants observed it would have been impossible to collect permission from all of them in turn providing a chance for inconsistency, and ii) asking their permission might have influenced the everyday behaviours they were carrying out and in turn influenced the data collected. The coding processes employed (as detailed later in this chapter) meant that anonymised data was analysed and the video recordings deleted (videos were not anonymised due to the presence of peoples' faces in the recordings). The lead researcher carried a project information sheet to present if questioned by a street inhabitant about what was being done. In order to achieve this, thus, author set a vantage point for maximum visibility of street edges to record peoples' behaviors and activities through a series of videos. Throughout the whole process, any personal information, such as name, home address, occupation etc., won't be disclosed. In this way, it can greatly protect street users' privacy.

5.2.1 Video recording

Film or video recordings give an exact visual record of the behavior which can subsequently be slowed down for analysis. This is useful for studying behavior that is too fast too complex to analyse in real time.

Bateson and Martin, 2021, p. 101

Video recording has been widely identified as a practical method to demonstrate everyday life, particularly in social science field (Haidet et al., 2009; Knoblauch et al., 2012; Gehl and Svarre, 2013). The purpose of this method here is to understand how and what activities are undertaken by street inhabitants. This encompasses a variety of activities, such as necessary, optional and social activities (Gehl, 1987). These activities align with daily needs and flow of desires (Bobic, 2004; Dovey, 2010). Crucially, this qualitative method also furnishes insights into the duration of each behavior, providing a nuanced understanding of how residents engage with street edge segments at different time periods.

The generation of diverse activities reflects the degree of people engagement and highlights the significance of physical settings (Thwaites et al., 2020; Simpson et al., 2022). Pioneers in this field, such as Whyte (1980), Pallasmaa (2009), and Gehl and Svarre (2013), adopted time-lapse photography techniques (a precursor to video recording) to illustrate how public space was occupied by differing social actions, see Figure 59 and Figure 60. Built upon this legacy, an explicit and accurate video recording investigation is employed within current research, providing quantified insights into human activities along with duration. It allows for an understanding of dynamic human engagement and behavior patterns in authentic environment instead of limiting photo-based situations, as Haidet *et al.* (2009) argued that –

Video recording provides a high degree of reproducibility when measuring

Video recordings are an excellent source of data that can be used to assess relationships between behaviors that occur in close temporal proximity to one another.

How is a bench used?

Jan Grah, "Tapsen on Foot" Arktika 181 no. 20/1988
- Mark Van Soule



There's a bench.



Ar: "Great, let's sit."



Ar: "... so I can pull on my pipe!"
(The man in the background is interesting.)



C: "By an empty seat on the end I'll grab that."



Ar: "Well, time to move on."



C: "This is a good place to sit."



C: "Here come two opportunities with people at their point. I think the door here long in a girl."



D: "Wow, what you got a look at her?"



There's an empty bench.



F: "Ah, an empty bench. I wonder if there are any rest coats left?"



C: "This is a nice place. I'll sit at the opposite end. What on earth is that white stuff? Long coat - well, I'm not going to sit there."



F: "She's dash it really want to sit down. I guess I'll message with my own company." The bench is a self washing parenthesis in this context.

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To capture a comprehensive view, the researcher strategically positioned at an optimal vantage point, ensuring maximum visibility of the scenes (Figure 61). This method allowed for the recording the exact location of various activities, complete with their respective durations along the street edges, especially in segments. It is noted that pedestrians passing by but without stopping were not recorded. The recording process was meticulously organised, spanning all six street edges and individually covering each of the 110 segments. A consistent fifteen-minute recording was conducted from morning to evening for each segment. Specifically, for Leisure Street 1 and 2, and Everyday Street 1, each segment within these three streets was recorded 3 times at morning, afternoon, and evening periods. For Everyday Street 2, 3 and 4, each segment was recorded 2 times in the morning and afternoon as they usually closed at 6pm. To a large extent, fifteen-minute observation is capable of recording and capturing most activities (Mehta, 2019). Data collection took place on workdays and weekend, as it was not possible to predict when the lockdown would occur during the Covid-19 period. During the data collection period, fortunately, there is no lockdown occurred. Thus, the whole data collection period stretched from late November 2020 to early March 2021. However, for three streets, recording was limited to the morning and afternoon. The reason for this is due to the everyday rhythms of these street edge segments were regularly opening in the morning (around 6:00 AM) and closing in the afternoon (around 6:00 PM). *Data was collected in acceptable weather conditions, no data was gathered during rainy or snowy weather.*



Figure 61 Video recording

Video recording, thus, was predominantly implemented within the current research. To the knowledge of the lead researcher, there is no investigations have employed such manner to anatomise human activity engagement with socio-spatial features of street edges in Chinese urban village context. Through applying this method, thus, it could establish a new methodological framework and provide a direct insight into human experience of everyday physical settings, which, in turn, address the existing methodological problems discussed in previous parts.

5.2.2 Onsite observation with field notes

In this study, the research observed six streets, recording activity patterns through detailed field notes (Figure 62). Observations were conducted on a detailed plan of each street, and the behaviors of street inhabitants were thus documented, such as where social encounters took place, the nature of activities, and their respective durations. Same as video recording, the whole data collection period stretched from late November 2020 to early March 2021. Thus, during the observation period, the author performed as a street participant to get involved in the street environment, actively engaging with the study areas. This allows for the capture and documentation of additional activities in other segments while video recordings were being conducted.

For instance, when author was recording segment 1, but a group of children were playing in segment 10, this activity would be promptly captured and documented. This method serves as a supplementary means to delve deeper into the relationship between people's behavior and the physical environment. Such thinking greatly echoed Asplund's (1979) research, which concisely described as –

... answers to these five questions: what was done (act), when or where was it done (scene), who did it (agent), how he did it (agency), and why (purpose).

Asplund, 1979, p. 12

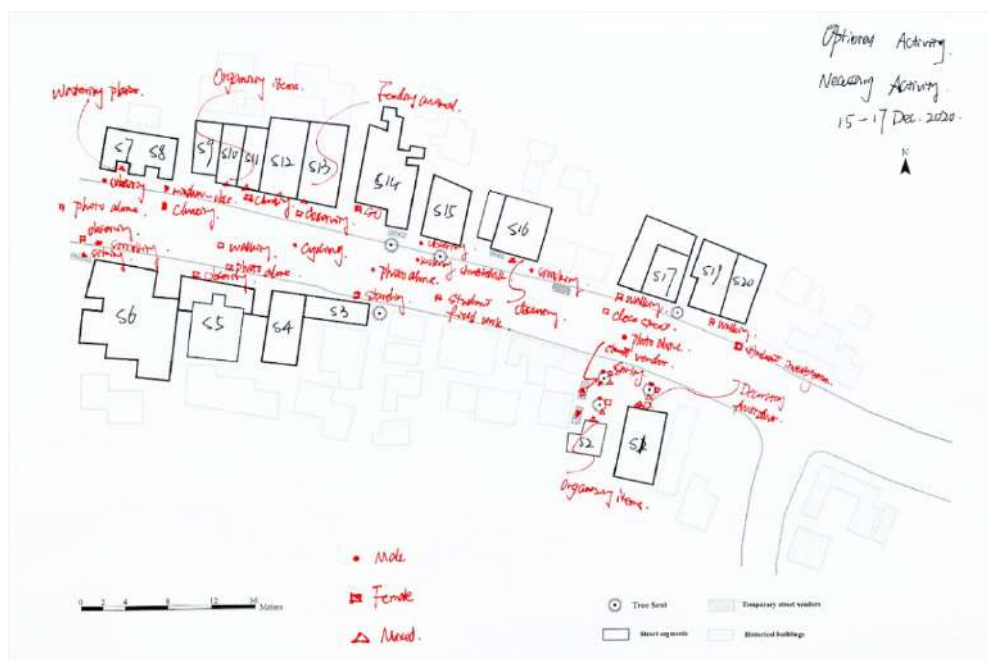


Figure 62 Onsite observation with field notes in Leisure Street I

In conclusion, observation of street user behaviours, based upon established methods by Gehl (1987) provides opportunity to interpret what a street user might be doing based upon broad criteria (optional / necessary / social). Rather than focusing upon the exact activity be undertaken e.g. 'rushing to work' an interpretation can be made where such an activity is observed (captured in the video recording), evaluated based upon obvious user behaviour and coded to the broad criteria group of 'necessary'.

Due to the scale of observation being undertaken (via the video recording) this broad categorisation was evaluated as giving enough detail for analysis without unnecessarily over-complicating the coding / subsequent data analysis. Also, due to Covid-19 limitations at the time of the research it was not possible to ask / interview street users about their use of space and behaviours. Reflection about this is made in the study limitations section later in the research.

5.2.3 Measuring socio-spatial attributes of street edges

A street edge assessment was carried out based upon transitional edge conception proposed and designed by Thwaites and colleagues (2020). An assessment was carried out to quantitatively examine whether socio-spatial attributes potentially influence people engagement with street edges. These attributes were predominantly consisted of three dimensions that comprise six qualities, which have been explicitly explained in Chapter 3, or see Figure 63. Thwaites *et al.* (2020) developed the framework that attempts to enhance the understanding of social value of urban street edges, which is, in their eyes, the most significant elements for street qualities.

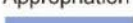
Segment Dimension	Segment Attributes	Indicator Themes <i>Evaluation Scale: weak (1) to strong (5)</i>
Material	Distinctiveness 	Is the segment distinctive against its immediate surroundings? <i>(eg. level of enclosure; material imageability; functionality; sensory prominence)</i>
	Temporality 	Does the segment have capacity for periodic change and adaptability? <i>(eg. material and/or spatial adaptability - diurnal, weekly etc; change in social function or purpose; capacity for flexibility and ambiguity)</i>
Spatial	Openness 	Does the segment appear open, accessible and engaging? <i>(eg. connectivity to other realms; visually and/or physically accessible, i.e. permeable/transparent; gradient from private-public realms)</i>
	Articulation 	Does the segment have material and spatial complexity? <i>(eg. overlapping of adjacent realms, capacity for social retreat or availability; gradient from public-private realms)</i>
Social	Appropriation 	Does the segment express clear social function and purpose? <i>(eg. distinct territorial expression; socially interactive; capacity for flexibility and ambiguity)</i>
	Occupation 	Can or do people occupy the segment? <i>(eg. potential to sit, stop linger; capacity to engage social activity; distinct territorial expression)</i>

Figure 63 Evaluation of Socio-spatial dimensions of street edge segments (Source: Thwaites et al., 2020)

To effectively assess the socio-spatial qualities of 110 segments, a semi-structured workshop was organised by researcher and other three urban scholars (two males and one female, and they are British). These professionals, who established Socio-Spatial Urbanism Unit (SsUU) research hub housed in the Department of Landscape Architecture at the University of Sheffield, were instrumental in developing the *Transitional Edge Conceptual Framework* (ibid). For the values of each attribute, they are scored by the author and other three urban scholars, spanning two weeks in November 2021 (25/11/2021 – 30/11/2021), and it is primarily built upon the hints proposed by Thwaites et al.'s work (2020). Specifically, the assessment has been built upon material (distinctiveness, temporality), spatial (openness, articulation) and social (appropriation, occupation) dimensions, attributing the score from 1 (weak) to 5 (strong) for each of the indicator features. Four participants evaluated these six street edges via video recording. Subsequently, the mean score was calculated based upon the four participants (lead researcher plus 3 urban experts). To some extent, this method aligns with the 'expert panel' proposed by Ewing and Clemente's work to identify and measure walkability in urban design (2013).

As mentioned above, scores of each attribute were assigned by the developers of the Transitional Edge Framework. Through this, scores were provided subjectively by individual reviewers for each segments (110 in total) while viewing the videos. Scores were based upon each individual reviewer using specific questions, developed in Transitional Edge framework, for instance, when assessing 'temporality' they used the question 'Does the segment have capacity for periodic change and adaptability?' (Figure 63). This is an established method used successfully for previous assessment of urban street edges (Thwaites et al., 2020). While it does not provide an objective measure of segment qualities it does provide a chance to accurately score segment

qualities based upon clear criteria of importance. The averaging of scores across the reviews provided a degree of rounding of scores to even out significant disparity in the scores. Reflection on the scores given, highlighted that there was minimal significant difference between scores given for segment attributes. Covid-19 limitations at the time of the research meant that this approach was employed, with limited opportunity for onsite engagement with street inhabitants.

5.2.4 The relationship between socio-spatial qualities and activity tasks

Lively social life has been considered as an indicator of street vitality and a reflection of inhabitants' attachment to their physical settings (Mehta, 2013). Recently, empirical work on streets has focused upon designing physical form or carrying out policies through professional tactics to improve street vibrancy (Montgomery, 2013; National Association of City Transport Officials, 2013; Global Design Cities Initiative, 2017). However, there is a notable gap in translating such theoretical insights into practice that foster a variety of inclusive activities along street edges. Although conducting video recording can be demanding and time-intensive, it plays a crucial role in this research. Few studies have ventured into adopting this ethnographic method (Holland et al., 2007; Cattell et al., 2008; Mehta, 2019), and none of them have meticulously recorded activity duration grouped into specific tasks. Video recording and field observation, in combination with Gehl's (1987) necessary, optional and social activity taxonomy, were thus used as the primary method. Despite the idea of '*everyday urbanism*' (Chase et al., 1999) has been widely discussed to validate the value of everyday actions, seldom empirical studies evaluate street edges and territorial segments, with a lens to assess street life and vitality, particularly in Chinese urban village context. Moreover, they often fall short of delving into whether socio-spatial attributes can influence upon activity tasks. An in-depth investigation is thus carried out to examine if there is the relationship between socio-spatial characteristics and activity engagement, which stands as the central assertion of the current study.

Expanding on prior studies, the current research asserts that a profound and empirical insights into street edge engagement can be attained through the application of video recording. Whilst not entirely novel, it is an effective way to quantify insights into human experience, allowing for an understanding of socio-spatial perception (Thwaites et al., 2020). Built upon such consideration, the data analysis of street activities and street edge qualities is becoming significant.

5.3 Data handling, analysis and presentation

Following collection, data gathered from a variety of methods was processed and coded. In Chapter 6, analysis and findings are presented from three key perspectives: socio-spatial assessment of street edge segments, users' activity along with duration, and the integration of these two, aligning with the research aims and questions posed.

5.3.1 Study data

As discussed above, the essential idea of this research is to explore the relationship between human engagement and street edge attributes. Based upon the conceptual frameworks and theories outlined in Chapter 3, research questions were formulated in Chapter 4. The data collected in this study were demonstrated at two levels: first, socio-spatial evaluation of territorial segments, focusing upon six indicator features pertinent to *transitional edge* framework (Thwaites et al., 2020), exploring the overlaps of environmental attributes and territorial segments. Second, the duration of three outdoor activities within each segment was examined to gain insights into inhabitant engagement with street edges. Within this framework, the fundamental stage is to bridge the connection between street edge evaluation and activity engagement. This step is designed not only to validate whether socio-spatial attributes correlate with activity tasks in Chinese urban village context, but also to elucidate the interactive mechanism. This understanding can inform and enhance design decision-making actions, be it top-down or bottom-up. To summarise, combining these two data types

would provide a new perspective for comprehending the social value of street edge space for pedestrian engagement.

5.3.2 Data processing and coding

The socio-spatial evaluation of segments was established as the fundamental step in developing the methodological framework for the street edge study. This process sought to validate the application of theoretical principles into practical assessment, rooted in segmentarity notion to identify territorial segment qualities (Thwaites et al., 2020). Thus, each individual street edge was collaged as a complete streetscape, offering visual representation of the study site. Subsequently, segments along street edges were territorially identified (Figure 64). This provides foundations for conducting an evaluation framework tailored to each individual territorial segment, addressing the given questions on a scale from 1 (weak) to 5 (strong), as illustrated in Figure 57.

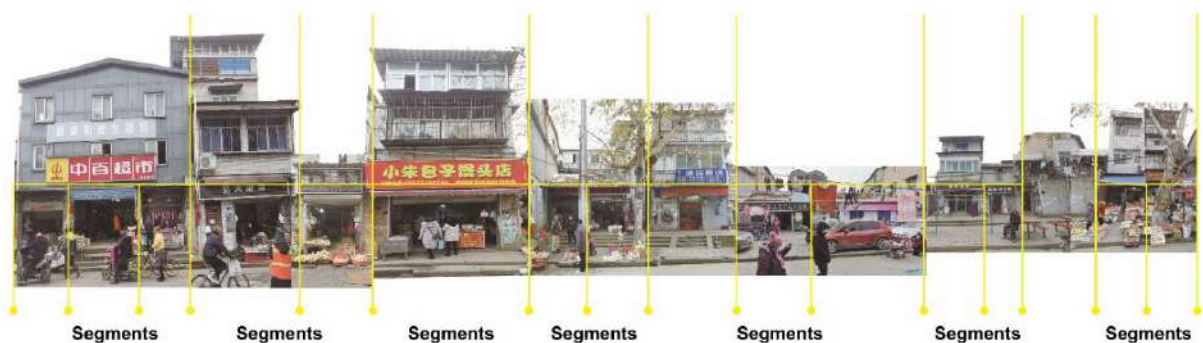


Figure 64 Territorial segments along street edge, it focuses upon the segment scale in-line with socio-spatial evaluation

Following the 15-minutes video recording, each individual activity task (necessary, optional and social) conducted by street inhabitants within every segment was meticulously documented in spreadsheets. Collecting and coding the data in this way ensured the avoidance of data loss issues, assuring a comprehensive capture of pedestrian behaviors along the street edges. Besides, employing the raw video recordings allowed for the precise recording of the duration of each activity, moving

beyond a focus solely upon activity itself. Once coded, the average duration and standard deviation of every activity task are able to be calculated. This also extended to calculating the overall average duration for each segment across the three outdoor activities. This approach facilitated an understanding of the variations and fluctuations in activity engagement, potentially associated with street edge components, such as street furniture, physical affordances, or spatial organisation, detailed in contemporary urban design discourses (Ewing and Clemente, 2013; Mehta, 2014; Harvey and Aultman-Hall, 2016; Kickert, 2016; Barros et al., 2021; Mehta and Bosson, 2021). Although some activities have been repeated by different street users, the duration of these activity behaviors was remarked and coded as an individual unit. This paves the way for subsequent analyses, providing nuanced insights into which street edge segments garnered the most engagement. And it also laid the foundation to quantitatively explore if there is a relationship between socio-spatial evaluation and activity tasks.

5.3.3 Data visualisation

Based upon the theoretical, practical, and methodological insights discussed above, the current study endeavors to graphically articulate socio-spatial attributes through integrating these insights. The visual production thus is primarily expressed through a plethora of diagrams and mappings (Streamgraph, Sankey, Behavior mapping), complemented by photographs captured during on-site observations. Notably, such visualised representations constitute integral components of the data analysis, furnishing a visual comprehension of the research. This serves an effective way to deliver the information and ideas to others through well-crafted data visualisations (Patnaik et al., 2016; Healy, 2018; Protopsaltis et al., 2020; Bateson and Martin, 2021). The approaches outlined provide a comprehensive overview of visualisation process within the data analysis phase. In the Results section (Chapter 7), a detailed explanation is provided on how these visualisations were developed in-line with the research questions proposed.

5.3.4 Behavior mapping

Behavior mapping is an objective method of observing behavior and associated built environment components and attributes.

Cosco et al., 2010, p. 513

In this study, behavior mapping, data collected from video recording and onsite observation, was adopted as the predominant visualised approach to illustrate how activity engagement interacts with street edge along with segments. Behavior mapping serves as a bridge connecting intricate physical features of the built environment with human behavior in both space and time (Bechtel and Zeisel, 1987). To inform this, each behavior observed, along with its corresponding location, as marked as a dot on the street plan / coding sheet. Moreover, instances where street inhabitants engaged in an activity as dyads, triads, or in larger groups were noted as one dot, differentiated by color and shape (Figure 65). Concisely, each activity is treated as an individual unit of analysis, regardless of the amount of people involved. This is primarily built upon Three Outdoor Activity Classification (*necessary, optional and social*) proposed by Gehl (1987), shifting the emphasis away from number of people towards the quantity of varying activities'. Through grouping of the activities insight into the use of the street edges could be gained while not providing an un-wieldy amount of detail that could potentially over-complicate the analyses and make it challenging to understand how the spaces were used. Point symbols represent every single behavior conducted by street pedestrians, originally recorded in the videos and field notes (Marušić, 2011). This provides insights into both the whereabouts of users and the nature of activities taking place.



Figure 65 Point mapping of varying activities took place

Utilising data collected from video recording and onsite observation, computerised behavioral maps were constructed within the Geographic Information System (GIS) (Marušić, 2011; Yin, 2017; Biljecki and Ito, 2021). The map integrated the layout of the study streets plan with respective activity points. The activity dots were categorised into specific individual layer, such as 'morning necessary, afternoon optional, and evening social', and so forth. Once completed dot mapping, these differing layers were 'merged' into a new one based upon their attributes, like necessary (morning / afternoon / evening), and morning (necessary / optional / social). Subsequently, the *Density of Spatial Analyst Tools* was used, specifically the *Point Density* to generate heat maps that activities were overlaid. This process provides a highly in-depth comprehension of what and where activities were taken place on street edges undertaken by the street inhabitants. To enhance readability and comprehensibility, the file was exported in .PNG format, and then imported into *Adobe Illustrator* and *Photoshop* for additional details, such as *Legend*, *Text Annotation* and other information, see Figure 66.



Figure 66 Heat map of merged layers

The production of such behavior mappings afforded a clear visual representation of how inhabitants engaged with street edges from a nuanced perspective. This qualitative analysis was further complemented by a wide range of visual illustrations, establishing the groundwork for subsequent quantitative analysis, with data gleaned from mapping documents. To review previous investigation, few of urban researchers have employed this approach to demonstrate the intensity of engagement, in response to activity distribution and concentration at street edge scale. Within the current study, this method provides an innovated and understandable insight into pedestrian experience along street edges, particularly territorial segments. This significantly advances visual communication and expression (Simpson, 2018). Overall, behavior mapping served as a robust tool to explore human-environment relations through systematically collecting, coding, analysing and representing data (Cosco, 2010).

5.3.5 Sankey diagram

Sankey diagrams are traditionally used to visualize the flow of energy or materials in various networks and processes. They illustrate quantitative information about

flows, their relationships, and their transformation.

Riehmann et al., 2005, p. 233

Having discussed behavior mapping method, Sankey diagram is an efficient approach to articulate quantitative data, and demonstrate the connectivity of complex flows between varying variables (Zarate et al., 2018). While such diagram type is commonly used in diverse fields, it has gained growing popularity as a method to visualise a series of statistical data analysis (ibid). Typically, it is drawn through a fixed set of layers or variables corresponding to a specific element. In this research, it thus attempts to employ this diagram pattern to manifest the interaction between three major variables: which are activity taxonomies (*necessary, optional* and *social*), time periods (*morning, afternoon, and evening*), and specific street edge (*LS1-2; ES1-4*). This approach allows for a comprehensive understanding of the interplay between these key factors.

Computerised Sankey models consist of variable data gained from video recordings, field notes and data information spreadsheet. *Origin 2022b* was then employed to draw vector lines based upon statistical data compiled, detailing *what* activities took place in the street, *when* they occurred and *where* they distributed. Once the data import process was completed, the corresponding diagram was generated by selecting *Parallel Sets* under the *Plot* option. This provided a detailed percentage distribution, revealing what activity was most prevalent, along with when and where street inhabitants were most engaged. For enhanced readability and clarity, the diagram was exported in .PNG format, and then refined in *Adobe Illustrator* and *Photoshop* to add some details, such as *Legend, Text Annotation* and other elements (Figure 67).

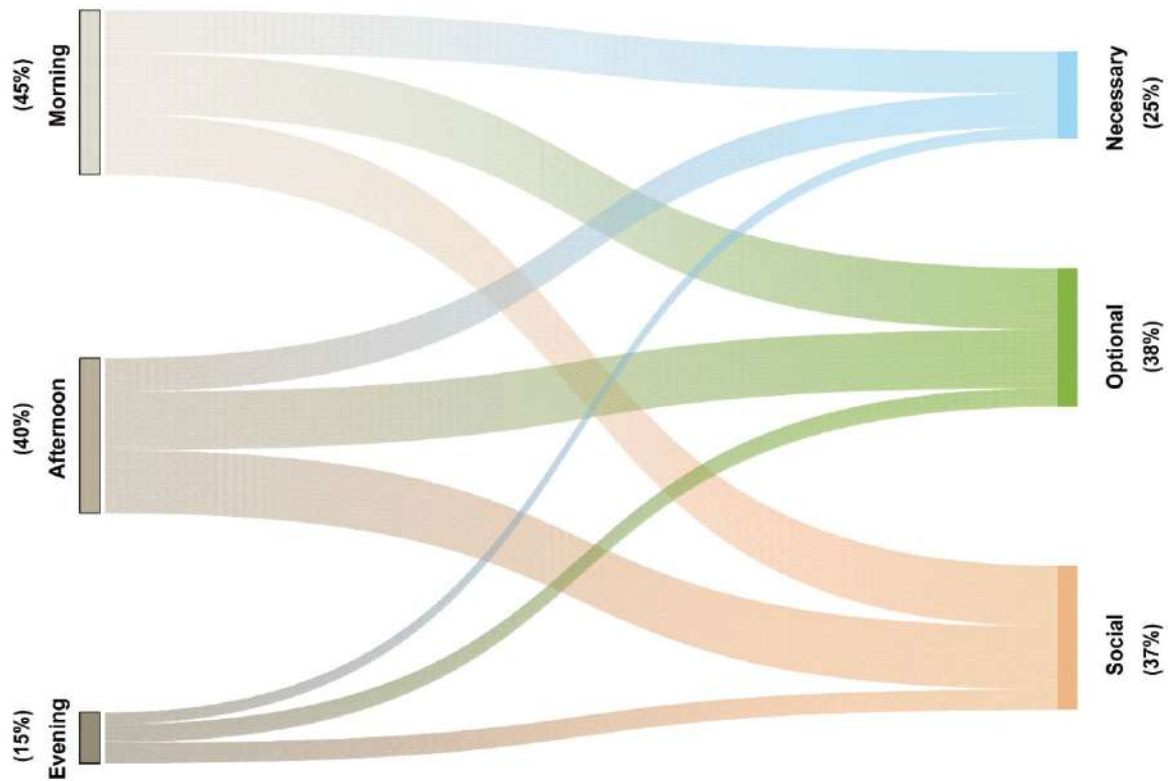


Figure 67 A fixed set of layers correspond to specific element through Sankey diagram

The production and manifestation of these diagrams provided a nuanced quantitative insight into activity engagement with street edges. And they were also related to later statistical analysis. To the knowledge of the researcher, the Sankey diagram approach is not yet prevalent in urban design field. It therefore provides a fresh perspective and holds potential for examining people's experience along street edges in Chinese urban village context. Significant for this, such quantitative insight serves as an effective way of visually communicating data information.

5.3.6 Other graphic visualisation

Beyond the creative visualisation and innovative diagram techniques developed, more conventional approaches, such as *scatter plots*, *bar charts* and *photography collages*, were also applied to illustrate the reliability and validity of the empirical insights acquired. Scatter plots with best-fit lines and bar charts were mainly produced by SPSS

and Excel. They were then exported as .PNG format, and further refined in *Adobe Illustrator* for adjustments in text and annotation. Besides, photographs were taken using smartphone (Huawei P20 and iPhone XS) to effectively capture street edge engagement. Through this, *collages* can be created by *Adobe Photoshop*, presenting holistic streetscape through territorial segments along street edges. The integration of qualitative and quantitative methods thus serves to reinforce the research feasibility.

5.3.7 Quantitative analysis and insights

The preceding discussion has illustrated the potential offered by graphic visualisation of video recording data. Anchored in this approach, the insights derived from bottom-up decision-making and evidence-based framework are fundamental for human-environment exploration (Carmona, 2014; Marshall, 2016). It means that visualisations such as mappings and diagrams will contribute to research validity and reliability, combined with quantitative analysis and insights. This explains why mixed-method strategy is adopted into the current study, in which qualitative and quantitative data are integrated during the analysis processes to heighten the dimension of the results.

Detailed earlier is the conventional approaches were commonly used to capture people's activity engagement to analyse data (Gehl and Svarre, 2013; Mehta and Bosson, 2021). In the current research, video recording of street edges (15 minutes recording of each segment) has not been widely employed, demanding a comprehensive consideration of material, spatial and social factors. To achieve this, the study draws inspiration from the research conducted by Mehta (2019) and Thwaites *et al.* (2020). This involves the application of statistical analyses, specifically employing a linear regression model, to evaluate the relationship between activity duration and socio-spatial qualities, which allows for multiple variables to be considered and calculated. Besides, it allows for an understanding how a single variable influences engagement, whilst not neglecting the impact of wider factors, such as varying activity

tasks undertaken by street inhabitants, which may be related to socio-spatial structures. Through this, the research results and findings can be more robust and justified through the integration of qualitative visualisation and quantitative analysis. Such thinking has echoed the points raised by Mehta, who described that –

Qualitative research excels at ‘telling the story’ from the participant's viewpoint, providing the rich descriptive detail that sets quantitative results into their human context.

Mehta, 2006, p. 34-35

5.4: Quality of the data

5.4.1 Validity and Reliability

Validity is a challenging aspect in designing and conducting case study investigation merely from a qualitative perspective (Yin, 2013). In combination with quantitative mean, the quality of qualitative analysis can be greatly evaluated and demonstrated its validity and reliability (Leung, 2015). In this study, validity has been upheld by a detailed set of operational assessments and statistical calculations. The use of varying sources of evidence, examined through multi-dimensional analysis, further contributes to the validation process (ibid). It is composed of two major perspectives, which are socio-spatial structures with specific six qualities and user activities along with engagement duration. Validity thus can be strengthened by grounding theory and data source; the processes of logical analysis; as well as justified interpretation of research findings and results (Yin, 2013; Protopsaltis, 2020). And these three points are explicitly taken into consideration into the current case study research.

Having discussed the validity for qualitative research, bolstering reliability involves a thorough analysing and comparing data, along with verifying its feasibility of sources (Leung, 2015). This principle readily applies to the present case study research. A

comprehensive dataset has been curated, drawing from a wide range of sources. Data has been rigorously examined and cross-verified to affirm the effectiveness of analytical framework, in addressing the questions and achieving the objectives. This not only validates the statistical analysis, but contributes to the advancement of theoretical frameworks, which can be conducive to studying similar cases.

Research investigation – moving forwards

The current chapter intends to develop feasible methodological foundations for examining how people engage with street edges through a mixed-method approach. It subsequently discussed video recording technique and corresponding analytical approaches, capturing how street edges are socially engaged. In doing so, it can effectively investigate the intricate relationship between pedestrian engagement and socio-spatial qualities of street edges and segments. This exploration is bifurcated into two key dimensions. Firstly, it involves an assessment of territorial segments, considering *material, spatial, and social* attributes based upon *Transitional Edge Framework*. Secondly, it includes the documentation of people's engagement duration, classifying activities as *necessary, optional* and *social* activities built upon *Three Outdoor Activities Taxonomy*. This research attempts to establish the correlation between these two frameworks, elucidating how street edge design indicators influence pedestrian experiences. This groundwork sets the stage for addressing the research question and achieving research objectives proposed earlier, a task that will be undertaken in the subsequent chapter – Results.

Chapter 6

Results

The following section presents study findings in line with the three study themes and the associated research questions. Each specific question posed has its own focused research method, building on the general methods introduced in the previous chapter.

6.1 Theme I: Transitional edge attributes manifested through segment territorialisation

6.1.1 Theme I. I – Do the segments along the street edges vary in transitional edge attributes along their length?

Method

The approach taken is mixed-method approach. Videos and photographs (Part 2 Video recording and measuring socio-spatial attributes, Chapter 5) were taken to record specific attributes of each territorially defined segment along the selected street edges via smartphone (iPhone XS and Huawei, Mate 20 Pro). A smartphone was used due to its high quality camera and in-obtrusive visual appearance compared with larger digital cameras. The segments were collaged according to each street and then segmented based upon differing areas of territorial ownership. Subsequently, a quantitatively examining the attributes of segments was undertaken. A semi-structure workshop was organised by researcher with other three urban study scholars, who established the Socio-Spatial Urbanism Unit (SsUU) research hub housed in the Department of Landscape Architecture at the University of Sheffield, and developed the Transitional Edge Analysis Framework. They viewed the video outputs for each street edge segment (110 segments in total, each video was 15 minutes long) and gave an evaluation of the street edge segments, attributing a score from 1 (weak) to 5 (strong) for each of the indicator with regards to material, spatial, and social dimensions based around a transitional edge analysis (Thwaites et al., 2020). The mean score was calculated according to four participants (lead researcher and 3 experts).

Results

The following pages will demonstrate the segment attribute evaluation. Within each page spread the diagram of first page presents an overall stream graph output, in line with methods developed with Thwaites *et al.* (2020). For the values of each attribute, they are scored by the author and other three urban scholars, and it is primarily built upon the hints proposed by Thwaites *et al.* (2020). Subsequently, the score for each attribute was calculated as the mean score across the four participants (lead researcher and 3 experts), and the overall mean score (17.5, red line) was calculated that across six streets 110 segments in total. The mean score for each individual street was also calculated to highlight the variation across the segments of the same street edges. The final results were displayed via stacked bar charts to show the socio-spatial variation in attributes of segments along each street edge.

Figure 68 – LS 1 Socio-spatial Evaluation

Figure 69 – LS 2 Socio-spatial Evaluation

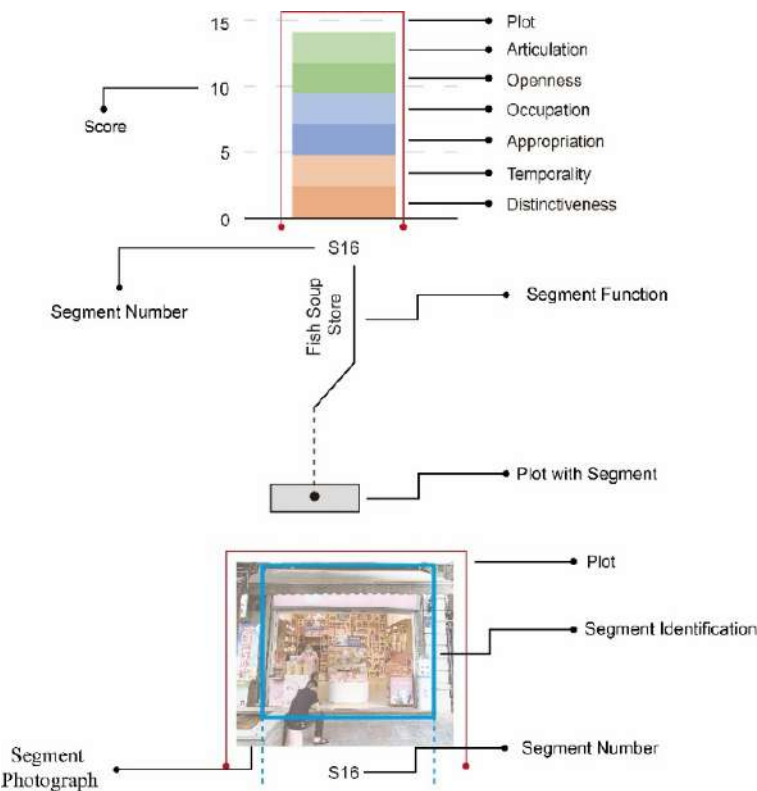
Figure 70 – ES 1 Socio-spatial Evaluation

Figure 71 – ES 2 Socio-spatial Evaluation

Figure 72 – ES 3 Socio-spatial Evaluation

Figure 73 – ES 4 Socio-spatial Evaluation

Legend



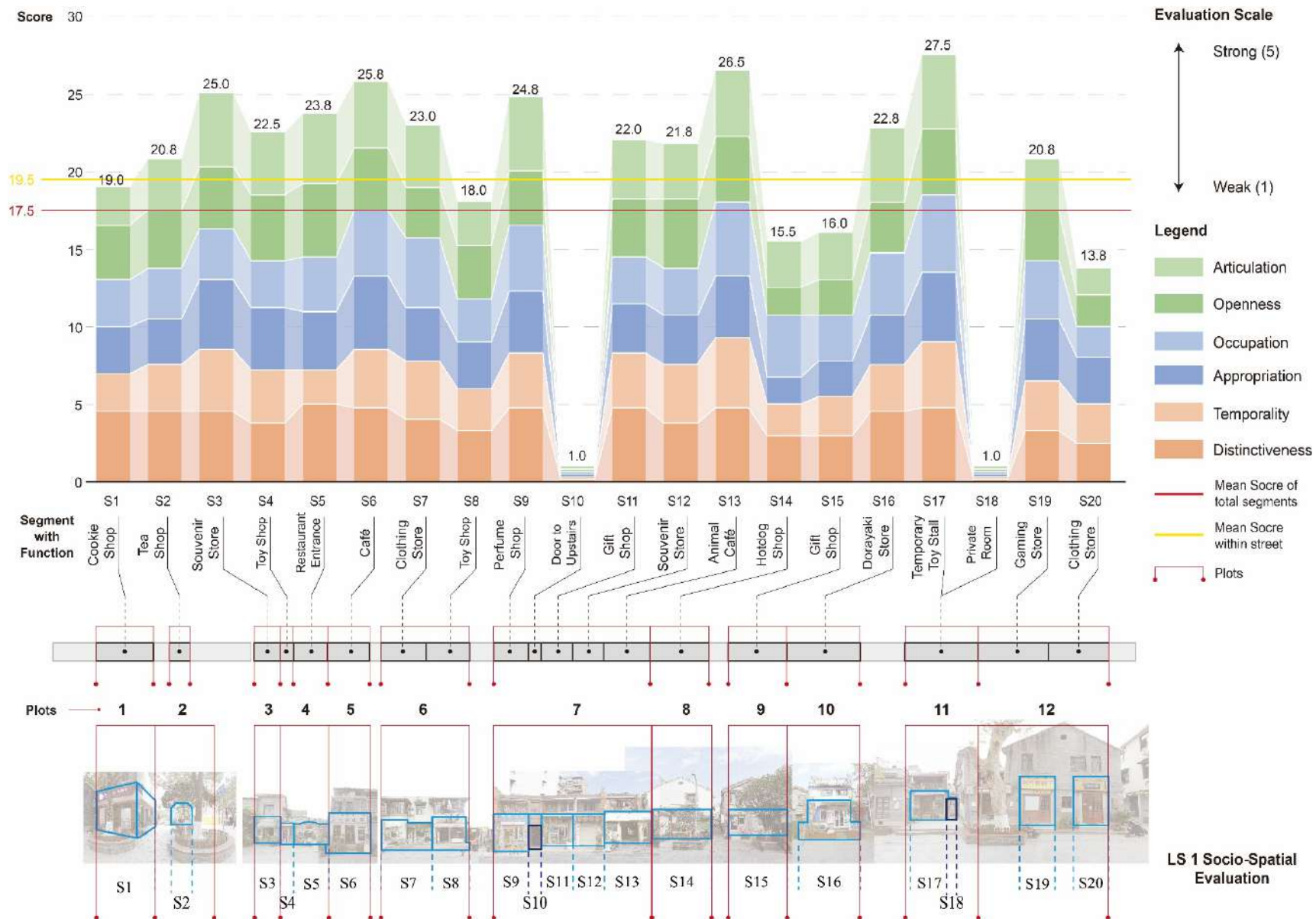


Figure 68
Leisure Street 1
Socio-spatial
Evaluation

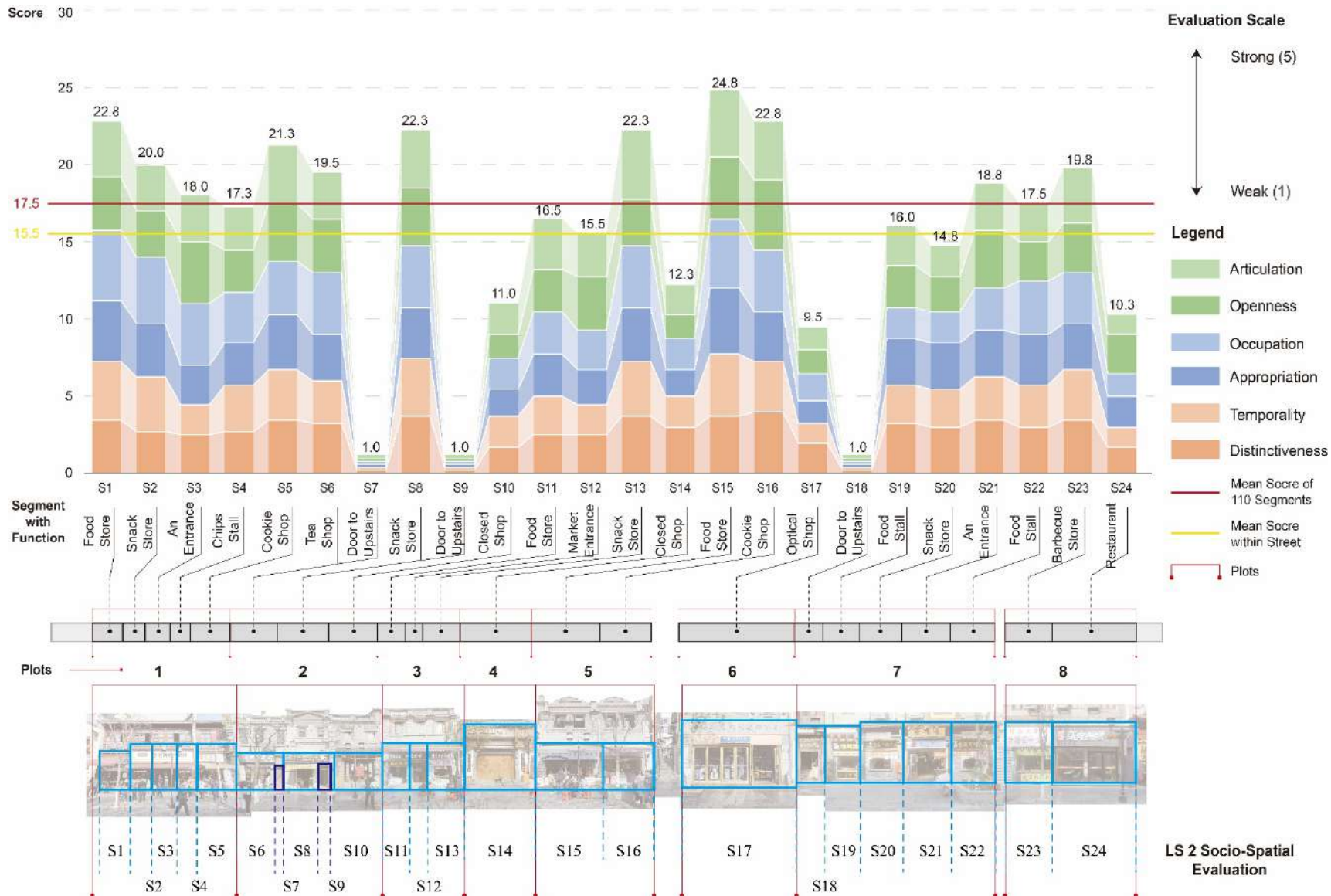


Figure 69
Leisure Street 2
Socio-spatial
Evaluation

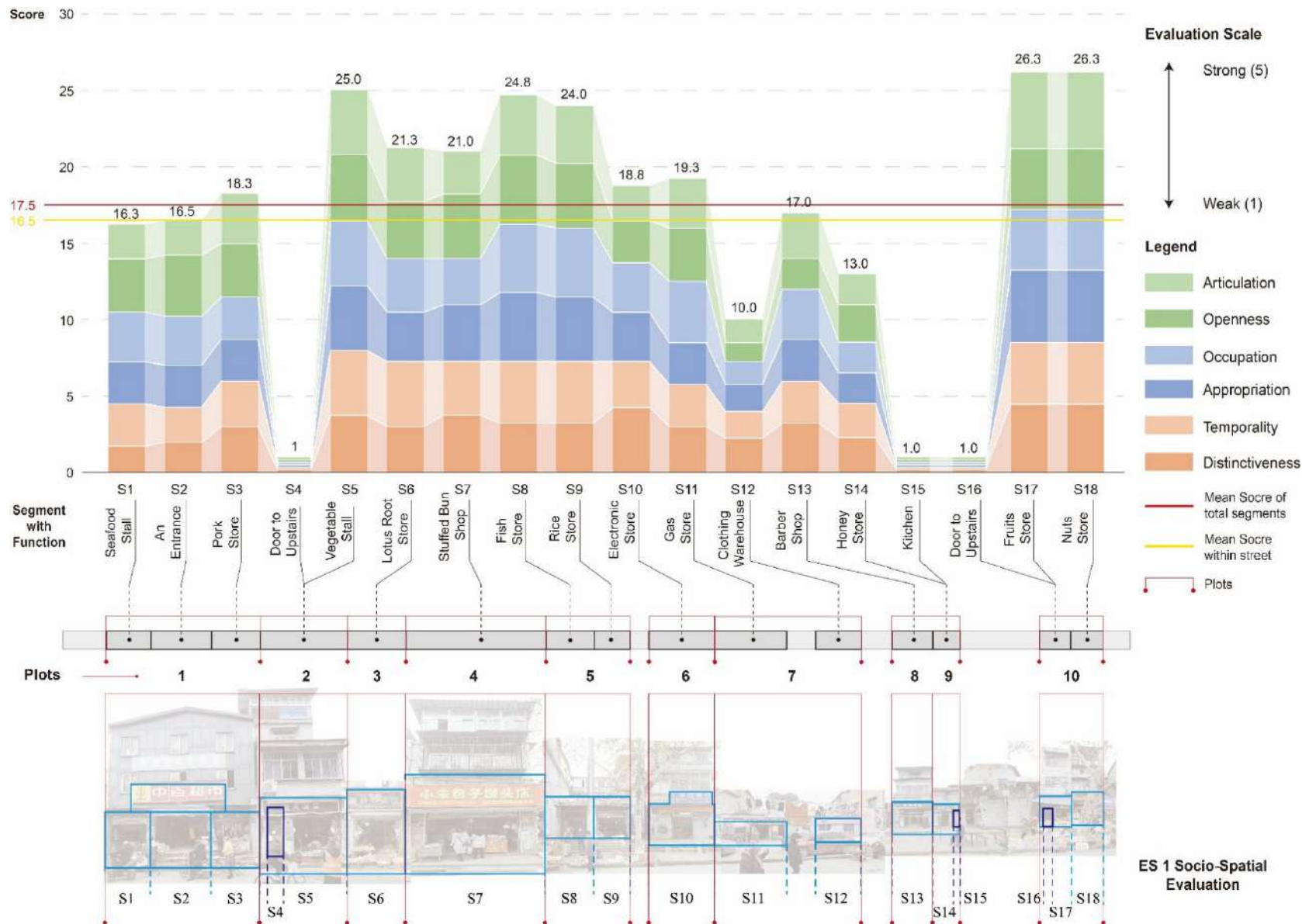


Figure 70
Everyday Street 1
Socio-spatial
Evaluation

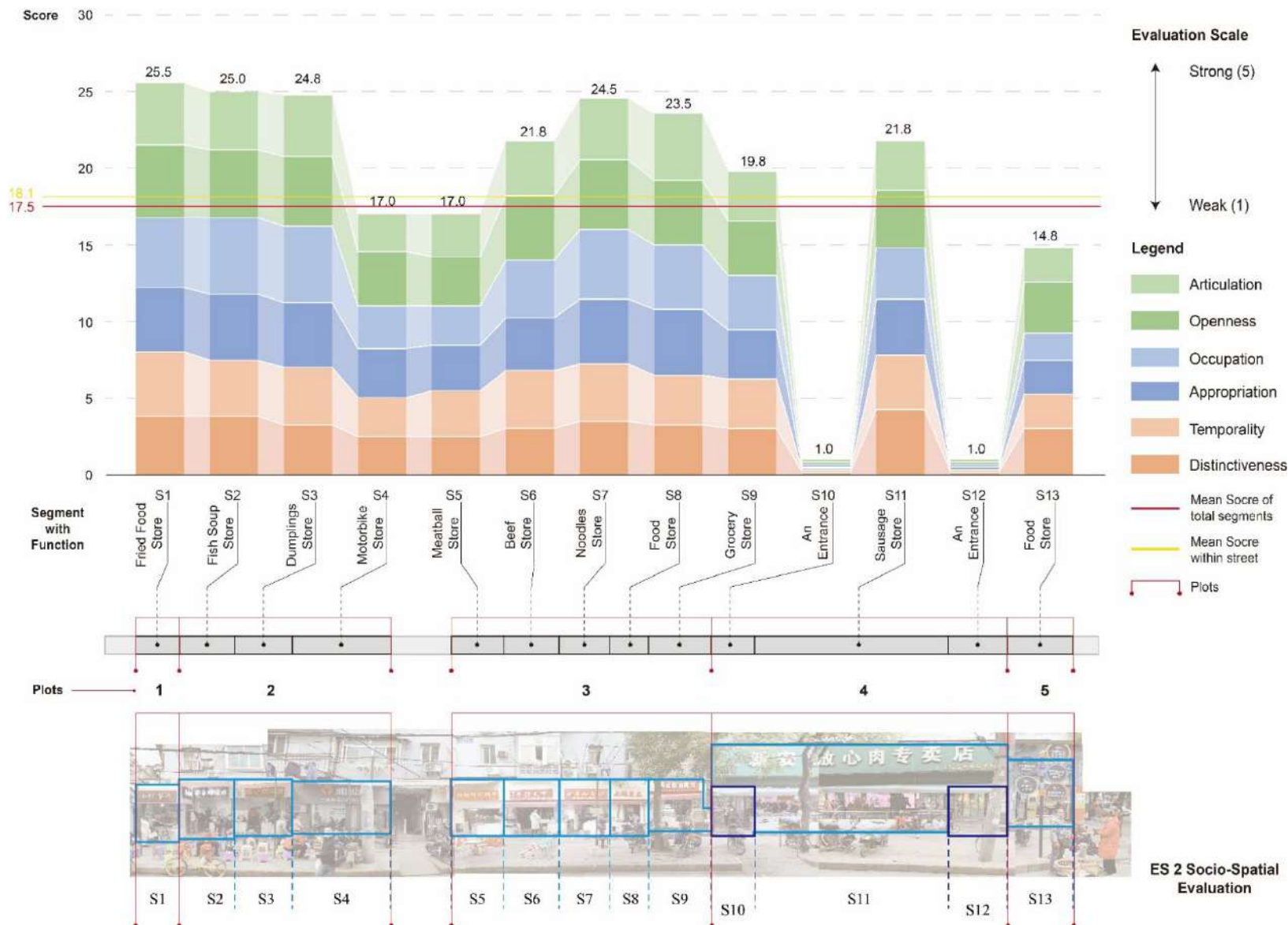


Figure 71 Everyday
Street 2 Socio-spatial
Evaluation



Figure 72 Everyday
Street 3 Socio-spatial
Evaluation

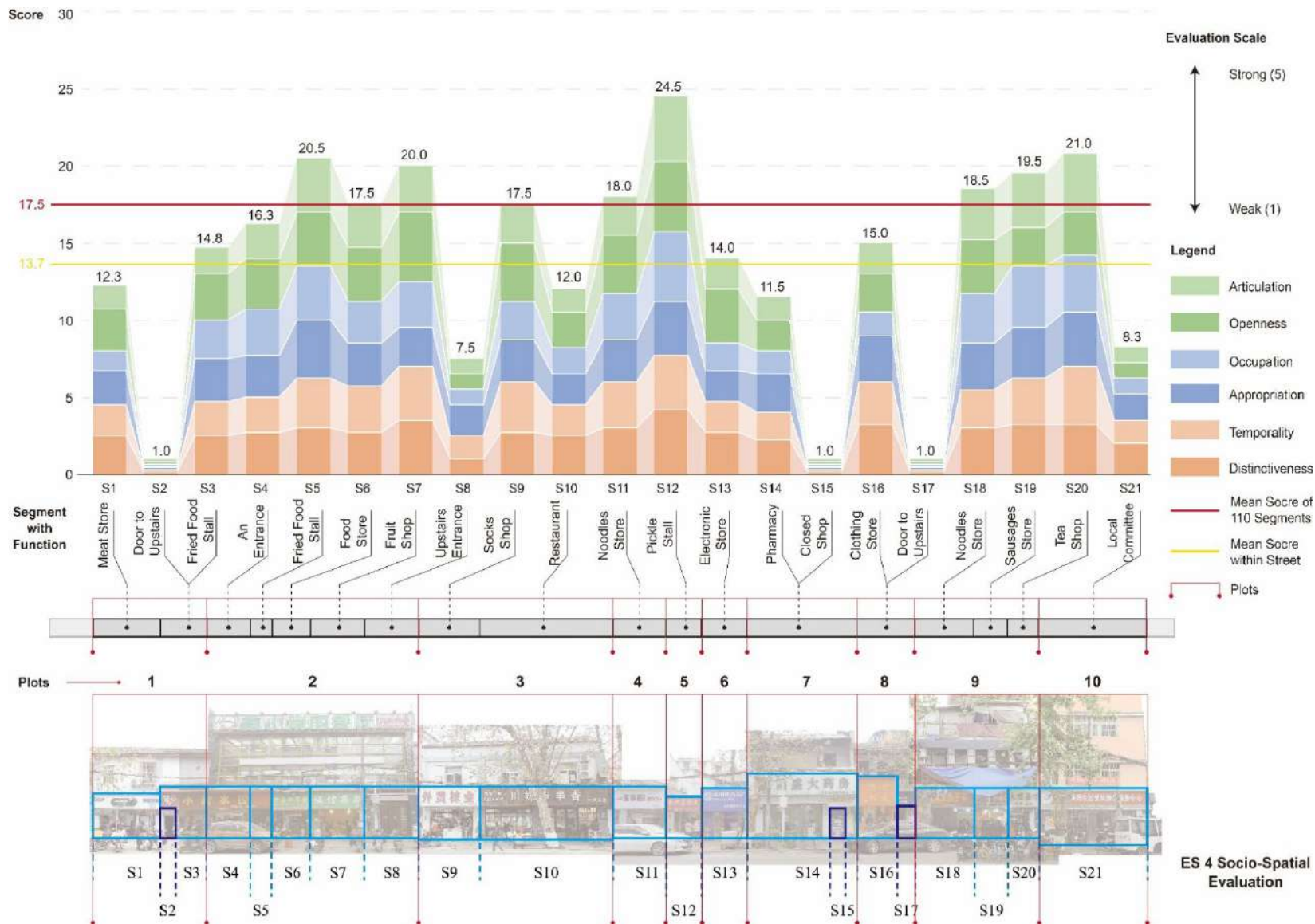


Figure 73 Everyday
Street 4 Socio-
spatial Evaluation

Findings discussion – Do the segments along the street edges vary in transitional edge attributes along their length?

The analyses shown provide a detailed understanding of socio-spatial qualities along the six street edges. This is while highlighting the variance of indicator scores for territorial street edge segments, collectively and individually.

Before delving into an examination of the specific socio-spatial attributes of each individual segment (undertaken in the subsequent section), it is apparent that there is considerable variation in the overall attribute scores along the length of each street edge. An examination of the street stream graphs reveals that in Leisure Street (LS) 1 and LS 2, there were 15 and 12 segments, respectively, that scored above the mean score of 17.5. In contrast, when comparing this to Everyday Street (ES) 1, ES 2, ES 3, and ES 4, there were 10, 8, 7, and 9 segments, respectively, at a similar level above the mean score. What is noticeable about these segments that surpass the mean score is their clear capacity for flexibility and adaptability. Moreover, they exhibit a high degree of socio-spatial complexity, which typically manifests in the material form, spatial organization, and social vitality of these areas, this will be explored in greater detail in later analysis and evaluations.

When considering the street type and combining it with the previously mentioned data, a noticeable trend emerges: Leisure Streets exhibit a greater number of high scoring territorial segments in comparison to Everyday Streets. This variation can likely be attributed to the diverse and prominent building morphology, plot configurations, textures, and functions found within Leisure Streets. Furthermore, it is essential to highlight that the various and distinctive material forms presented within these segments may have played a significant role in shaping their territorial characteristics along the street edge. In contrast, the territorial segments within Everyday Streets predominantly failed to deliver rich socio-spatial complexity. This is primarily because

the functions and contributing factors in these areas tend to be more homogenised and limited when compared to the multifaceted nature of Leisure Streets, with ES 2 and 3 standing out as particularly homogeneous in this regard.

In the current research, the conceptualisation of street edge quality revolved around six socio-spatial attributes as outlined by Thwaites *et al.* in 2020. These attributes are considered pivotal in defining the essence of street edge segments, reflecting themselves through physical manifestations, spatial configurations, and social dynamics. Upon scrutinising the socio-spatial evaluation of street edges, a discernible pattern emerges: segments scoring equal to or higher than the overall mean score (≥ 17.5) consistently adhere to these socio-spatial complexities. What they share in common is the presence of diverse material affordances or offerings by shopkeepers. These not only express the functional nature of these segments but also accentuate and reinforce their unique identities. Importantly, this richness in material offerings has the potential to enhance pedestrian engagement and interaction. In contrast, segments scoring below the overall mean score (< 17.5) tend to lack the richness associated with these socio-spatial qualities along the extent of the street edge. They often present themselves as impermeable and uninviting, with minimal social vibrancy. The subsequent section will delve into a specific examination of the socio-spatial evaluation of each territorial segment.

6.1.2 Theme I. 2 – How does each territorial segment vary broadly in its composition of material, spatial and social attributes?

Method

The approach taken is mixed-method approach. The method that was employed in the Theme I. I was again used, specifically, video recording, photographs and socio-spatial evaluation (Part 2 Video recording and measuring socio-spatial attributes, Chapter 5).

The lead researcher with other three scholars give an evaluation of six street edge segments (110 in total) in relation to material, spatial, and social dimensions of each segment. The mean score afterwards was calculated based upon four participants assessment. In terms of such classification, it can be noticed the manifestation and similarities of socio-spatial attributes from low score to high score.

Results

The following pages will demonstrate the segment attribute evaluation. These segments will divide into six scales, which are 1 – 5, 6 – 10, 11 – 15, 16 – 20, 21 – 25, 26 – 30. Through this, it revealed the variation between specific segment attributes and characteristics of focus relating to street edge qualities.

Figure 74 Scale 1 – 5 Segment Evaluation

Figure 75 Scale 6 – 10 Segment Evaluation

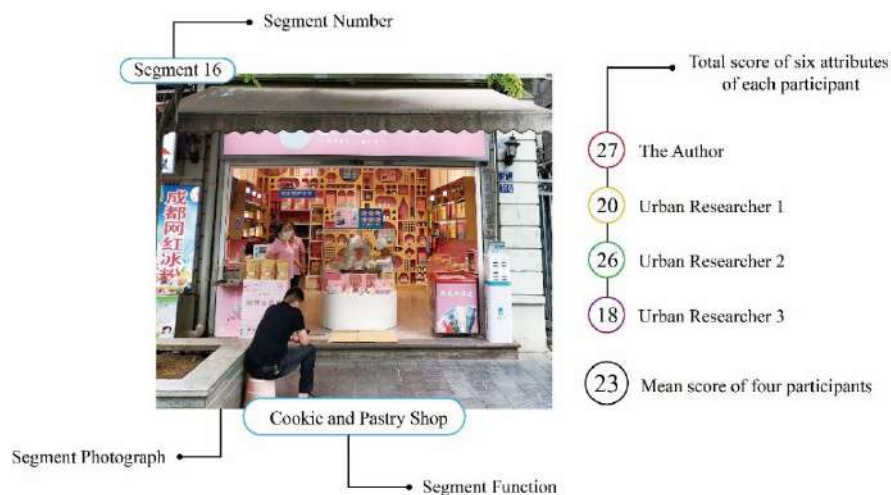
Figure 76 Scale 11 – 15 Segment Evaluation

Figure 77 Scale 16 – 20 Segment Evaluation

Figure 78 Scale 21 – 25 Segment Evaluation

Figure 79 Scale 26 – 30 Segment Evaluation

Legend



Segment Evaluation Ranking (1 - 5)

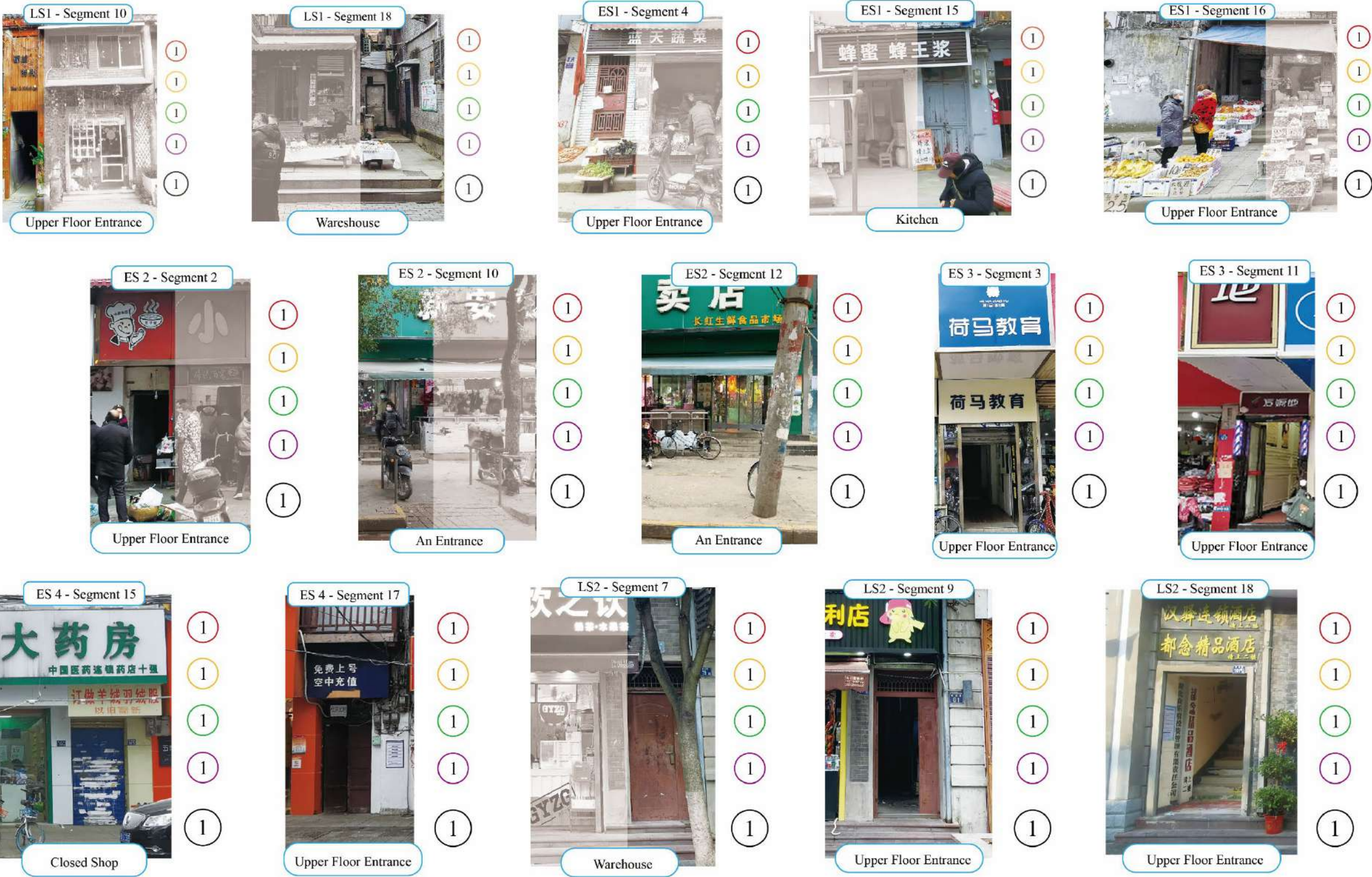


Figure 74 Scale 1- 5 Segment Evaluation

Segment Evaluation Ranking (6 - 10)



Figure 75 Scale 6 – 10 Segment Evaluation

Segment Evaluation Ranking (11 - 15)

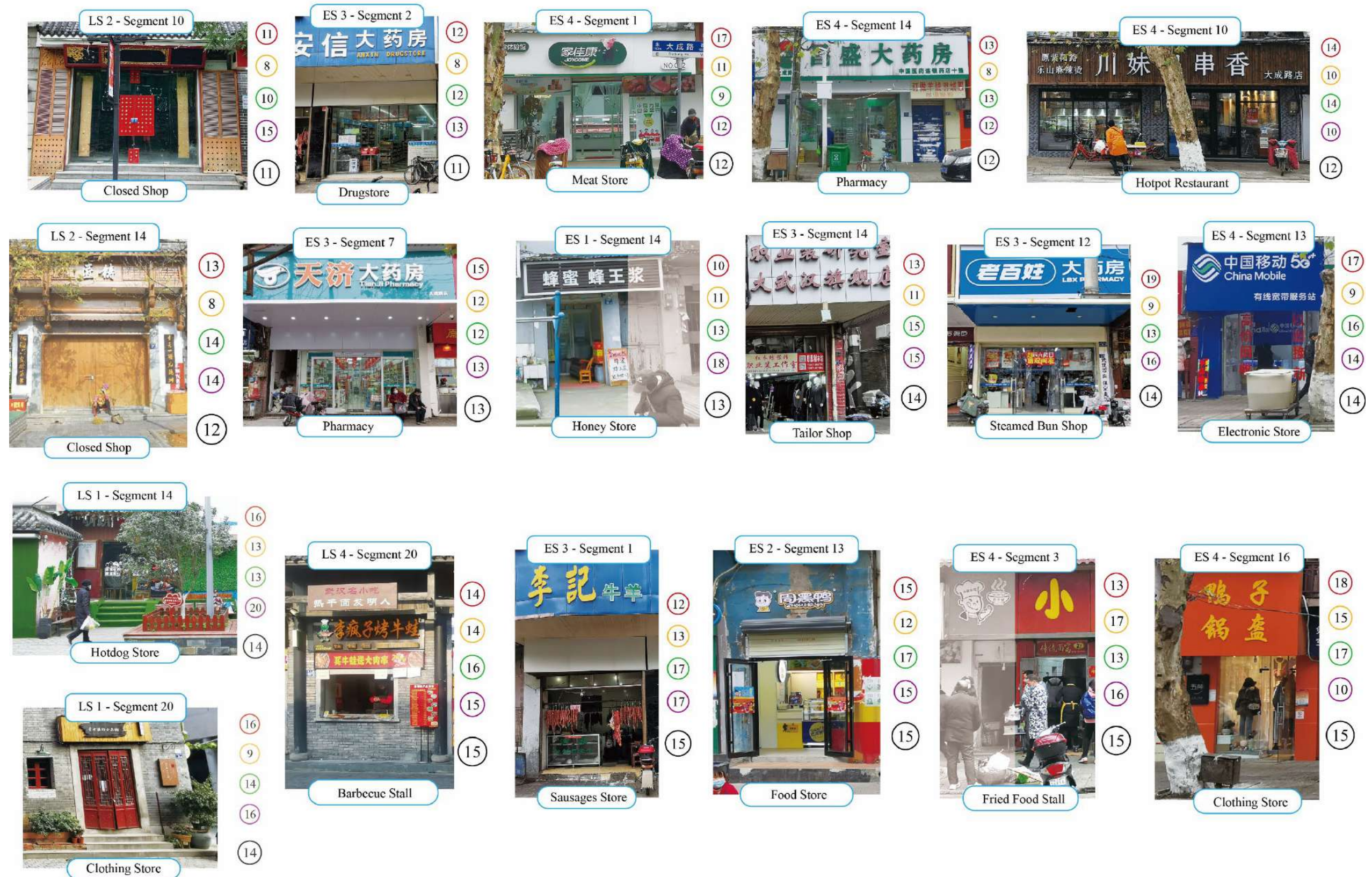


Figure 76 Scale 11 – 15 Segment Evaluation

Segment Evaluation Ranking (16 - 20)



Figure 77 Scale 16 – 20 Segment Evaluation

Segment Evaluation Ranking (16 - 20)

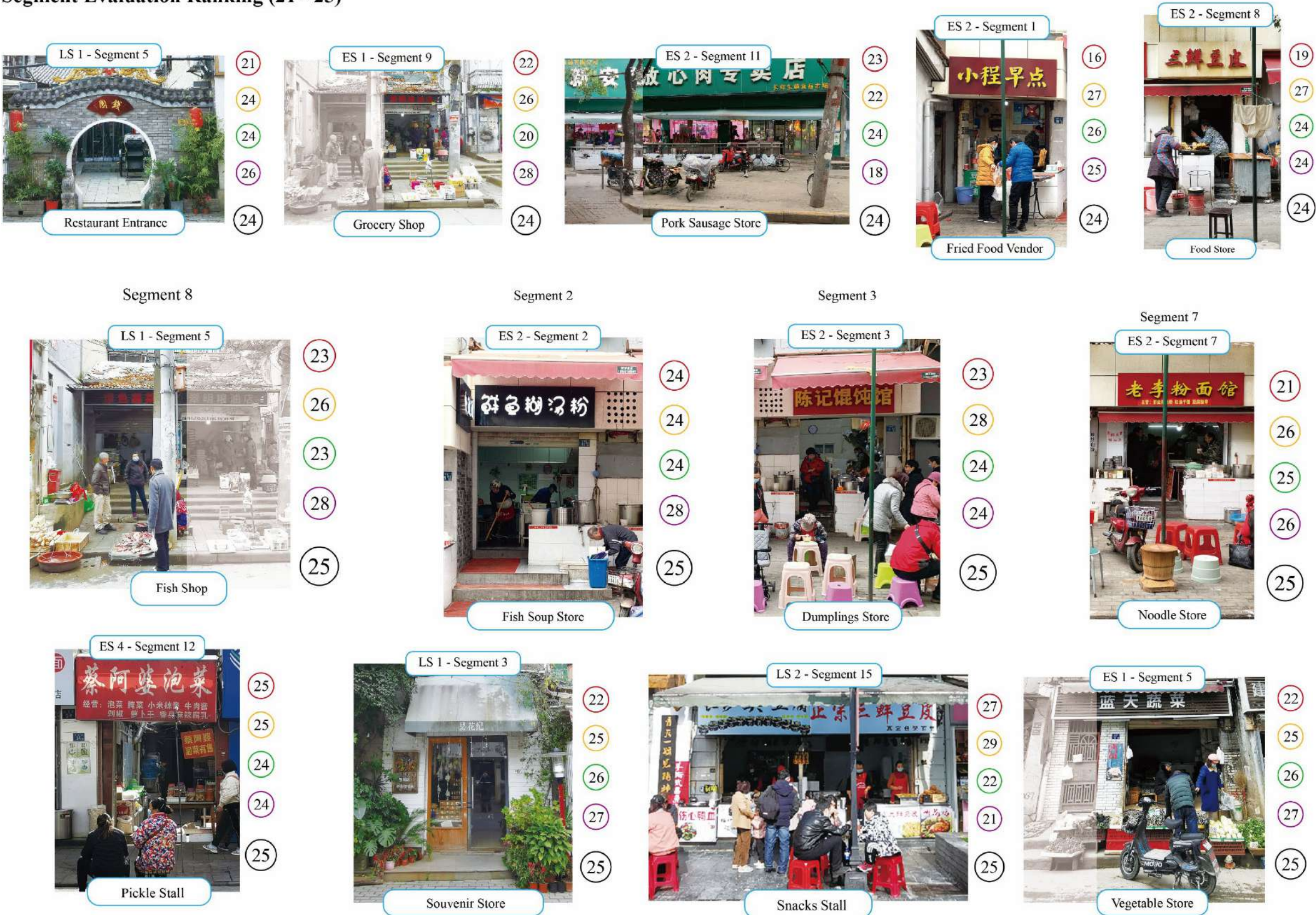


Segment Evaluation Ranking (21 - 25)



Figure 78 Scale 21 – 25 Segment Evaluation

Segment Evaluation Ranking (21 - 25)



Segment Evaluation Ranking (26 - 30)



Figure 79 Scale 26 – 30 Segment Evaluation

Findings discussion - How does each territorial segment vary broadly in its composition of material, spatial and social attributes?

Analysing the ranked segment visualizations reveals a clear distribution pattern in terms of varying segment characteristics. The majority of segments fall within the scale ranges of 16 – 20 (n=36), 21 – 25 (n=30), and 26 – 30 (n=6). Notably, across all street edges, segments with high evaluations stand out due to their identifiable function and rich socio-spatial complexities. Consequently, these segments are more prominent and eye-catching from a pedestrian perspective, offering a multi-sensory experience that underscores the potential influence of the space between the street and the buildings. The composition of these segments, including factors spanning rich colour, texture, and high- or low-level physical affordances, likely contributes to their heightened engagement compared to their surroundings. From the bar charts and segment evaluation, it shows that segments with higher score (four participants' assessment) are highly engaged compared with segments with lower score. For instance, LS 1 – Segment 6 and 13 were scored as 27 and 26, both of them show the greatest engagement compared with other segments. Conversely, segments lacking pronounced materiality, along with unidentifiable function and orientation, may affect their scores. This is particularly evident in segments falling within scale ranges of 6 – 10 (n=5) and 1 – 5 (n=15). The way these segments present themselves suggests that they are not as prominent as other recognisable segments. In other words, they fail to provide the material and spatial affordances necessary for meaningful engagement. Further investigation could delve into exploring how different segment scales impact engagement duration with these street edges, as part of Theme 3 of this study.

In Chapter 3 of the current research, it has established that socio-spatial characteristics of segments were manifested through personalisation and occupation. In instance where such actions deliver the communication of rich qualities and attract pedestrian attention to encourage social engagement and interaction, this was considered as

active segment territorialisation (Figure 42) (Kärrholm, 2009). It is evident from the ranked visualisations that segments falling within Scale 16 to 30 vividly exhibit complex socio-spatial expression, effectively communicating these attributes to street inhabitants. On the contrary, those falling within Scale 6 to 10 tend to be sharply delineated between interior and exterior, creating two isolated realms. These are typically regarded as instances of inactive segment territorialisation (Figure 42) (ibid). Examining the actions taken by segment owners, it can be noticed that the flow of desires and needs behind such processes (Dovey, 2010) in response to positive or negative segment manifestation. Here again, this is particularly from the perspective of bottom-up actions in relation to segment owners and street inhabitants. The various scales of segment photos further corroborate such conceptions, offering a detailed look into socio-spatial manifestation. Subsequent sections will provide specific explanations on how each socio-spatial feature exerts influences upon territorialised segments.

6.1.3 Theme I. 3 – How do street edge segments vary in their **Material dimension, manifested through **Distinctiveness** and **Temporality** attributes?**

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. The stream graphs in combination with ranked segments evaluation from Theme I. I were reviewed in detail to explore how the attributes of *distinctiveness* and *temporality* and manifested and vary within the street edge segments. It should be noted, nevertheless, that the temporality is challenging to accurately estimate just based upon the photographs or video clips at a certain given period. Through adopting the existing materials in conjunction with transitional edge theoretical framework, the current research attempts to provide a wider understanding of how territorial segments changed and adapted potentially influenced by temporality.

Findings Discussion

Distinctiveness Dimension

As previously highlighted, territorial segments with mean scores equal to or higher than 17.5 tend to feature easily recognisable functions, often projecting their functionality through material expressions. This observation is closely tied to the concept of distinctive physical affordances proposed by Gibson (1979). Small-scale, high-level and quick to implement interventions, such as plant settings, billboards, moveable chairs and tables, as well as other elements within a segment (Figure 80), have the potential to manifest the distinctiveness of segment territorialisation. This is evident in the product display of segment 1 (cookie shop), the diverse materiality of segment 13 (animal café), and the temporary toy stall of segment 13 (toy shop) in Leisure Street 1, for instance. The inclusion of these diverse materiality aims to enrich the characteristics of segments and enhance their identifiability along the street edges, thereby facilitating potential social activity. Besides, such physical affordances serve as another means to manifest the enclosure feature within a territorial segment. Consequently, these interventions of physical make-up and material components demonstrated how segments stand out in contrast to their general surroundings. This understanding further suggests that segments with such high-level material organisations not only express their distinctiveness to strengthen street edge identity, but are also associated with temporality. They can have either a short-term or long-lasting impact, adding an intriguing dimension to their socio-spatial expression.

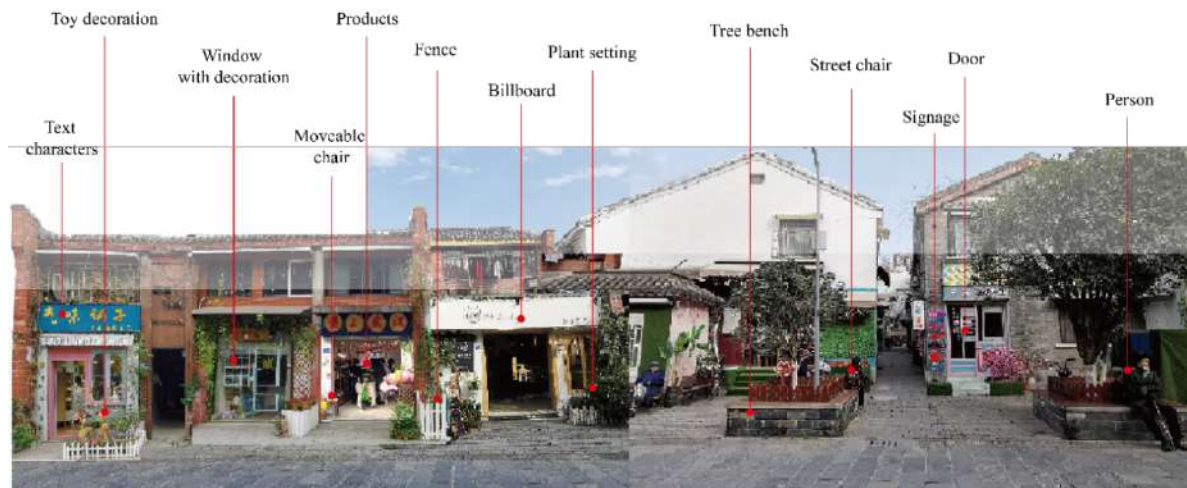


Figure 80 High-level physical affordance

These insights, related to the distinctive attributes of transitional edges, also shed light on the key differences between highly pronounced segments and those that are less conspicuous. One significant difference lies in the fact that the less prominent segments often appear sterile or monotonous across their facades, leading to vague identification and function, especially when compared to the well-decorated segments in their vicinity. This resonates with the idea proposed by Franck and Stevens (2007) that such ambiguous segment components shaped ‘social dead’ or hard edge space. Similarly, this insight aligns with the idea articulated by Joyce and Guaralda (2013), Dovey and Wood (2015), and Hassan *et al.*, (2019), all of whom have highlighted that impermeable and blank ground-floor interfaces made little contributions to street life and vitality. This can be readily observed in the socio-spatial evaluation of segments presented above, such as segment 17 (optical shop) of Leisure Street 2, segment 13 (barber shop) of Everyday Street I, as well as segment 14 (pharmacy) of Everyday Street 4 (Figure 81). Consequently, the distinctiveness of a segment is profoundly influenced by the presence of prominent material objects, physical expression, and capacity to deliver an identifiable function.



Figure 81 Less distinctive segments

In addition to the prominent physical objects, segments with high score (≥ 17.5 , corresponding to Scale 16 – 30) underscored how seemingly inconspicuous elements held potential influence in shaping their distinctiveness. These features, such as building textures, setback, canopy, colours, lights, as well as other objects, play a significant role in enhancing the overall perception of segments along the street edge (Figure 82). Upon scrutinising each street edge collage and segment evaluation (Figure 68 – Figure 79), it became evident that segments scoring above the mean (≥ 17.5) vividly showcased how these commonplace elements subtly contributed to segment identity when compared to those segments falling below the same level. This insight can be noticed that, the setback of segment 15 (gift shop), segment 17 (temporary toy stall), and segment 18 (game stall) within Leisure Street I, as well as the neon light of segment 13 (snack stall), and the bright color of segment 16 (cookie store) within Leisure Street 2 (Figure 83).

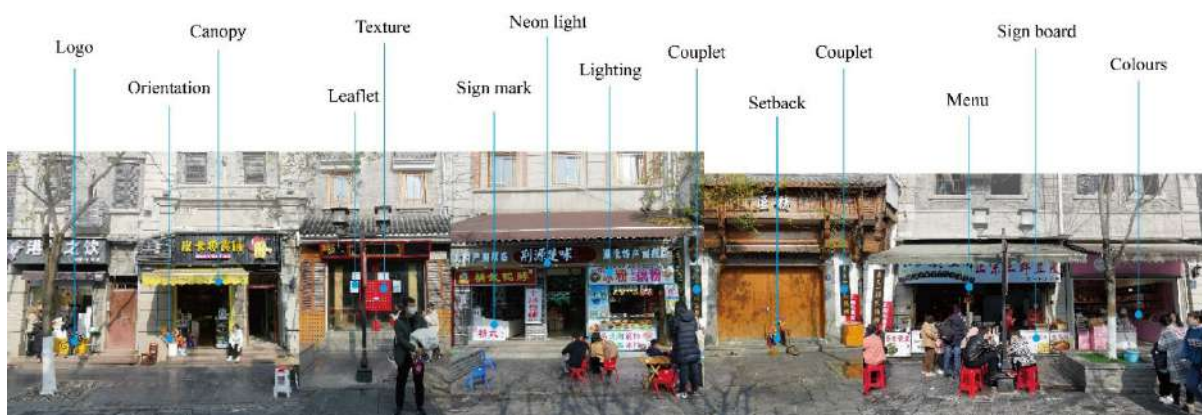


Figure 82 Low-level physical affordances



Figure 83 Subtle physical affordances

As highlighted previously, although substantial high- / low-level material objects within a segment primarily convey its distinctiveness along the overall street edge extent, hanging signs also played a crucial yet often overlooked role. Positioned at the forefront of a frontage, these signs serve as a segment's visual maker, enhancing the connection between building and street, whilst manifesting the major orientation and enclosure. This is evident in the small board hung on the tree of segment 22 (stall vendor) within Leisure Street 2, and the poster placed at the ground-floor interface of segment 13 (hotpot restaurant) within Everyday Street 3 (Figure 84). Such easily overlooked features also were capable of drawing pedestrians' attention, thereby rendering segments easily distinguishable. On the other hand, the adoption of such elements also needs to be carefully considered by shopkeepers how such physical affordances within a segment can be prominent from the normal background. To a larger extent, consequently, it can be assumed that segment's distinction arises from a combination of practical functionality, as well as the presence of high- / low-level material elements, all working in concert to achieve this outcome.



Figure 84 Other physical affordances

Overall, distinctiveness can be recognised as an essential feature that is manifested through discernible, attention-grabbing physical affordances, such as plant settings, billboards, and movable tables and chairs. And it also encompasses subtle elements that are easily overlooked, like building textures, colours, lights etc. It also contains minor elements that were generally easily overlooked, like building textures, colours, lights etc. The integration of these two different scales allows the segment that can be prominent from their general surroundings. Besides this, it is crucial to realise that these physical affordances did not pre-exist or independently exist being-in-the-world then waiting to be satisfied (DeLanda 2006). Instead, they arise through dynamic interaction of various components. Consequently, built upon the distinctiveness of a segment, the empirical insights gained from fieldwork investigation have demonstrated how such material affordances, either high level or low level, have the capability to influence potential engagement with the segments along the street edges. Noteworthy is the way distinctiveness does not exist in isolation; it serves as an integral characteristic contributing to the overall development of socio-spatial qualities within a segment, which will be explored in the subsequent sections.

Temporality Dimension

Temporality extends beyond the realm of transient or pop-up material interventions of everyday urbanism (Chase et al., 1999) along the street edges, or the predictable opening and closing rhythms of segments (Bobic, 2004; Kärrholm, 2009; Simpson, 2018). It is fundamentally tied to the potential for diverse expressions and uses, reflecting the flexibility and adaptability of segments (Thwaites et al., 2020). Due to the time limitation and uniqueness of this attribute, again, it is challenging to fully explore just through the recordings. Therefore, this section, in conjunction with existing knowledge, delves into how territorial segments undergo shifts and transformations to align with different contexts with the time passing by.

Based upon the collages and segments displayed above, it is evident that some have

undergone conversion over time. Such shifts can be categorised into three major ways of examining temporality attributes. Firstly, a segment was decorated through small-scale interventions, usually in front of the frontage, utilising material objects to express its capability and adaptation for change (*intervention temporality*). This adjustment can be either temporary or long-term, such as placing objects to enhance the recognisability. To some extent, this process is intertwined with distinctiveness dimension in relation to materiality. Secondly, the function of a segment experienced a complete change (*function temporality*), typically in response to unforeseen circumstances such as the Covid-19 pandemic or other stakeholder-driven factors. This led to the creation of a new experience for the street inhabitants. Thirdly, a segment had extensive renovations, both interior and exterior, facilitated either in a top-down or bottom-up approach. This resulted in the new images through attractive and novel elements that served to reinforce its identification (*re-design temporality*).

Intervention temporality involves segment owners employing small-scale, fine-grained physical objects in the segment development. This practice enhances the overall significance of changes and adaptations that occur over time along the street edge. At the segment level, such intervention can be flexibly tailored to suit varying environments across different periods, even if they exist for only a short period or minor changes generated. In this way, it explains why shopkeepers place more emphasis upon the segment's façade or ground-floor interface to express rhythms of temporality. They achieve this through using posters or signboards to display relevant information, or through regularly changing the products on display for window-shopping. This can be seen through Figure 85, which exemplifies intervention temporality. For instance, segment I (cookie store) exhibited the latest products and amusing electric toy through the window of Leisure Street 1, and segment 13 (snack store) manifested its function through posters and manuscript sign boards of Leisure Street 2. This is also similar to other street segments that periodically changed their showcases, the apparent instance is the segment 9 (pharmacy) of Everyday Street 3, as well as segment 16

(clothing store) of Everyday Street 4. In general, such temporal changes and shifts, executed through differing degrees of physical intervention, serve to enhance a segment's distinctiveness and augment its socio-spatial complexity.

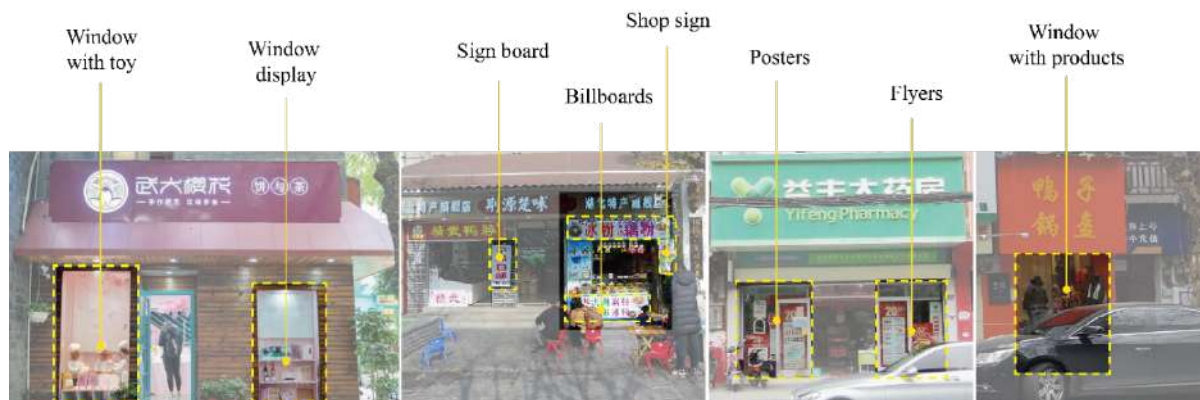


Figure 85 Intervention Temporality

Beyond the influence of intervention temporality at a small scale within segments, *function temporality* also acts as a significant role in shaping the territorial nature of a segment. This provides new experience for the street edge and its users. Throughout the six street edges studied, some segments had entirely changed their function when researcher revisited the case study sites. This transformation can be attributed to a change in segment ownership, leading to the emergence of new stakeholders who brought new opportunities and potential engagement along the street edges. Some notable instances include the evolution of a souvenir store into a flower shop in segment 12 within Leisure Street I, the conversion of a motorcycle shop into a steamed stuffed bun shop in segment 4 within Everyday Street 2, and transition from clothing store to a food store in segment I within Everyday Street 4 (Figure 86). Such shifts vividly reflect the decision-making of segment owners, who anticipated to rebuild segment's image and distinctiveness through function changes.



Figure 86 Function Temporality

Consequently, although they might not emerge as the most prominent segments based upon socio-spatial evaluation or broader understandings of physical affordance, segments experiencing function temporality plays a vital role in the territorialised segment scale. These changes have the potential to form liveable and vibrant street interface space in a long term (Pafka & Dovey, 2017). In essence, the analysis pertaining to territorial segment transformations seeks to provide insights into how function temporality can wield a substantial influence over the identity and vitality of the street edge. Here again, a segment retains its original function or adopts a new one, it inevitably carries its distinct characteristics and caters to targeted groups. This

is because it provides diverse territorial experience along the edge space, and through this to promote sense of place and self-identification (Thwaites et al., 2013).

Apart from the two forms of temporality mentioned above, *re-design temporality*, executed through the segment refurbishment both indoor and outdoor, represents another temporal expression. This form entails (re)territorialisation of a segment, potentially providing a new everyday experience and set of affordances. This is exemplified by remarkable instances such as segment 14 (hotdog shop) of Leisure Street 1, and segment 14 (closed store) of Leisure Street 2. These segments vividly demonstrate the transformation from being less prominent or engaged to becoming distinctive and appealing through a shift in renovation temporality (Figure 87). This insight resonated with the notions forwarded by Gehl (1977, 1986), suggesting that soft edges can mitigate the barrier and abruptness between public and private spaces. As a result, it seems that re-design temporality represents a combination that evolves from the previous temporality forms, manifesting the potential capability for (re)territorialised segments, and even for the overall street extent. In a long term, such relative larger scale shifts are linked with different perspectives, particularly in relation to the enhancement of distinctiveness and spatial organisation, thus promoting the development of social dimension.



Figure 87 Re-design Temporality

Generally, either large- or small-scale shifts and changes usually bring new image and vitality into segments and street edges, especially compared with those that are invariably tedious function and repetitious affordance objects. The findings from the current research provide empirical validation for these ideas, emphasising how these transformations, intertwined with territorialisation, manifest through segment temporality. While some segments have already exhibited their adaptability and flexibility within the study streets, further investigation should be paid attention to how this attribute is able to establish socially responsive street edge.

6.1.4 Theme I. 4 – How do street edge segments vary in their **Spatial** dimension, manifested through **Openness** and **Articulation** attributes?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. The segment evaluation ranking combined with stream graphs from Theme I. I were used whilst exploring the relationship between *articulation* and *openness* attributes of segments along the street edges. Through applying the photographs along with lateral transitional quality, it aims to have a broader insight of the potential influence of laterality.

Findings Discussion

Openness Dimension

In accordance with the transitional edge conceptual framework (Thwaites et al., 2013; 2020), openness is typically associated with the capacity of *transparency* and *permeability* within a segment. Segments featuring high-level features, characterised by elements like windows, doors, or smoothly transitional space (semi-public or -private) between the inside and outside, generally stands out more than their surroundings. Through this, they were able to manifest varying degrees of socio-spatial complexity and identifiable function. This can be noticed across Figure 68 – Figure 79. In terms of the stream graphs and segment evaluation, it evidently shows that segments with such lateral characteristics acquired higher scores in comparison with those with less lateral expression.

Permeability is generally associated with physical accessibility between two adjacent realms, particularly the interconnectivity between building space and street, or private and public (Thwaites et al., 2013). And it extends to various sensory engagement as

well (Simpson, 2018). This quality not only promotes walkability but enriches sensory experiences, such as visual, auditory or olfactory stimuli, which are projected to segment's laterality, whilst accentuating its distinctiveness. Across the six street edges, segments with high scores consistently demonstrated impressive lateral performance. They provide clear sight, pleasant music or unique aroma through windows, doorways or smooth thresholds from inside to outside. These insights empirically resonated with the concept claimed by Cullen (1971) and Thwaites et al., (2013), who had argued the significance of experiencing the interaction between 'here-ness' and 'there-ness' within an adjacent space. They also emphasised the potential for spatial practice to soften the abrupt separation between segment and street.

To a large extent, the directionality along the street edge is profoundly influenced by the degree of permeability. The reason for this is vision being focused away from the overall linear direction of the street edge, towards *public-private gradient* of laterality significance and locality focus within a segment. This can be easily observed through segment 17 (temporal toy stall) of Leisure Street 1, as well as segment 17 (fruit store) and segment 18 (nut store) are also able to demonstrate this quality (Figure 88). These notable segments vividly illustrate the expression of permeability through semi-public / -private transitional lateral space complemented by various types of physical affordances. In contrast, low-scoring segments, often featuring closed segments or invariant interfaces, are typically segregated by rigorous threshold between interior and exterior. They seldom present any lateral structure or depth. The most noticeable instances are segment 10 (closed store) and segment 17 (optical shop) of Leisure Street 2 (Figure 89). It is apparent that the devoid of permeability restrict the possibility for lateral practices, and localised expression between the building and street.

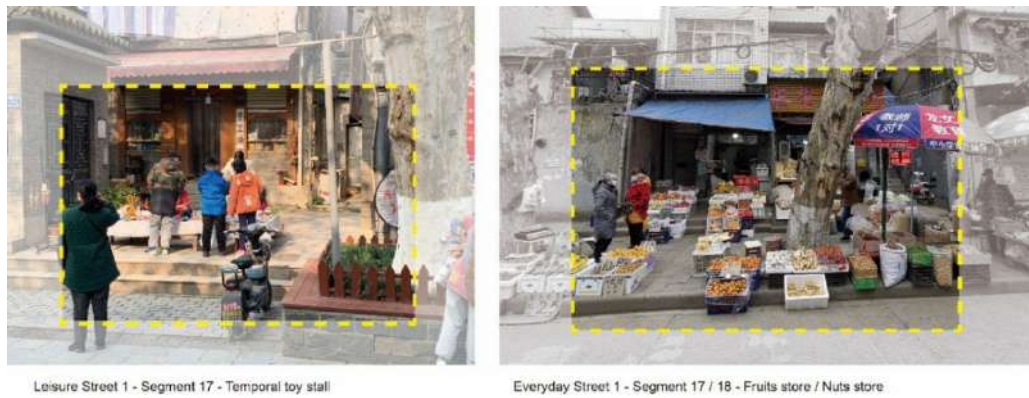


Figure 88 High-level permeability



Figure 89 Low-level permeability

Transparency, within the current research, pertains to the visual engagement facilitated by well-lit doorways or windows, attempting to highlight the sense of ‘here-ness’ and ‘there-ness’ within a segment (Cullen, 1971). The segments that received high scores within each edge typically boasted exceptional visibility, often achieved through semi-open threshold or glass-like materials. This is prominently demonstrated by segment 1 (cookie store), segment 7 (clothing store), as well as segment 8 (toy shop) of Leisure Street 1, where products were exhibited in windows to enhance visual experience and make them more eye-catching than their surroundings (Figure 90). The other examples can be found in segments 11(sausage store) of Everyday Street 2 where doorways provided an expanded visual complexity, and segment 12 (pickle stall) of Everyday Street 4 (Figure 91). These segments heightened visual intensity by allowing pedestrians to view the products within. This not only augments spatial depth and

porosity from inside to outside, but contributes to segment's distinctiveness.



Figure 90 High-level transparency



Figure 91 High-level transparency

Throughout six street edges, it is evident how openness quality in a segment is manifested through physical affordances, which are intricately linked with the attributes of distinctiveness and temporality. It is worth noting, however, not all physical affordances have a positive effect. Segments that portrayed opaque or less transparent, such as those covered up by posters or objects, tend to be less outstanding or engaging. A striking example can be observed in a group of pharmacy segments within Everyday Street 3 (Figure 92), where they have exhibit certain degree of *intervention temporality* (Theme I. 2) through posters, stickers and other objects. On the one hand, this approach effectively conveys important information to the public, potentially attracting street inhabitants, whilst expressing its distinctiveness. On the other hand, nevertheless, the visibility of these segments was blocked-off by materials like plastic strip curtains or doors, creating a tangible barrier between internal and external spaces along the edge. This makes them less conducive to potential social interaction. This

can be observed through segment 8 (upstairs entrance) and segment 21 (neighborhood community) of Everyday Street 4 (Figure 93). As a result, to some extent, a segment can stand out is associated with transparency performance, or vice versa. Such empirical evidence resonated with the ideas proposed by Alexander (1977), Jacobs (1993), Thwaites et al., (2013), Dovey and Wood (2015), and Pafka and Dovey (2017), all of whom emphasised the significance of transparency within segment along the edge space.



Figure 92 Low-level transparency with posters



Figure 93 Low-level transparency with vacant interface

In general, in response to openness quality, the insights obtained through socio-spatial evaluation and segment ranking have empirically illustrated how important of the quality of permeability and transparency is, these attributes have capacity to influence upon potentially physical and sensory social engagement along street edges. Besides, this is not only for the material affordances, but lay the foundation for the articulation feature development, and this will further explore in the following part.

Articulation Dimension

The quality of openness, as previously discussed in terms of permeability and transparency within a segment, represents the potential for both physical and sensory experiences along the street edges. It also accentuates the spatial articulation between the building and street. Through the transitional edge evaluation in Theme I. I, it becomes evident that segments scoring above the mean (≥ 17.5) tend to exhibit a rich laterality, overlapping two adjacent realms to express a transitional articulation, rather than presenting an abrupt division between inside and outside. It exhibits a certain degree of spatial expansion manifested through semi-public / -private realm, providing the capacity for social retreat and availability. This spatial expansion is intricately connected with the attributes of distinctiveness and temporality within a segment, encompassing both high and low-level physical affordances. Such an understanding, in combination with material attributes, have echoed the insights claimed by Nooraddin (2002) and Thwaites et al. (2013, 2020), emphasising how the convergence of visual and functional elements is able to create an identifiable transitional space. This, in turn, contributes to the gradient articulation from the private to the public realm, potentially facilitating the capacity for hide and reveal.

Spatial expansion, acting as a bridge between the public and private realms within a segment, also plays a significant role in lateral articulation. Segments that stand out from their surroundings often exhibit spatial porosity, which is manifested through the use of materials and objects within segments, illustrating *hide and reveal* and *public-private gradient* features. A striking example of this can be noticed in a semi-enclosure space created by the display of products along the edge of segment 5 (vegetable stall) and segment 6 (lotus store) within Everyday Street 1 (Figure 94). Such product displayed soothe the segregation between inside and outside realms, whilst providing opportunities to be hide or reveal. Likewise, in segment 2 (fish soup store) and segment 3 (dumplings store) of Everyday Street 2 (Figure 95), segment owners have installed large canopies, subtly enhancing spatial depth and alleviating abrupt separation

between the building and street. Consequently, such material affordances, either eye-catching or routine, directly contribute to the lateral articulation between external and internal. Segment owners transformed such ordinary space into a vibrant and active place through everyday behaviors of those who inhabit it. Imagine street inhabitants strolling along the edges, such objects not only grab people's eyes, but soften the rigid threshold between street and building. This once again validated that spatial expansion and intensity are prominently manifested through appropriate gradient articulation.



Figure 94 High-level spatial articulation (Left)



Figure 95 High-level spatial articulation (Right)

By contrast, segments that portrayed vacant or sterile between the segment frontage and street were less prominent or attractive than those with rich lateral transition. Segments lacking any spatial articulation, presenting as two isolated realms, fail to be prominent to catch pedestrians' attention. Throughout the six street edges, several segments barely afford spatial intensity to demonstrate the potential for public-private gradient articulation. One glaring instance of this can be seen through the vacant transition of segment 14 (honey store) within Everyday Street 1, the abrupt detachment of segment 13 (food store) within Everyday Street 2, as well as the rigid physical separation by opaque door curtain of segment 8 (upstairs entrance) within Everyday Street 4 (Figure 96). These segments inadequately presented spatial extension, offering limited affordances along the overall street edges. The absence of public-

private gradient or hide and reveal within a segment, therefore, makes it challenging to distinguish them from the surroundings. This, in turn, leaves little room for lateral extension between edge the and segment (Cullen, 1971).



Figure 96 Low-level spatial articulation

As discussed earlier, permeability and transparency of segment also played an important role in lateral articulation, allowing for the interconnection of different sensory complexities, especially visual and auditory features, creating a collective engagement from private to public. Again, the way transparency allows for visual perception within a segment to be engaged is closely linked to the impact of permeability upon broader sensory complexities of the segments along the overall edge extent (Simpson, 2018). In terms of the study streets, many segments with visual engaging façades often featured high transparency or openings, facilitating the dispersion of other sensory activities to the public realm. This, in turn, manifests spatial articulation through the physical or sensory expression of this feature. An illustrative example is found in a group of food stores, segments 1-3 and 6-8 along Everyday Street 2 (Figure 97), where the aroma of food extends to the street, and conversations between segment owners and clients reach the adjacent space. Besides, another form of sensory complexity involving audio, where sounds are disseminated to bridge the gap between the building (indoor) and street (outdoor), could enhance laterality. This can also be testified through the two animal cafés (segment 6 and 13) of the Leisure Street I (Figure 98), where light music can be spread from the internal to external. Thus, such sensory complexities demonstrate varying ways of spatial articulation along the street edges,

whilst illustrating how this quality make contributions to segment distinctiveness.



Figure 97 High-level spatial articulation with sensory complexity



Figure 98 High-level spatial articulation with sensory complexity

Overall, in terms of the spatial dimension of segments, the empirical insight obtained through the real-world investigation have emphasised how openness and articulation have the great potential to promote social engagement with street edges. Such transitional attributes also contribute to localised expression within a segment, which will be further explored in the following part.

6.1.5 Theme I. 5 – How do street edge segments vary in their **Social dimension, manifested through **Appropriation** and **Occupation** attributes?**

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. The stream graphs of socio-spatial evaluation from Theme I.

I, in combination with segment evaluation, were adopted whilst exploring the relationship between social dimension of *appropriation* and *occupation* within a segment. This allows for an investigation of how varying segments were expressed personalisation and territorialisation through looseness in terms of such transitional attributes along the street edges.

Findings Discussion

Appropriation Dimension

Based upon the previous discussions, it has been established that street edges are intricately linked to diverse territorial attributes. As a significant localised expression, appropriation attribute is closely interconnected with *loose space* (Franck and Stevens, 2007), or also known as *looseness* (Thwaites et al., 2013). This highlights that the looseness of a segment is a significant feature of street edges. This property is commonly recognised that they have the capacities for flexibility and ambiguity within a space, which in turn holds implications for potential social engagement. Such an understanding, in response to the feature of personalisation and territorialisation, provides an insight into why segments stand out and are potentially more engaging than those are less pronounced. According to the socio-spatial evaluation, it reveals that segments with higher scores tend to exhibit a certain degree of loose space, thereby enabling diverse possibilities. This insight has echoed the empirical evidences maintained by Thwaites *et al.* (2013), emphasising that the looseness associated with territorialised and personalised characteristics significantly influences the segment identification within a street environment.

Again, loose space is generally characterised by ambiguous, flexible, and unexpected uses, which has the capacity for undertaking different forms of engagement with two adjoining realms. In terms of the segment ranking, it presents how loose space was manifested through private and public within a segment, whilst reflecting upon the way

of territorialisation and personalisation. This can be seen that appropriation shifts emphasis away from the overall extent level, towards nuanced segment scale highlights the significance of locality. A striking example of this can be seen through segment 17 (temporary toy stall) and segment 19 (game store) of Leisure Street I (Figure 99). A great deal of physical affordances, either high or low level, were placed to display territoriality from private to public through bottom-up personalisation, whilst through this forming a loose space to encourage potential social interaction.



Figure 99 High-level looseness with territorialisation

Another compelling example of unexpected use pattern along the street edge is found in a cluster of food store segments, which are segment 1-3, and segment 6-8 of Everyday Street 2 (Figure 100). Striking, within this street edge, is this realm presented an undefined space between the building and street, cleverly filled with quick-to-implement moveable tables and chairs. This not only showcases adaptability and flexibility, but demonstrated the interconnection with *permeability* (Theme I. 4), improving physical accessibility and capacity for connectivity between two adjacent realms. Last, such looseness quality also linked with *temporality* (Theme I. 3) as well. Although it is uncommon, this can also be clearly observed from the Everyday Street 1 at certain periods. For instance, within Everyday Street 2, the interface of segment 10 (electronic store) was occasionally occupied by a temporary street vendor, as well as segment 17 (fruit store) and segment 18 (nut store) displayed the products along the street edge, making them easily identifiable compared to the surroundings (Figure

101). Such examples further validated the significance of localised looseness for the development of socially responsive street edges, and eventually determining whether a segment positively accommodates diverse activities or negatively restrain them.



Figure 100 High-level looseness with personalisation

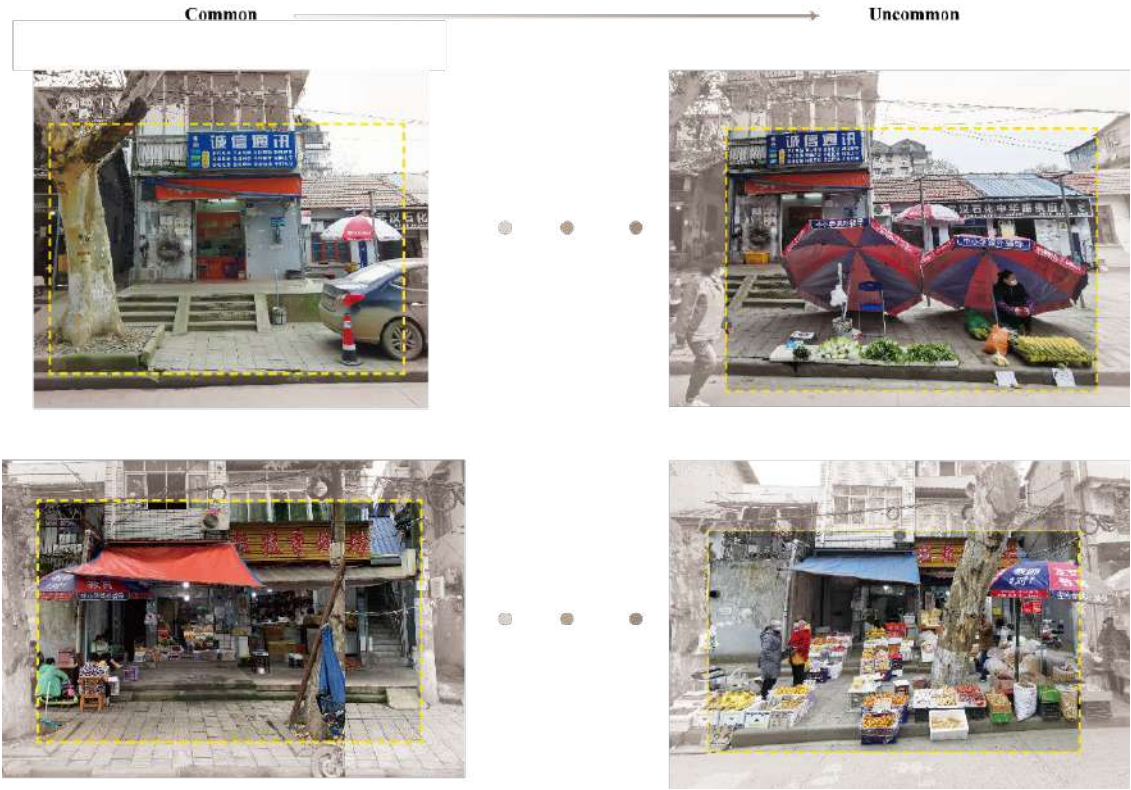


Figure 101 Temporality Appropriation

Of the segments that manifested a lower degree of looseness, it is noticeable that not only do they lack territorialisation and personalisation within the segment, but also provide little room for lateral transition between the street and building. This suggests

that these segments have limited potential for prominence or for fostering social interaction. This can be noticed through, for instance, segment 1 (seafood stall), segment 2 (an entrance), and segment 10 (electronic store) of Everyday Street 1 (Figure 102). Both of them might present certain slight material and spatial expression, which merely express their functionality and utility. Through this, these segments, lacking the quality of looseness, are less conducive to potential social contact. Thus, the absence of localised looseness diminishes the potential for social interaction due to the inadequacy of appropriate physical affordances and spatial feature.



Figure 102 Low-level looseness

This can also be seen through the other noticeable examples, the blank territorial expression of segment 2 (pharmacy) and segment 14 (tailor shop) of Everyday Street 3 (Figure 103), as well as the harsh demarcation of segment 1 (meat store) and segment 21 (neighborhood committee) of Everyday Street 4 (Figure 104). All of these less pronounced segments presented limited looseness through poor quality of territorialisation and personalisation within the segments. Thus, the lack of such territorial features makes little contribution to the social cohesion, whilst constraining the acts of personalisation to foster sustainable street and edge. Such understanding acquired similarly has echoed Wood and Dovey's (2015) argument of *mix of mixes* that emphasising how a variety of clusters synergize to strengthen their connection.



Everyday Street 3 - Segment 2 - Pharmacy



Everyday Street 3 - Segment 14 - Tailor shop

Figure 103 Low-level looseness



Everyday Street 4 - Segment 2 - Meat store



Everyday Street 4 - Segment 21 - Neighborhood committee

Figure 104 Low-level looseness

Occupation Dimension

Associated with the way of loose space allowed segment appropriation to be interacted is the way occupation influenced broader social activity engagement within the segments. Here it will focus upon occupation quality, particularly exploring how it interacts with and is influenced by other socio-spatial characteristics expressed through street edge space. Through this, occupation, as a territorial expression, is usually connected with *enclosure* property, which in turn promotes *social activity* and provides opportunities for *hide and reveal* (Thwaites et al., 2013; 2020). The socio-spatial evaluations of segments reveal that high scores were often characterised by an attractive semi-enclosed space. This feature allowed these territorial segments to be prominent, contributing to sense of place through territorialisation and personalisation. Hence, these segments regularly were easily identifiable with distinctively physical affordances and spatial structure, providing the various types of localised expression

between the street and building, be it for social retreat or social availability.

Through this, it also provides an insight into why segments with enclosure quality, creating partially enclosed sub-spaces between interior and exterior (Buchanan, 1988; Department for Transport, 2007), often command greater attention. These segments, displaying a distinctive territorial expression, are characterised by material and spatial features, encompassing high- / low-level physical affordances and differing degrees of lateral articulation, particularly compared with the surrounding segments. In this way, potential social activity along the edge space is significantly influenced. This is due to social activity shifts the focus from the overall street extent, towards nuanced sub-space level within locality. The most prominent examples are segment 9 (perfume store), segment 16 (dorayaki store) and segment 17 (temporary toy stall) of Leisure Street I (Figure 105). A noticeable semi-enclosure space with eye-catching physical affordances and certain lateral depth was manifested within segment, which provided the opportunity for street inhabitants to be private retreat or social availability through smoothing the separation between the two adjacent realms.



Figure 105 High-level enclosure with hide and reveal

Another example can also be noticed through Everyday Street I (Figure 106), where merchandise is strategically placed in the space between the building and street, as seen in segment 8 (fish store) and segment 9 (rice store), as well as segment 17 (fruit store) and segment 18 (nut store). This arrangement also effectively showcases varying degrees of enclosure, emphasising its distinctiveness and territorial benefit. It

is worth noting that the level of enclosure is not limited to material affordances, but also relates to temporality to facilitate social activity. A compelling instance can be found among a group of food stores (segment 1-3 and segments 6-8) of Everyday Street 2 (Figure 107). Here, these sub-space between the street and building were temporarily occupied, resulting in open-ended enclosure that conveys distinct territorial expression.



Figure 106 High-level enclosure with hide and reveal



Figure 107 Temporality Enclosure

Of the segments that did not exhibit any degrees of enclosure, it is apparent that not only did they demonstrate poor territorialisation and personalisation within a segment, but were incapable of accommodating potential social communication for street users,

to a larger extent. Again, this allowed the quality, such as social activity and hide and reveal, of a less pronounced segment to be negatively projected to the street edges. This is discernible in examples such as segment 12 (warehouse), segment 13 (barber shop) and segment 14 (honey store) of Everyday Street I (Figure 108), all of them scarcely manifested territorial expression through physical enclosure or lateral articulation within the spacious transitional realms. Other recognisable examples can be found in Leisure Street 2 (Figure 109), where few degrees of enclosure were shown through segment 17 (optical shop) and segments 24 (restaurant) of Leisure Street 2. Such segments also ranked among the least pronounced along the street, the reason for this is due to the devoid of expression in relation to material and spatial dimension, resulting in the limitation for potential social activity between the building and street.



Everyday Street 1 - Segment 12 / 13 / 14 - Closed warehouse / Barber shop / Honey store

Figure 108 Low-level enclosure without territorialisation and personalisation



Leisure Street 2 - Segment 17 - Optical store

Leisure Street 2 - Segment 24 - Restaurant

Figure 109 Low-level enclosure without territorialisation and personalisation

In the light of the previous discussion, there has been an overall understanding of the significance of localised expression based upon varying transitional attributes. Overall,

in response to social dimension, these empirical findings obtained through the current investigation have highlighted how appropriation and occupation have the potential influence to facilitate social activity through distinct territorial expression at a nuanced segment level. All of these socio-spatial qualities discussed here, it is not only significant to street edge establishment, but social vitality and cohesion, particularly in Chinese urban village context analysed.

Theme I – Findings Summary

The findings obtained through the current section primarily focus upon street edge socio-spatial attributes with regards to segment-by-segment perspective, whilst validating the insight that territorial segment is closely linked with different transitional edge features, either individual or collective. Through this, the findings add evidence towards the understanding that segments' manifestation along the street edges are influenced by material, spatial and social dimension. And this also paves the road for the establishment of socially responsive street edge framework.

6.2 Theme 2: Understanding variation in activities within territorial segments along street edges

6.2.1 Theme 2. I:

- **What** Necessary, Optional and Social activities take place within the study streets?
- **When** do Necessary, Optional and Social activities take place within the study streets?
- **Where** Necessary, Optional and Social activities take place within the study streets?

Method

The approach taken is mixed-method approach, this includes video recording and onsite observation with filed notes. Video recording (iPhone X and Huawei, Mate 20 Pro) along with onsite observation were adopted as the primary methods to record peoples' activities along the six street edges within the current investigation (Part 2 Video recording and onsite observation; Chapter 5). Following this, the videos were viewed and activities were classified and coded based on three activity types proposed by Gehl (1987) – *Necessary*, *Optional* and *Social*; and different time periods (morning, afternoon and evening); as well as within different study streets (Leisure and Everyday Streets). Such group activity visualisations were displayed through Sankey diagrams in the following pages by i) the activities took place – the **What**; ii) the time period of these activities took place – the **When** (+ *What*); iii) the exact streets of these activities took place – the **Where** (+ *What* + *When*). Subsequently, the resultant diagrams were displayed through stream graphs and behavior mappings, comparing their distributions and variances. In this way, it provided an overall understanding of activity engagement within the street edge space.

Results

Over the following pages are presented –

Figure 110 – What activities took place: **What** (*Necessary / Optional / Social*)

Figure 111– Different time periods of activities that took place: **When** (+ *What*)

Overall **Morning / Afternoon / Evening** (+ *Necessary / Optional / Social*)

Figure 112 – Activities took place of each street: **Where** (+ *When* + *What*)

Overall **LS1, LS2, ES1, ES2, ES3, ES4**

(*Morning / Afternoon / Evening* + *Necessary / Optional / Social*)

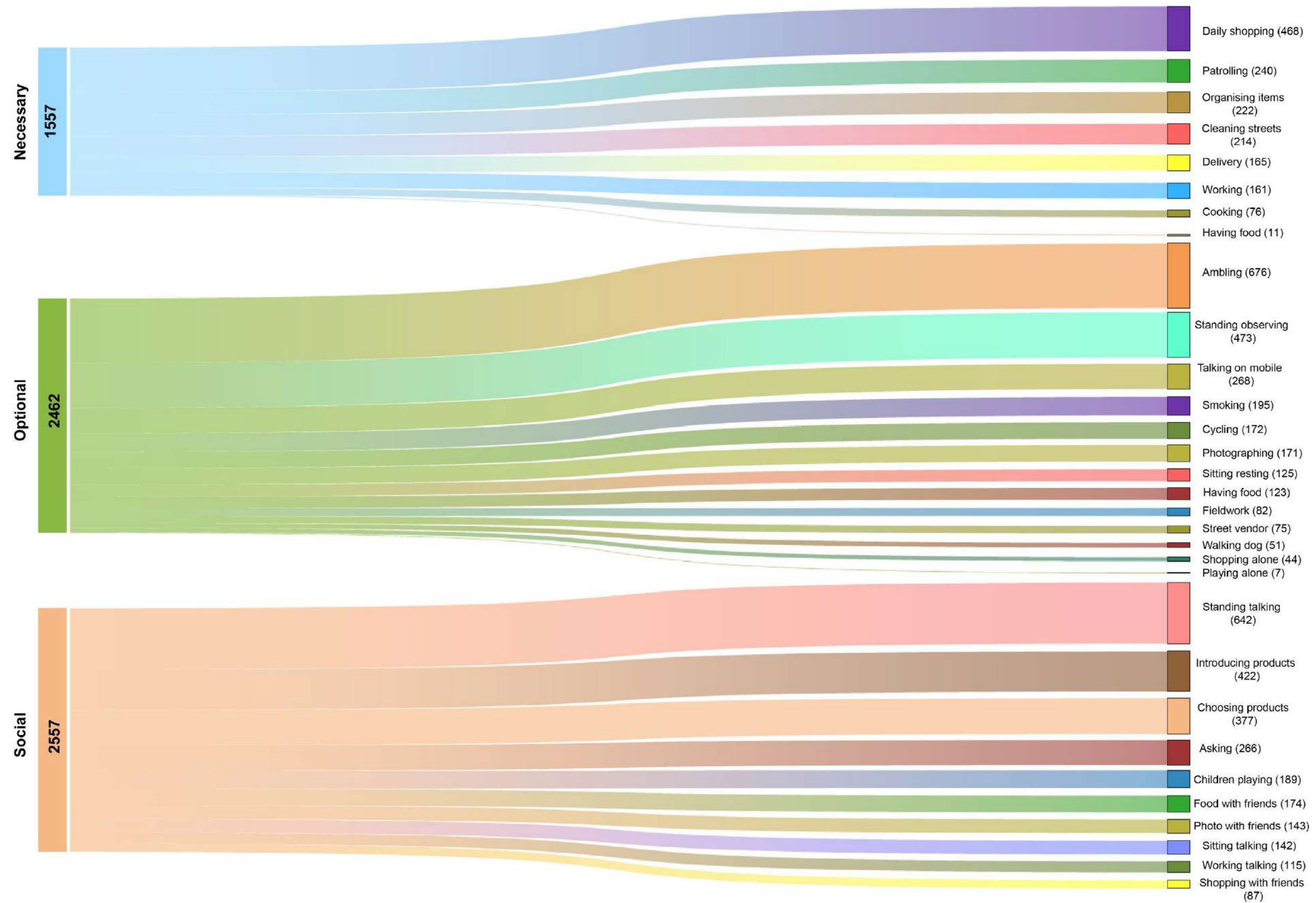


Figure 110 What activities took place: *What*

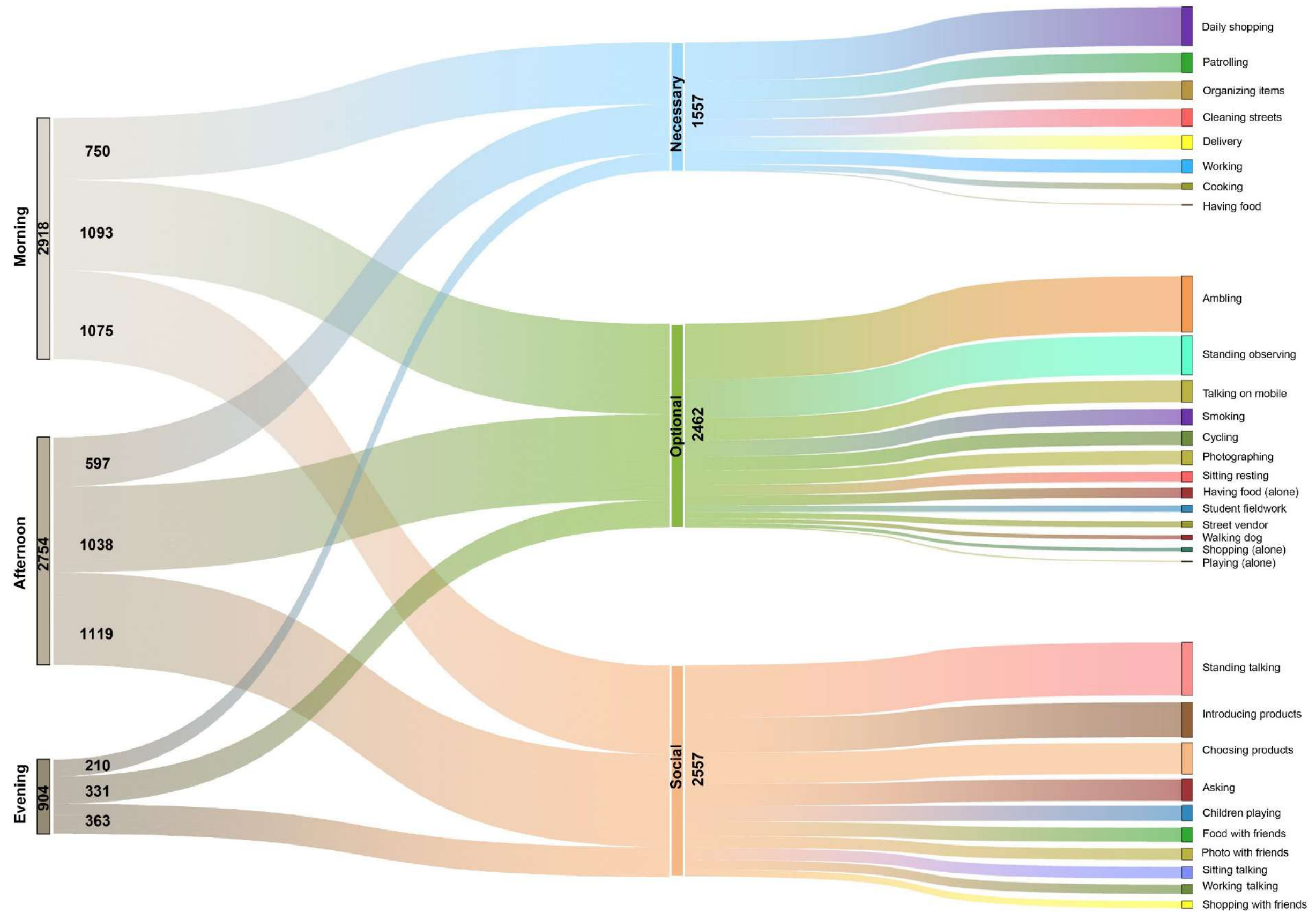


Figure 111 Different time periods of activities that took place: *When (+ What)*

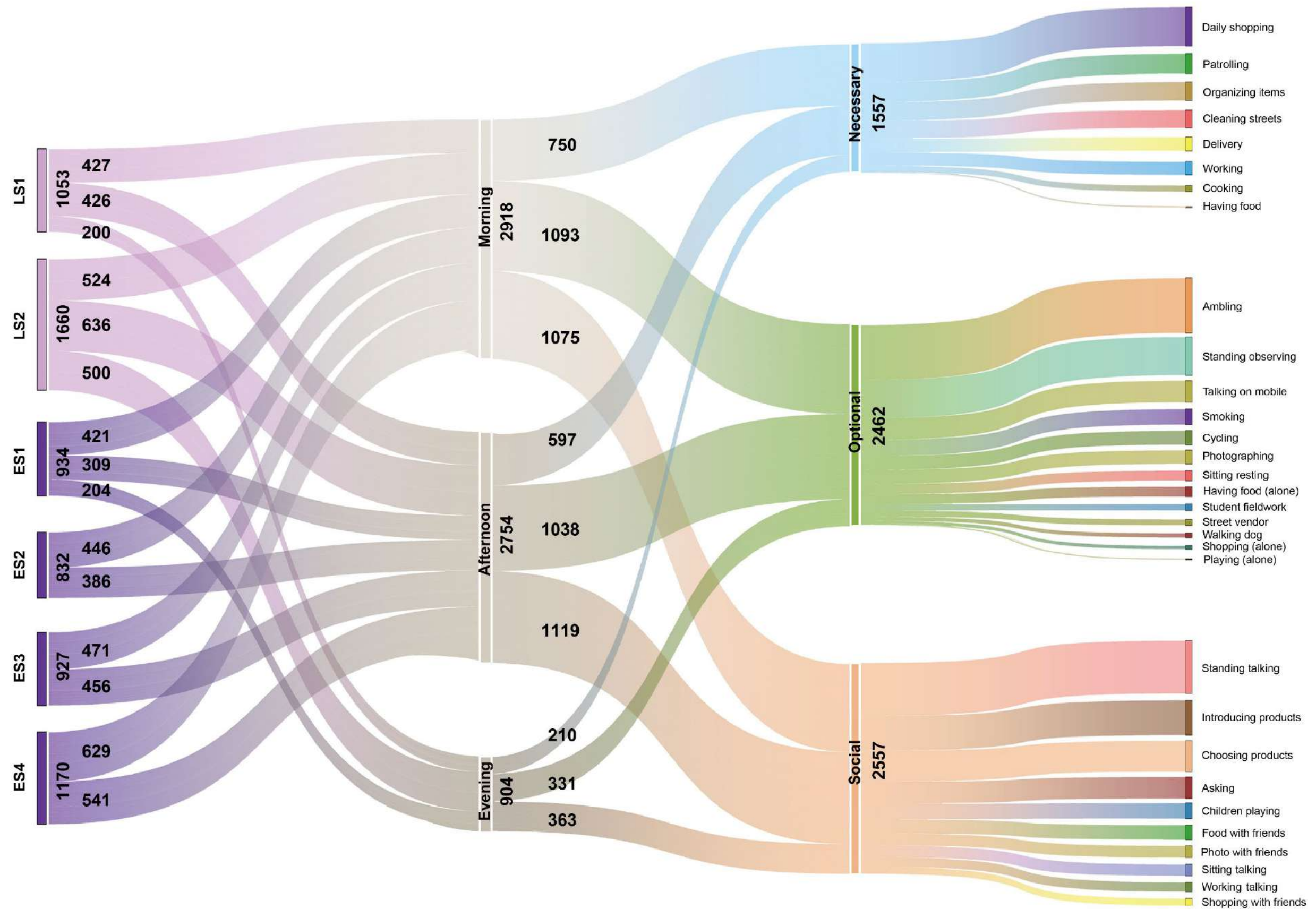


Figure 112 Activities took place of each street: *Where (+ When + What)*

Findings discussion – What / When / Where activities take place within the study streets?

Prior to delving into the relationship between activity tasks and socio-spatial attributes, it is beneficial to investigate *What* and *When* activities took place, and how these activities are distributed at different streets (*Where*), and the variations between them. In Figure 110, *What* activities took place, it can be easily noticed that *optional* (n=2462) and *social* (n=2557) activities prevail the most activity engagement, with necessary activity (n=1557) being relatively less than those two. This can be attributed to the fact that optional and social tasks generally encourage higher levels of interaction for street inhabitants, whilst reflecting the quality of street edge environment. A noteworthy example is the dominance of *Ambling* (orange) (n=676) as an optional activity, and *Standing talking* (coral) (n=642) as a social activity, which are the primary activities across six street edges. Moreover, these two activities have less mandatory, and greatly dependent upon street users' intention. This can be noticed through the presence of activities like *standing observing* (sapphire) (n=473) and *choosing products* (golden) (n=377). This variety of behaviors associated with optional and social tasks sets them apart from necessary activities. This insight aligns with the ideas proposed by Gehl (2010), who emphasised that a higher quality environment is more conducive to engaging people.

Necessary activity tends to be more routine and repetitive due to their inherent nature in everyday rhythm. Although it may not offer the same diversity as optional and social activities, it still serves as an essential role in daily life of street inhabitants. *Daily shopping* (purple) (n=468) is notably prominent, reflecting the street's functional role. This prevalence is particularly evident among groups like shopkeepers and local residents, who have explicit intentions and purposes. Besides street type, optional and social activities have less mandatory, and mainly dependent upon street users' intention. This explains why necessary activities are comparatively less than optional and social tasks. These activity classifications, drawn from Gehl's work (1987),

empirically validating how activity tasks were influenced by street quality and users' requirements and needs. From nuanced behavior perspective, it also provides new understandings to the street edge engagement. Despite variations within each activity category, it suggests that behaviors with fewer constraints might foster greater participation and activity diversity.

Figure 111, in combination with the activity engagement (Figure 110), demonstrates how activities are distributed across different time periods and groups (**When**). It is evident that the morning (n=2918) and afternoon (n=2754) periods see the highest concentration of activities compared to the evening (n=904) across six street edges. The reason for this is segments in three streets (ES 2 / 3 / 4) closed at night, rendering them unable to undertake any behavior engagement. From the visualisation, the morning period particularly sees a significant prevalence of necessary activity, surpassing both the afternoon and evening periods. This is likely influenced by the behavior habits of local inhabitants who tend to visit these streets in the morning. The obvious example is the prominence of *daily shopping* (purple) (n=468) in the morning period. Additionally, many preparations carried out by segment owners occur early in the morning, significantly contributing to the generation of activities. This, in turn, bolsters the segment's identity and enhances lateral depth along the edge. This is reflected in behaviors like *working* (blue) (n=161) and *organising items* (brown) (n=222).

In both morning and afternoon periods, *optional* (n=1093) and *social* (n=1075) activities dominate in terms of quantity. This prevalence stems from the flexibility and versatility of these two groups, which encourage increased activity along street edges. Within the *optional* category, *ambling* (orange) (n=676) and *standing observing* (turquoise) (n=473) emerge as the most common behaviors throughout the day. The reason behind this is these activities can be easily carried out by pedestrians at any time, aligning with the potential for engaging with territorial segments. Likewise, this insight can be reflected upon *social* activity. Although there exists a huge variance in different periods, it is a noticeable emphasis upon the distribution of *standing talking* (coral)

across all day long. This behavior acts as a catalyst for enhanced social interaction along the street edge, contributing to a sense of place for street inhabitants (Thwaites et al., 2013), either fleeting or enduring (Mehta, 2013). A definable understanding of how behavior distribution along street edges varied depending upon different time period is, however, challenging to explore through these activity statistics. This is because of the interplay of temporality and behaviors, which cannot exist in isolation. Here again, this underscores the importance of considering the diverse needs of street users, as it significantly how and why they engage with street edges in response to socio-spatial attributes.

The last diagram focuses upon how different time periods and activity behaviors were distributed at specific street (**Where**), which acts as an integration of all factors (Figure 112). From an overall perspective, it is apparent that Leisure Streets witness a higher volume of activities compared to Everyday Streets. This discrepancy arises from a combination of factors, including both temporality and street type. Segments in leisure streets are open from morning until evening. On the contrary, for everyday streets, they show the temporality of interest, which the opening and closing of segments relate to the daily flows and often-regular rhythms. Moreover, it shows that *optional* and *social* groups constituted the majority of activity quantity across all study streets, particularly in Leisure Streets. This is greatly determined by recreational focus of these streets. Consequently, street users are more likely to develop a sense of belonging by engaging such *optional* and *social* behaviors. Therefore, all these activity tasks play a vital role in stimulating interaction with street edges.

Conversely, the predominant distribution of the *necessary* group is more concentrated upon Everyday Streets than Leisure Streets. This is attributed to the daily routines of street inhabitants. These streets cater to specific targeted groups who regularly repeat similar behaviors to meet their essential needs and requirements. Although the absence of well-designed physical affordances in Everyday Streets compared with Leisure Streets, the edge spaces are still used by street inhabitants for everyday social

interaction. The intention of inhabitants and varied activities they undertaken might be intertwined with street environment and settings.

Through visually juxtaposing and elucidating the distinct different thematic diagrams in relation to three activity groups, it becomes apparent that everyday activities are influenced not only by street types, but people's needs and preference. As a result, this understanding, which takes into account the *what*, *when* and *where* activities, is crucial. Each theme has the potential to reveal deeper insights into the extent to which edge spaces are engaged by different street users. Within the current investigation, this analysis provides an empirical grasp of different activity engagement along street edges. It is significant to note that the three activity groups across different themes are interconnected and overlap, making it challenging to completely separate them as independent existence. Through this, it paves the road to further explore complex socio-spatial attributes from a nuanced scale – street edge segments, which will be discussed in the following part.

6.2.2 Theme 2. 2 – Do the segments along street edges vary in engagement along their length?

Method

The approach taken is mixed-method approach, this includes video recording and onsite observation. Onsite observations supplemented with field notes (Part 2 Video recording and onsite observation; Chapter 5) were applied to record these three groups – *necessary*, *optional*, *social* – activities and their behavior distribution at different periods – *morning*, *afternoon* and *evening* (part of them – LS I / 2, and ES I). This method combined with viewing of video recordings to understand what activities took place, and which segment people engaged with. Pedestrian passing by without stopping along the street edges were not recorded. Thus, engagement duration was obtained through video recording. For instance, when someone shopping on street, it

would observe how long does it takes for this activity and then write down the duration (seconds) in spreadsheet. Within the current investigation, Geographic Information System (GIS) was adopted as the primary way to demonstrate activity distribution in line with streets / segments. Through this, behavior mappings were manifested through comparing various activity distribution, concentration and intensity. It presented a visually understanding of how people engage with street edges and segments in the Chinese urban village assessed. Subsequently, engagement duration could be made in the form of streamgraph which would reveal the variation and fluctuation of each segment and overall street edge extent. Meanwhile, SPSS was applied to fit Kruskal-Wallis test model to the data calculation.

Results

Over the following pages are presented –

Figure 113 – ***Overall*** Behavior mapping of **Leisure Street 1**

Figure 114 – ***Overall*** engagement duration of **Leisure Street 1**

Figure 115 – ***Overall*** Behavior mapping of **Leisure Street 2**

Figure 116 – ***Overall*** engagement duration of **Leisure Street 2**

Figure 117 – ***Overall*** Behavior mapping of **Everyday Street 1**

Figure 118 – ***Overall*** engagement duration of **Everyday Street 1**

Figure 119 – ***Overall*** Behavior mapping of **Everyday Street 2**

Figure 120 – ***Overall*** engagement duration of **Everyday Street 2**

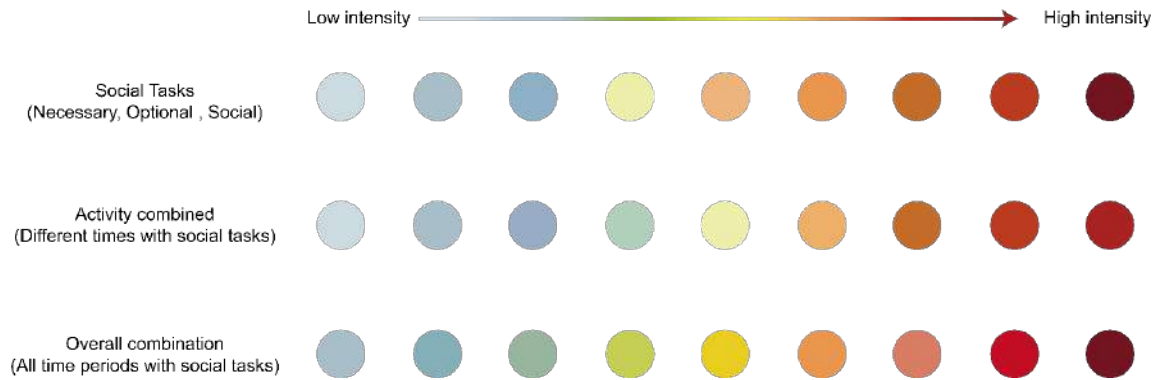
Figure 121 – ***Overall*** Behavior mapping of **Everyday Street 3**

Figure 122 – ***Overall*** engagement duration of **Everyday Street 3**

Figure 123 – **Overall** Behavior mapping of **Everyday Street 4**

Figure 124 – **Overall** engagement duration of **Everyday Street 4**

Legend





Leisure Street 1 - Overall activities combined heatmap
(Necessary / Optional / Social + Morning / Afternoon / Evening)

Figure 113 Overall behavior mapping of Leisure Street I

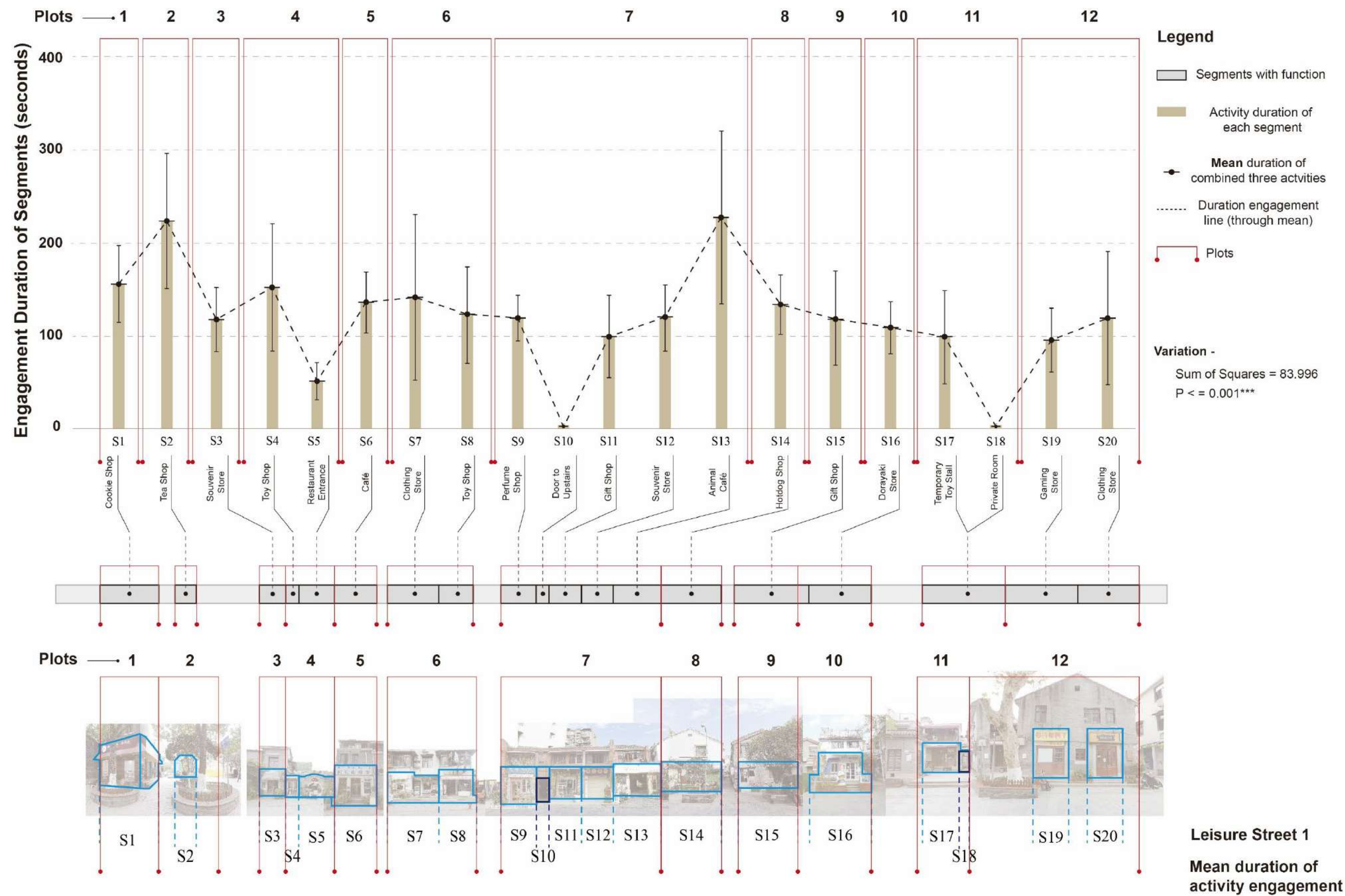


Figure 114 Overall engagement duration of Leisure Street I

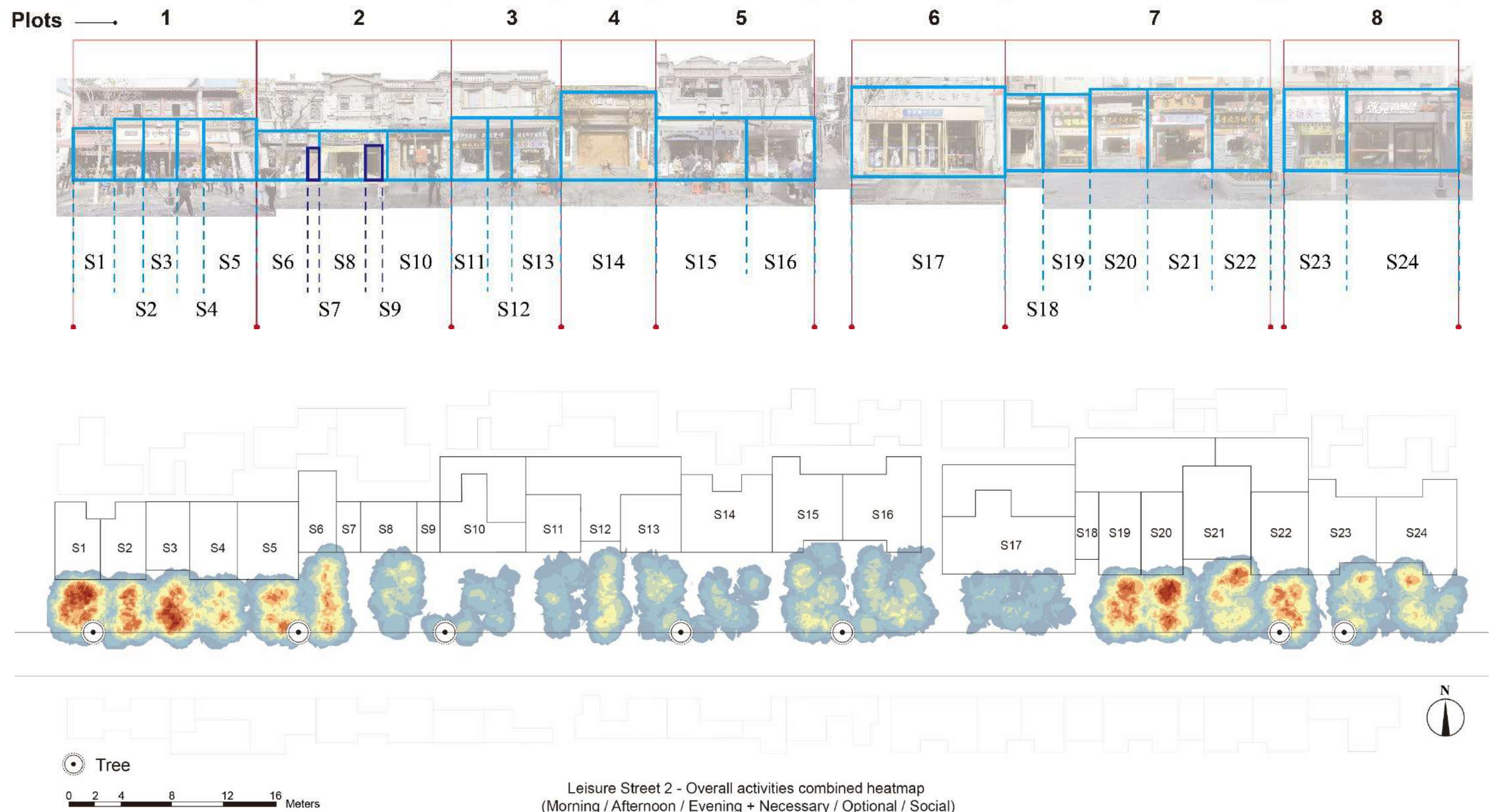


Figure 115 Overall behavior mapping of Leisure Street 2

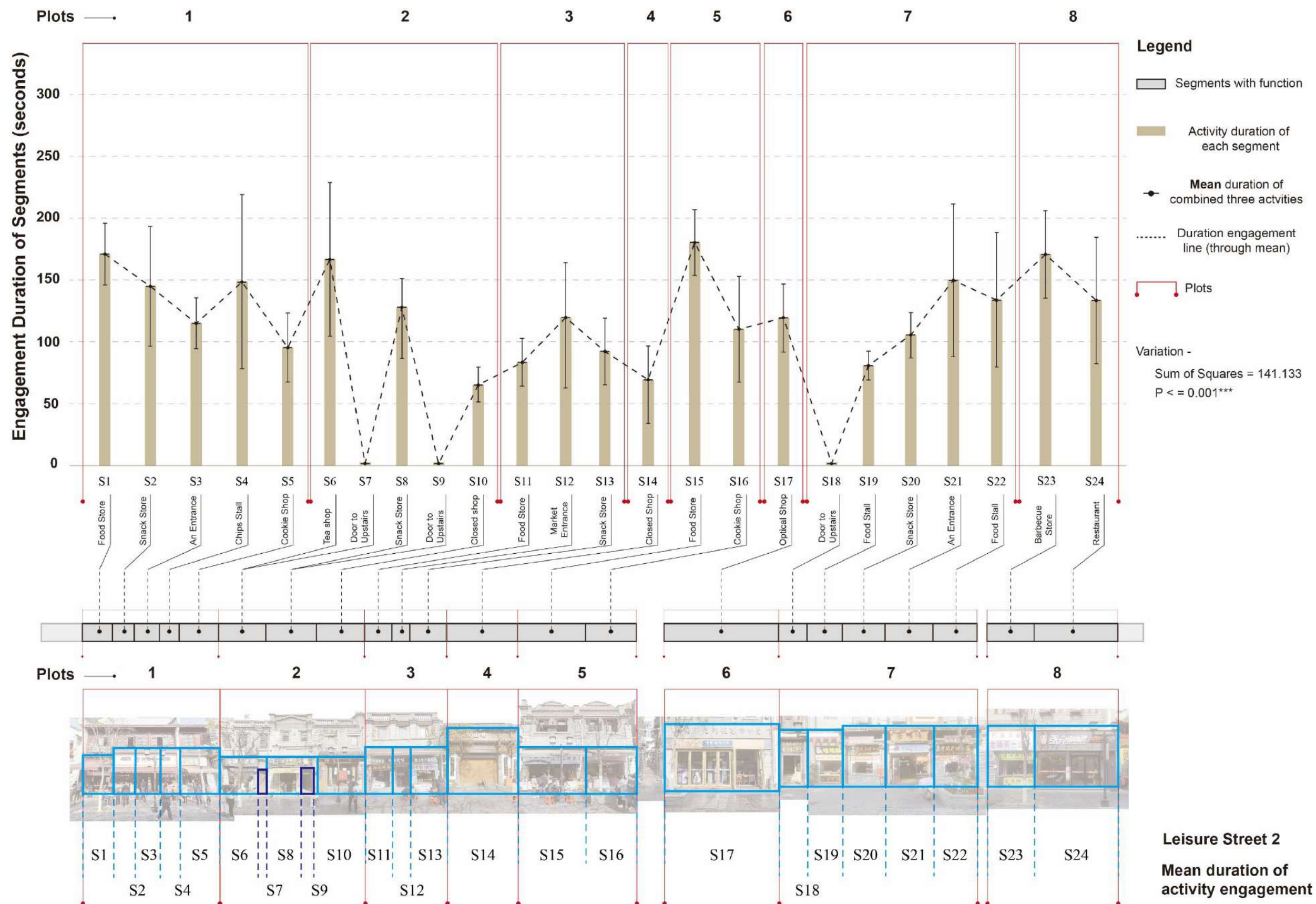


Figure 116 Overall engagement duration of Leisure Street 2

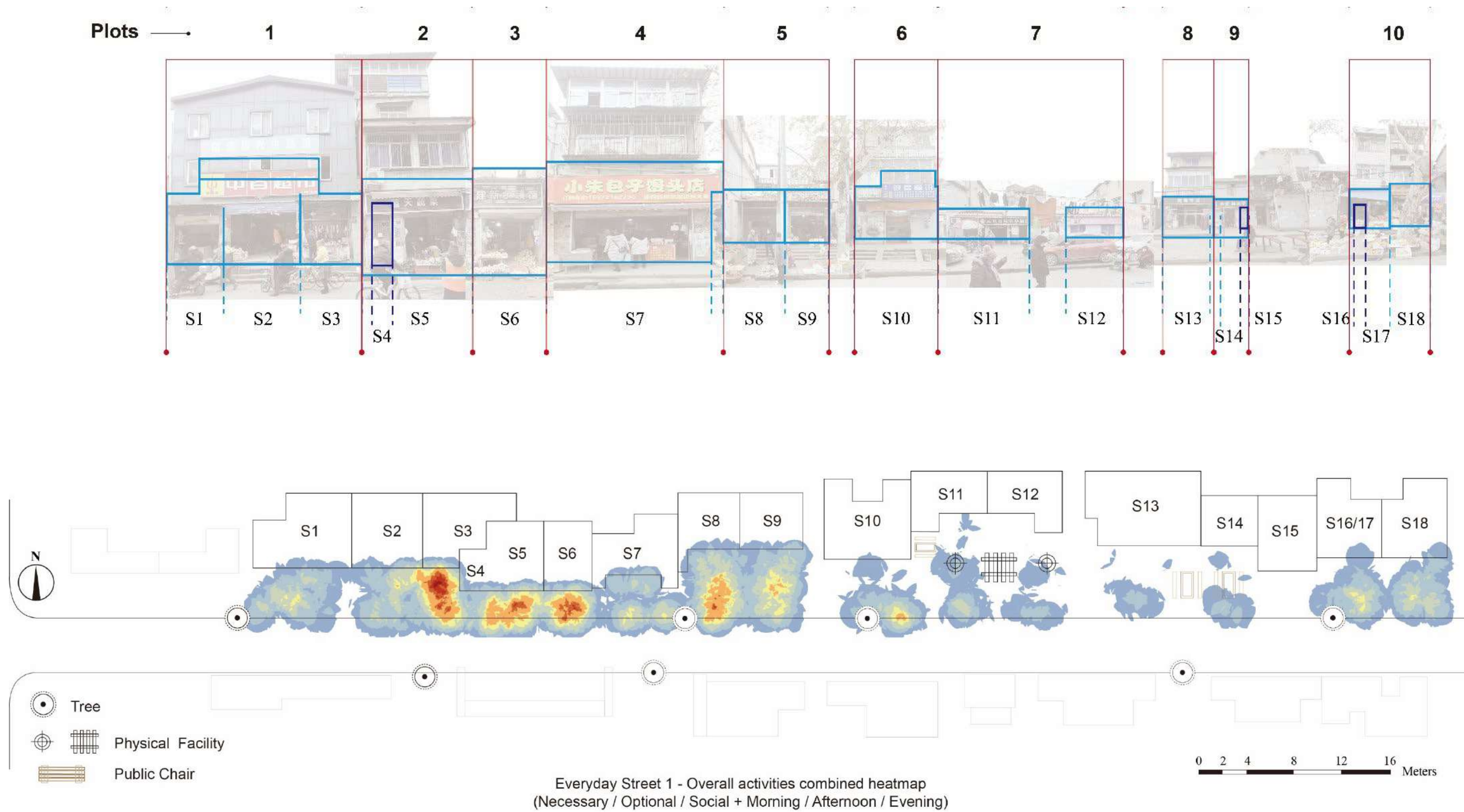


Figure 117 Overall behavior mapping of Everyday Street I

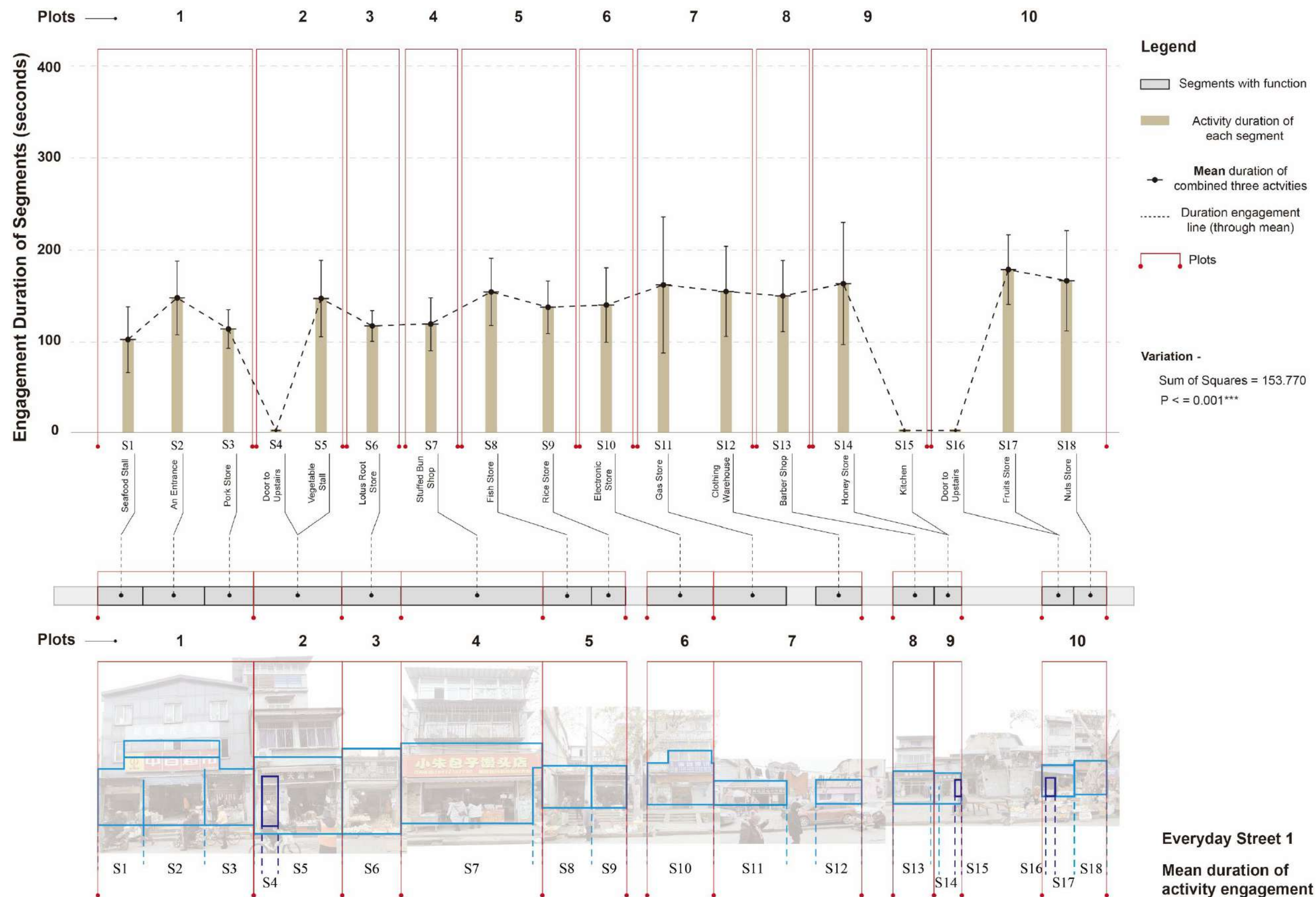


Figure 118 Overall engagement duration of Everyday Street I

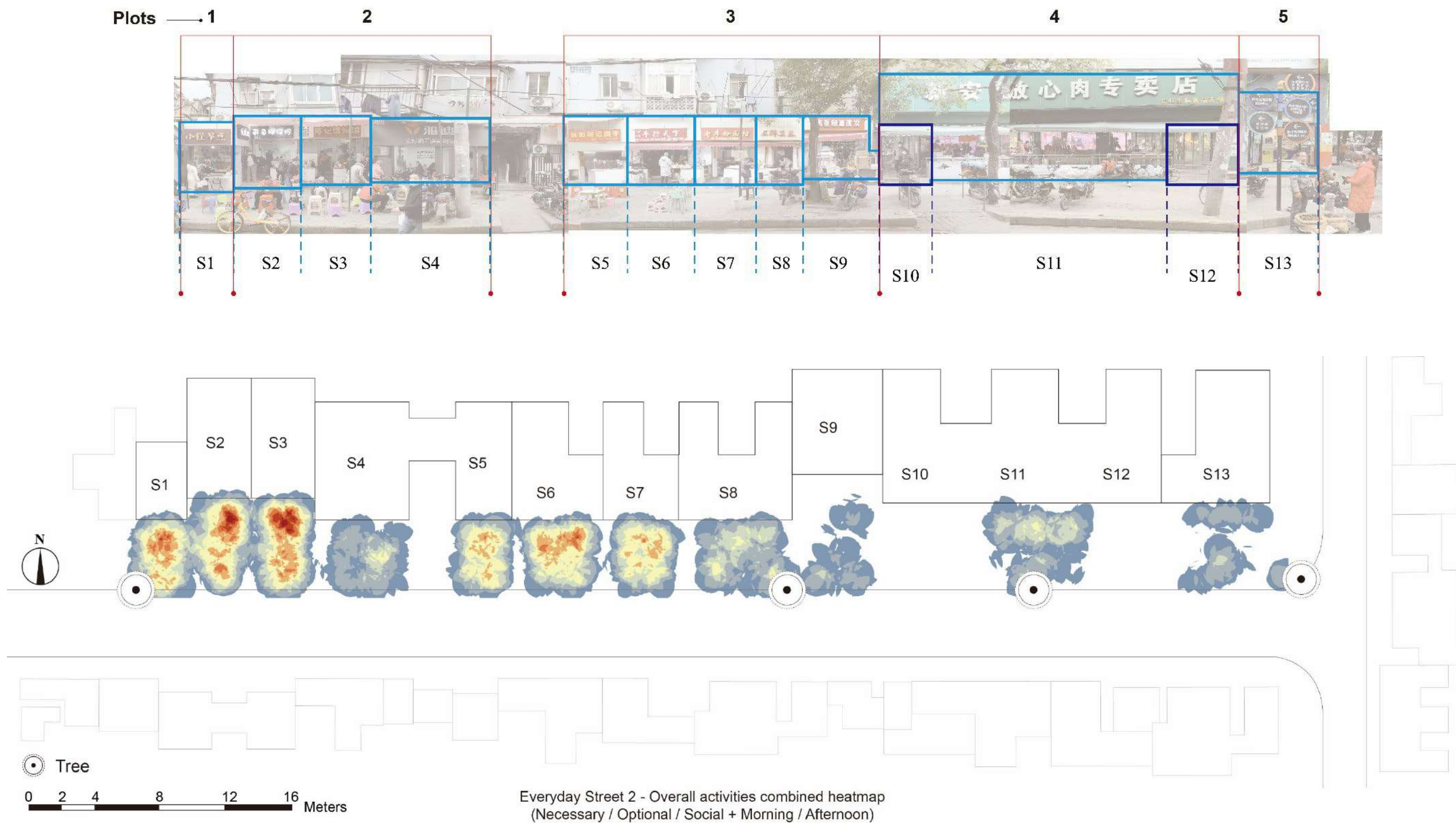


Figure 119 Overall behavior mapping of Everyday Street 2

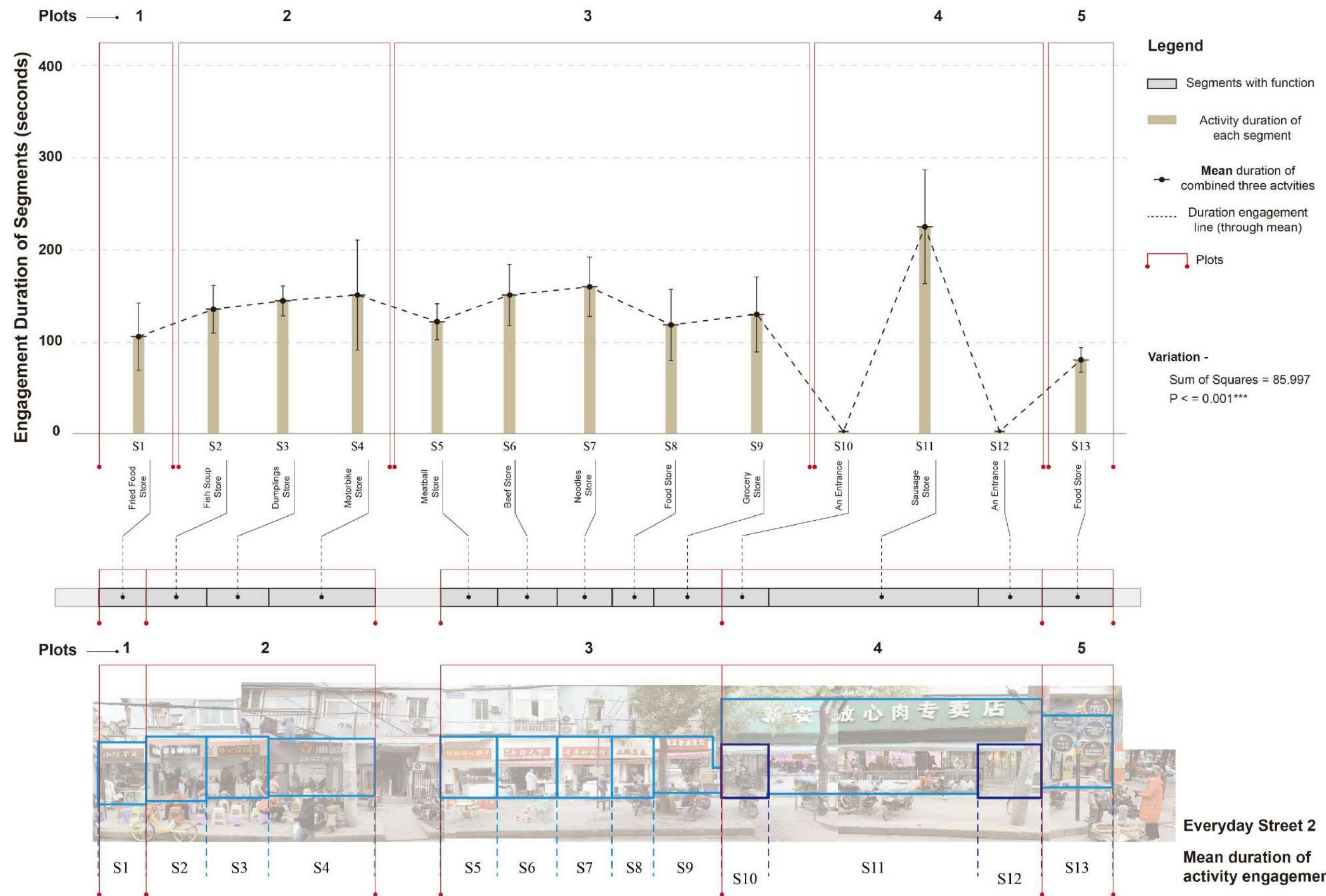
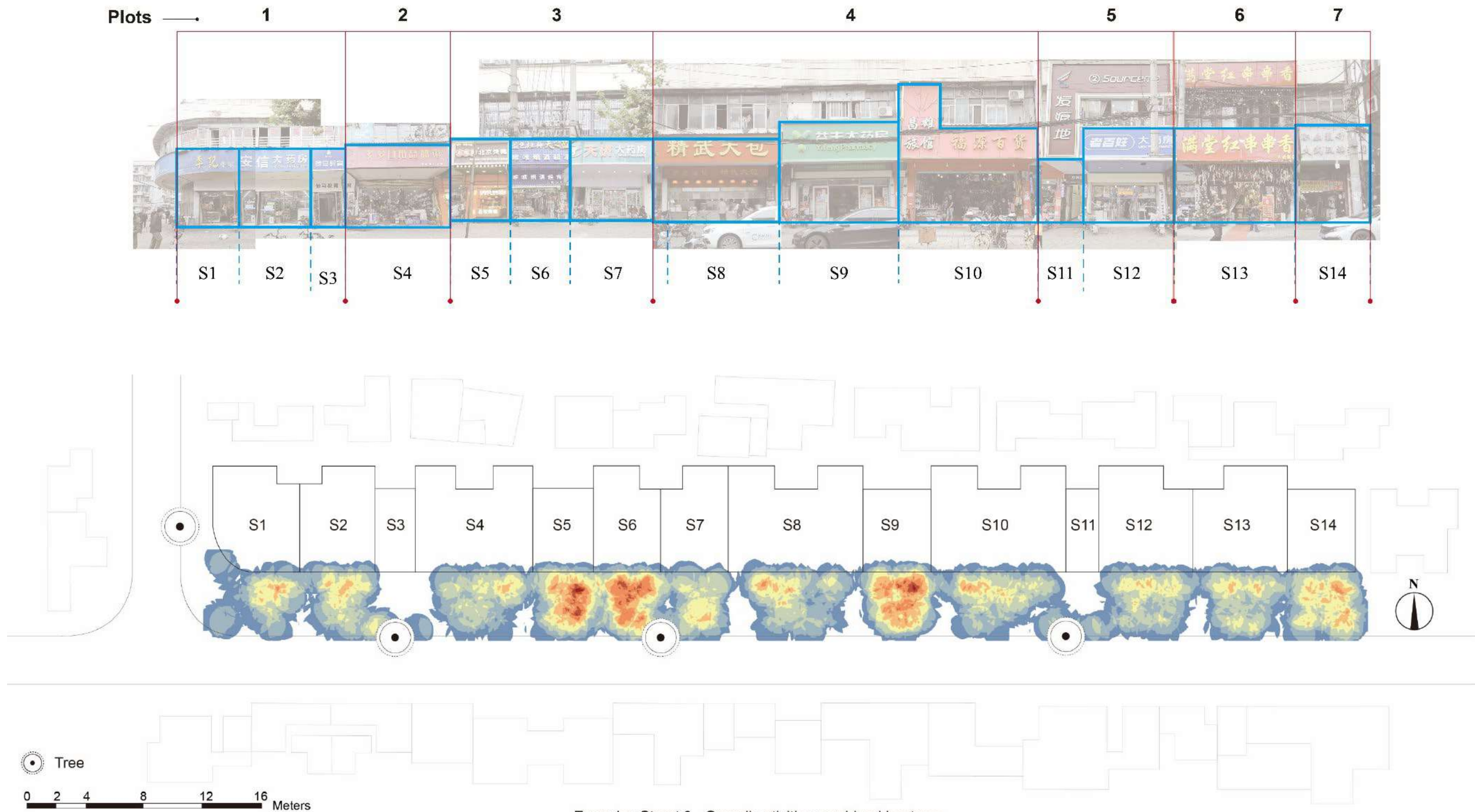


Figure 120 Overall engagement duration of Everyday Street 2



Everyday Street 3 - Overall activities combined heatmap
(Necessary / Optional / Social + Morning / Afternoon)

Figure 121 Overall behavior mapping of Everyday Street 3

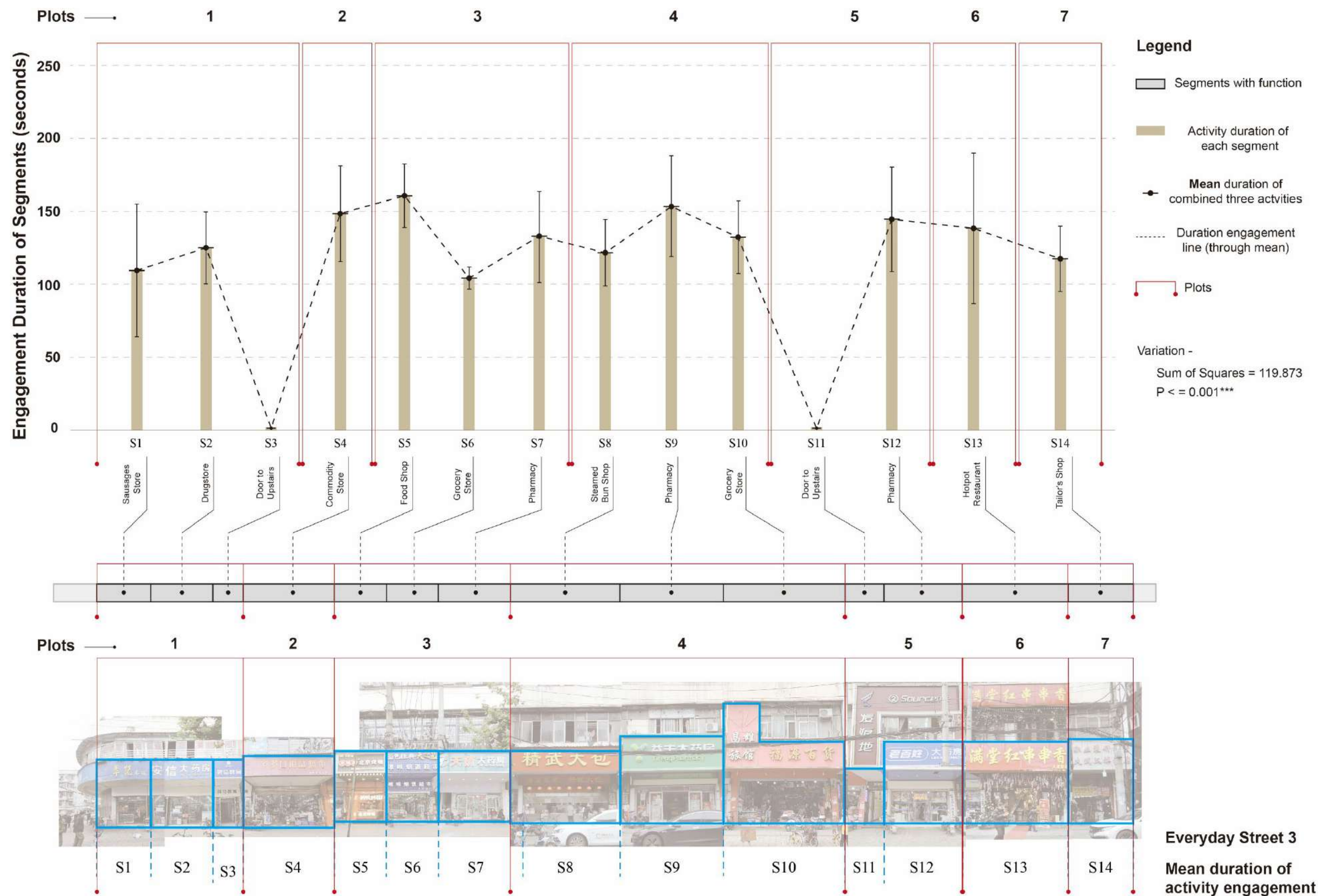
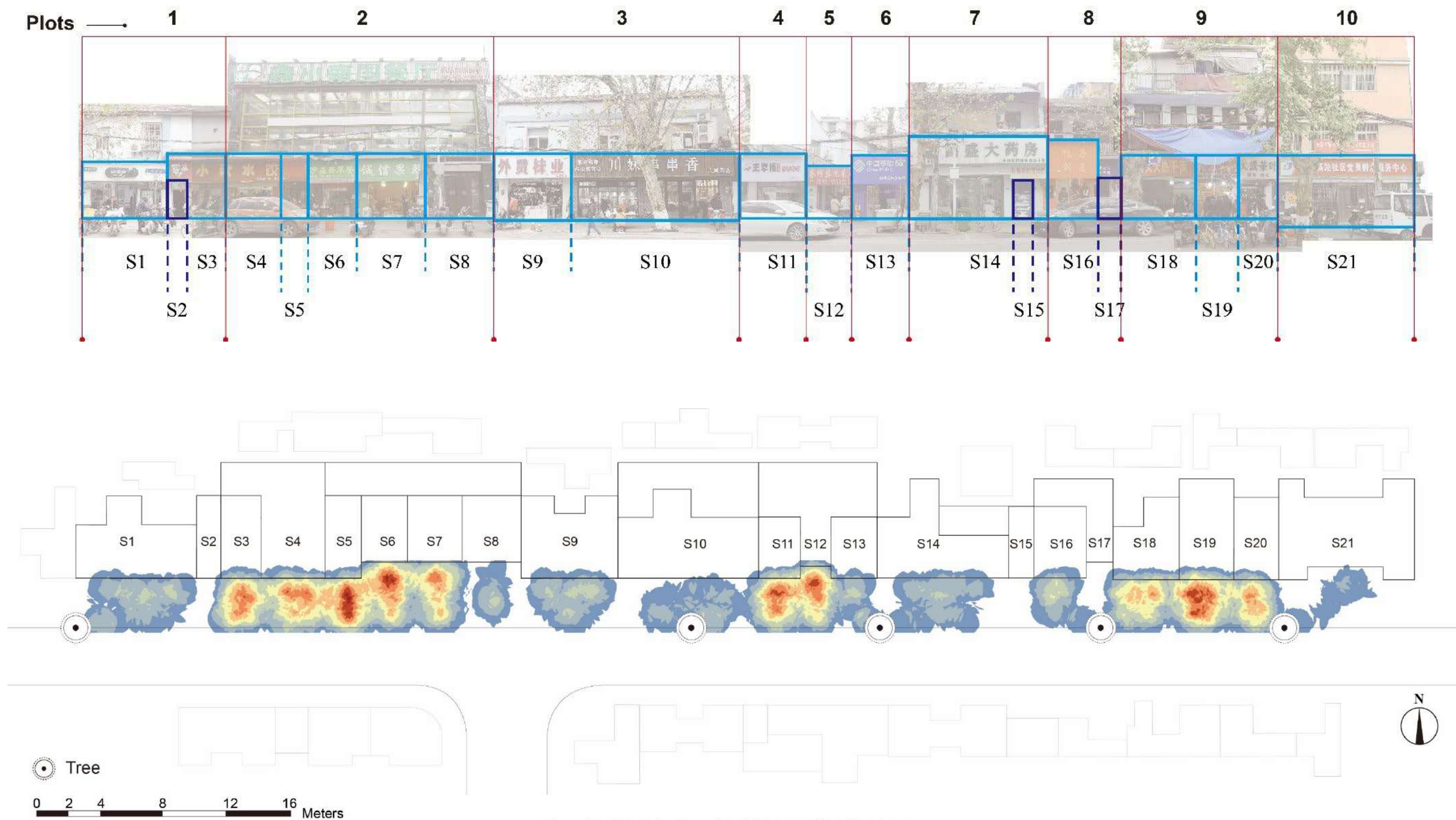


Figure 122 Overall engagement duration of Everyday Street 3



Everyday Street 4 - Overall activities combined heatmap
(Necessary / Optional / Social + Morning / Afternoon)

Figure 123 Overall behavior mapping of Everyday Street 4

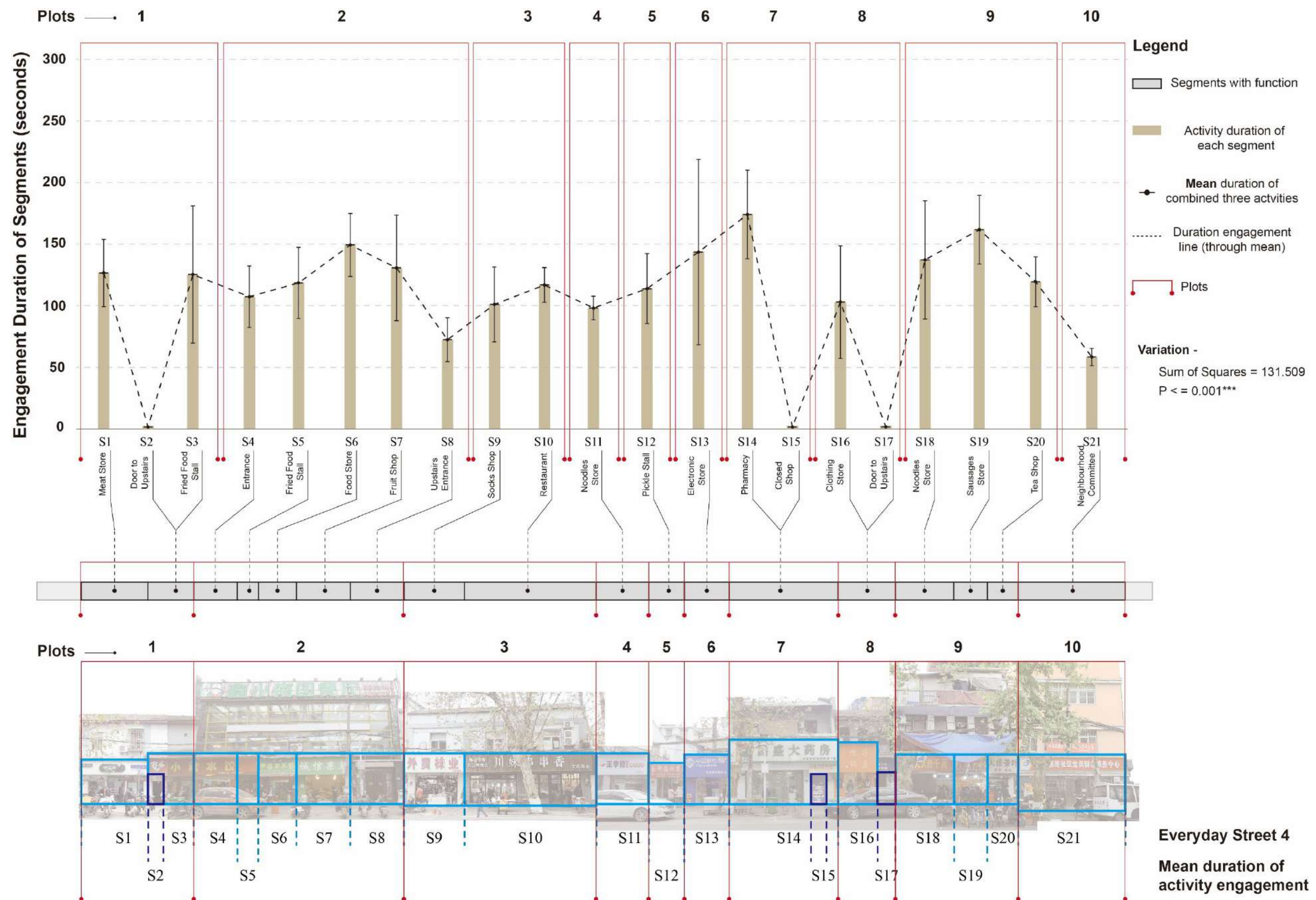


Figure 124 Overall engagement duration of Everyday Street 4

Findings discussion – Do the segments along the street edges vary in engagement along their length?

The behavior mappings, generated from video recordings and observations, provide tangible insight into the location and intensity of people's activities along the street edges and segments analysed. In terms of this, it is worth considering how activities vary at a holistic scale – along the overall extent of street edges. A detailed insight of this can be understood through the behavior mappings, which presented the different levels of engagement intensity – depicted by red area (high concentration) and light blue area (low concentration) – across each street edge. Obviously, substantial difference arise in how street residents inhabit and use segments within each street edge. These distributions, coupled with the duration of activities, underscore the significance of engagement, whilst projecting to the nature of localised flexibility and evolutionary change. They contribute to the conception of the edge not as a line without any density or intensity (Alexander et al., 1977), but regarded as a transitional area characterised by variations in patterns of engagement and territorial negotiation (Thwaites et al., 2020).

The behavior mappings reveal that while all segments along the street edges were accessible for street users, certain segments emerged as preferred gathering locations with higher concentration of diverse behaviors. For instance, there is a high engagement with Animal Café (segment 13) in Leisure Street I that pedestrian spent more time on it (Figure 113 and Figure 114), as well as Food Store (segment 5) in Everyday Street 3 (Figure 121 and Figure 122). It evidences the ideas forwarded by Dovey (2015; 2017), Hassan *et al.* (2019), and Simpson *et al.* (2022), emphasising the significant impact of ground-floor interfaces and territorial segments upon pedestrian engagement. Based upon this thinking, the understandings help validate the notion that street edges act as a socio-spatial assemblage (Dovey, 2010; Thwaites et al., 2020), rather than an entity that exists purely spatially. These urban scholars, through

their research, have laid the foundations for the socio-spatial ideas forwarded to socially responsive street edge establishment. As a result, the current part is built upon the ideas that people's activity is not equally distributed throughout the overall street edge, but towards a nuanced scale – segments of focused locality. It also illuminates how pedestrians distribute habitation across different segments along the edges, manifested through the expression of engagement density. This, in turn, reflects the relationship between street user activities and environment that encourages engagement in-line with the specifics of their activities. Consequently, it suggests that people's engagement is not only linked with the functionalities offered by the street, but also intricately related to localised expression and lateral depth of edge space.

Beyond the extent and locality aspects discussed above is the way that mappings demonstrate how activity engagement along street edges varies in the lateral structure. Noticeably, it is challenging to regard these transitional edge attributes as completely independent feature; instead, they emerge from interconnectivity, reflecting the socio-spatial nature of transitional edges. They did not pre-exist being-in-the-world waiting to be fulfilled (DeLanda 2006). Considering this, a comprehension can be acquired through viewing the mappings. It reveals that territorial segments with high concentration usually have spatial depth, facilitating social encounters along the street edges. One of the most prominent examples is the Segment 1-5 (food stalls) in Leisure Street 2 (Figure 115). This depth is regularly associated with material forms and physical affordances. The lateral intensity, significantly, is expressed through semi-public / -private realms, manifesting spatial expansion or hide and reveal attributes (Thwaites et al., 2020). On the contrary, segments with less concentration lack such characteristics to attract pedestrian habitation. Consequently, social vitality of street edges is closely connected with laterality, which, in turn, projects to the overall extent. This, again, testified to the idea that street edge is an assemblage displayed through localised structures and lateral structure. As such, all these qualities working together might generate profound influence upon how edge space can be socially engaged.

During the analysis conducted, there emerges an opportunity to reevaluate the profound relationship between people's everyday activities and street edges. Behavior mappings not only exhibit varying degrees of habitation, but have demonstrated how activity tasks interact with the intricate transitional edge conditions – extent, localised, and laterality, which have detailed in Chapter 3. This shifts the emphasis away from superficially isolated linear pattern, towards a nuanced scale – territorial segment – nestled in the ground floor interface. Beyond this, such mappings also add new understanding of street edge engagement in relation to socio-spatial dimension, whilst laying the foundation for the following Theme 2. 3, which delves into the engagement duration of each activity task at nuanced segment scale.

6.2.3 Theme 2. 3 – Does activity type (necessary, optional, social) affect engagement with segments along street edges?

Method

The approach taken is mixed-method approach, this includes video recording and onsite observation. Similar to Theme 2. 2, Geographic Information System (GIS) was employed as the primary way to demonstrate distribution of three activities – necessary, optional and social along the street edges (Part 2 Video recording and onsite observation; Chapter 5). This method seeks to visualise what activities took place, and which segment people engaged with. Through this, such detailed behavior mappings of three activities in each segment across six street edges were graphically manifested, the resultant mappings were manifested through comparing activity distribution, concentration and intensity. It presented a visually understanding of how pedestrian engage with street edges in the Chinese urban village context analysed. According to the recording and observation, the mean duration of each activity in every segment can be acquired and coded, and mean value of combined three activity duration was computed as well. In doing so, the standard deviation of each activity task was

calculated to interpret their variations within and across whole street segments. Meanwhile, SPSS was applied to fit Kruskal-Wallis test model to the data calculation.

Results

Over the following pages are presented –

Figure 125 – Behavior mapping of three activities in **Leisure Street I**

Figure 126 – Engagement duration of three activities in **Leisure Street I**

Figure 127 – Behavior mapping of three activities in **Leisure Street 2**

Figure 128 – Engagement duration of three activities in **Leisure Street 2**

Figure 129 – Behavior mapping of three activities in **Everyday Street I**

Figure 130 – Engagement duration of three activities in **Everyday Street I**

Figure 131– Behavior mapping of three activities in **Everyday Street 2**

Figure 132 – Engagement duration of three activities in **Everyday Street 2**

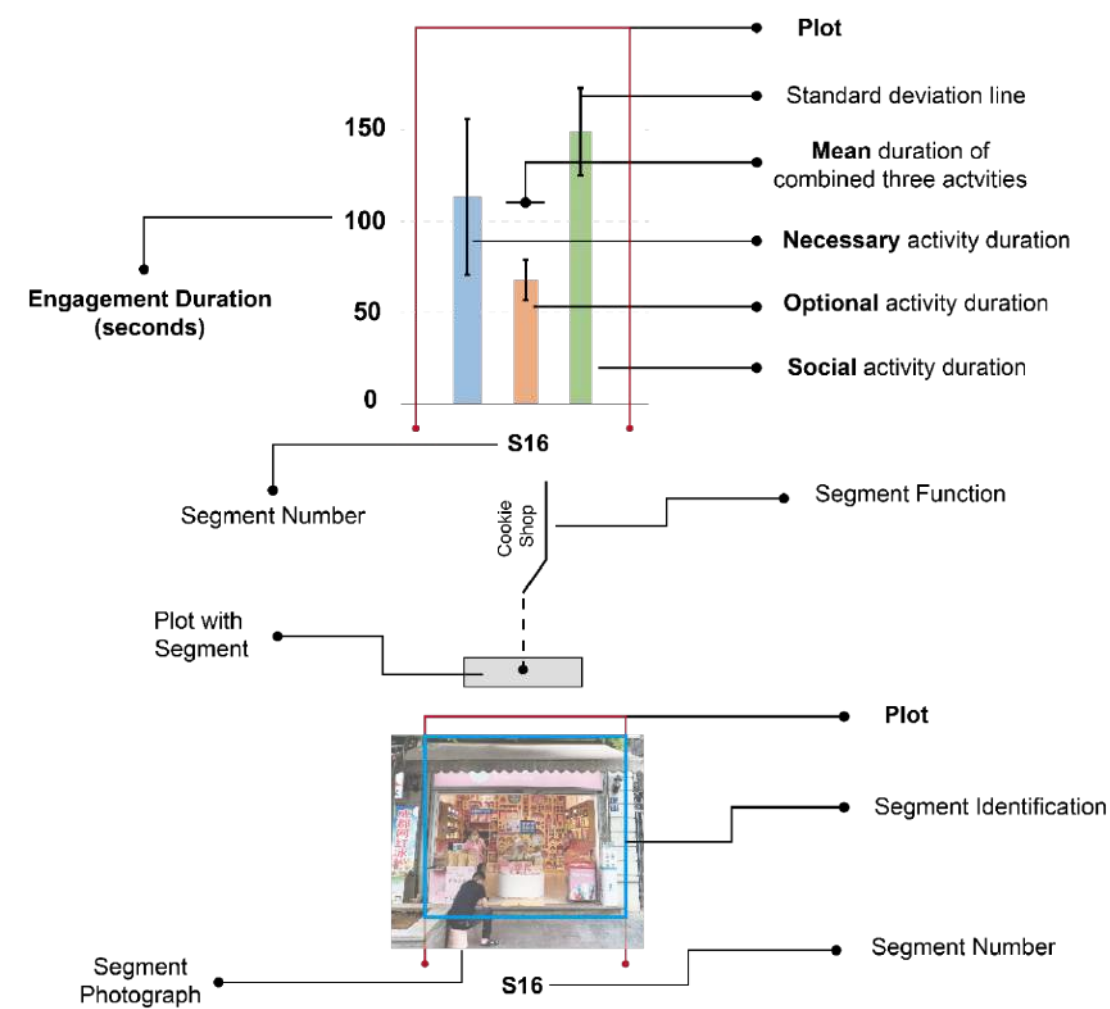
Figure 133 – Behavior mapping of three activities in **Everyday Street 3**

Figure 134 – Engagement duration of three activities in **Everyday Street 3**

Figure 135 – Behavior mapping of three activities in **Everyday Street 4**

Figure 136 – Engagement duration of three activities in **Everyday Street 4**

Legend



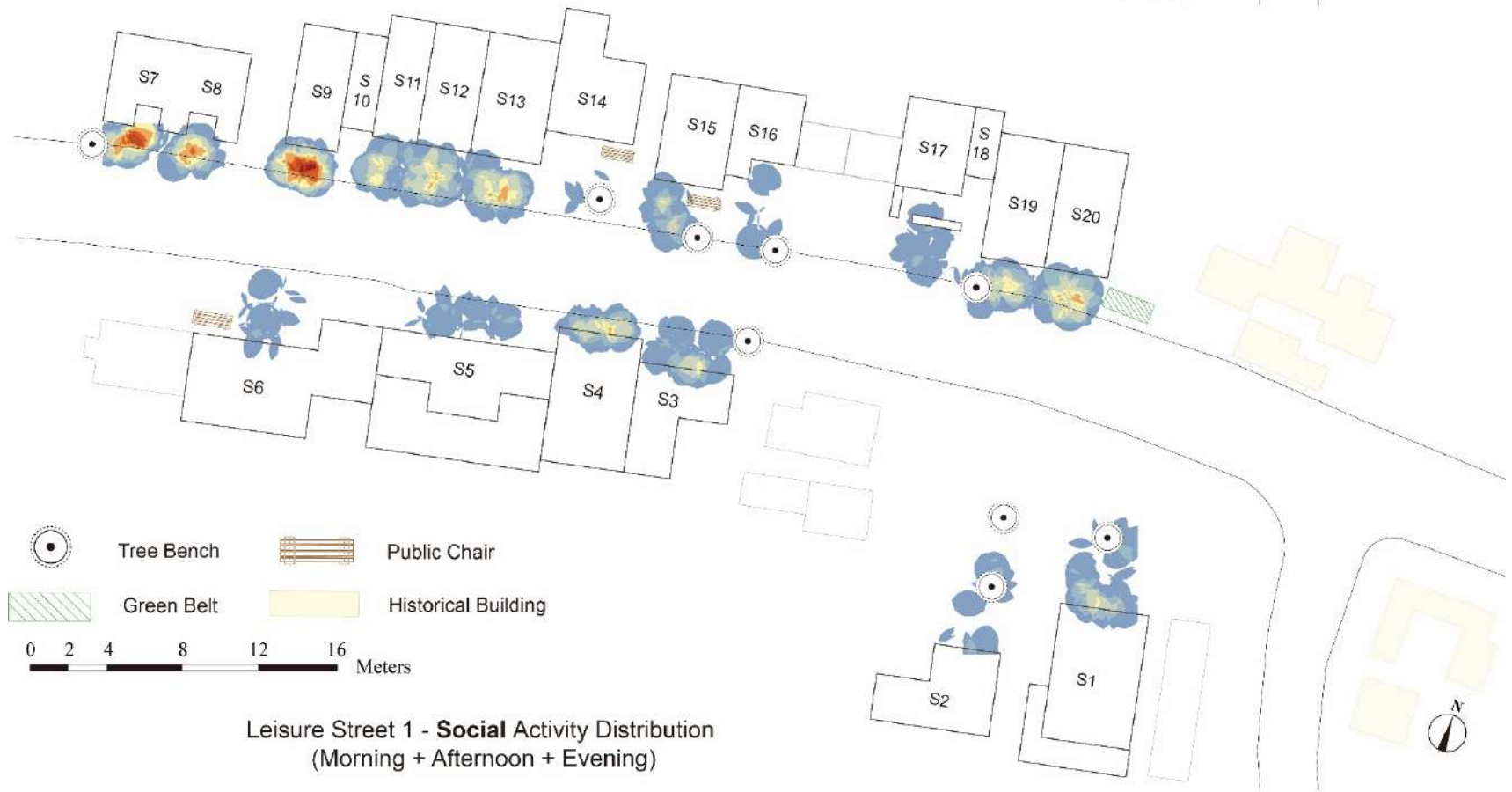


Figure 125 Behavior mapping of three activities in Leisure Street I

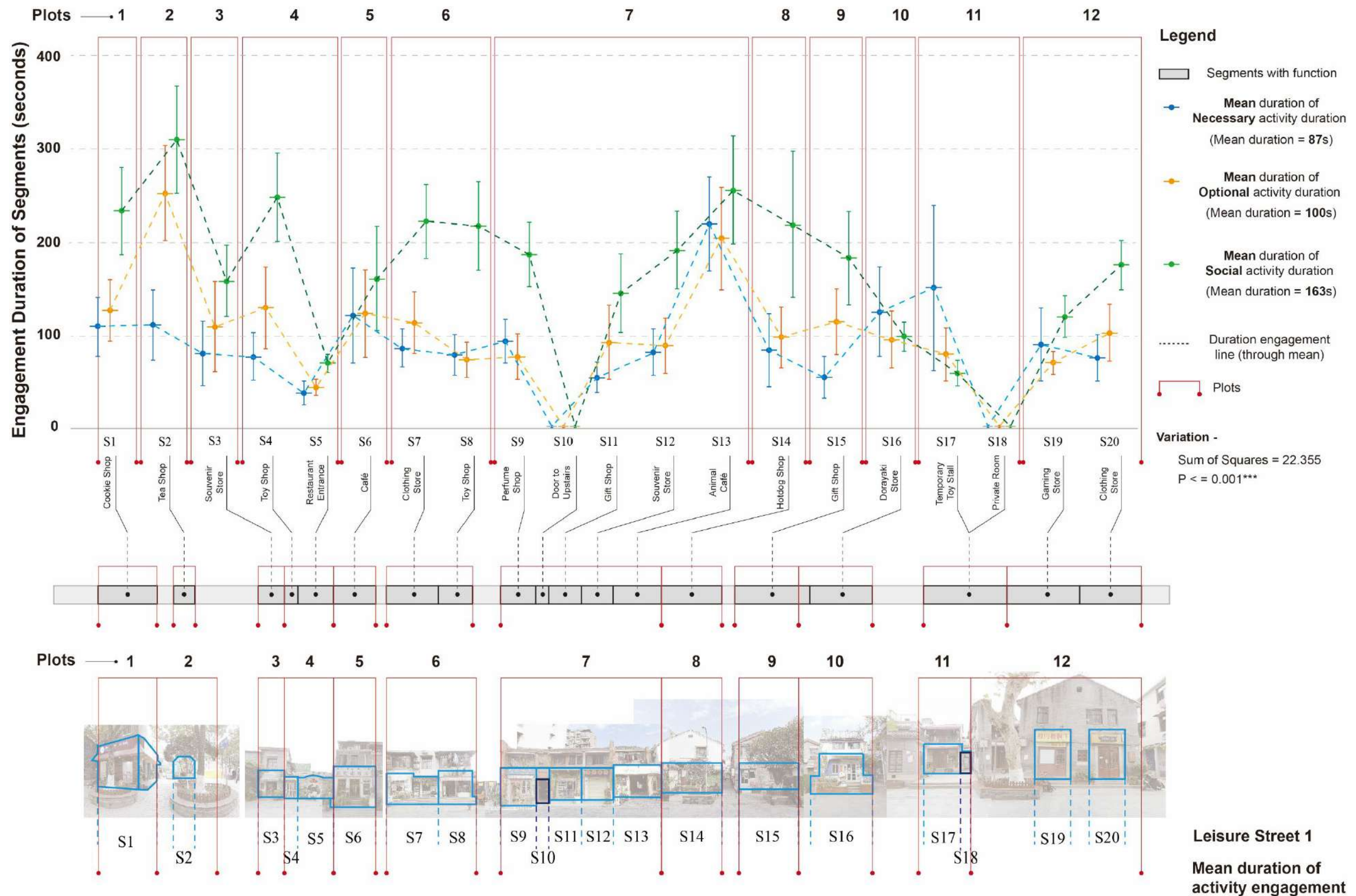
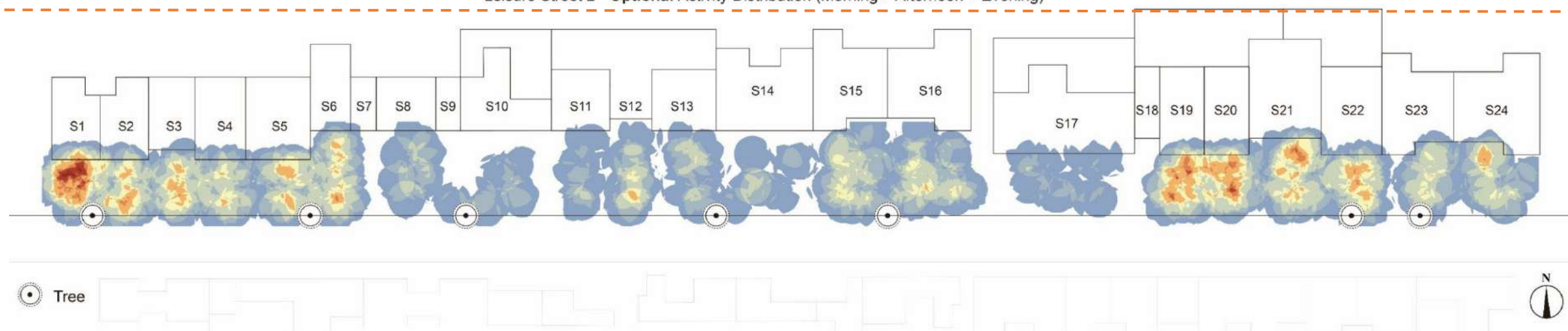
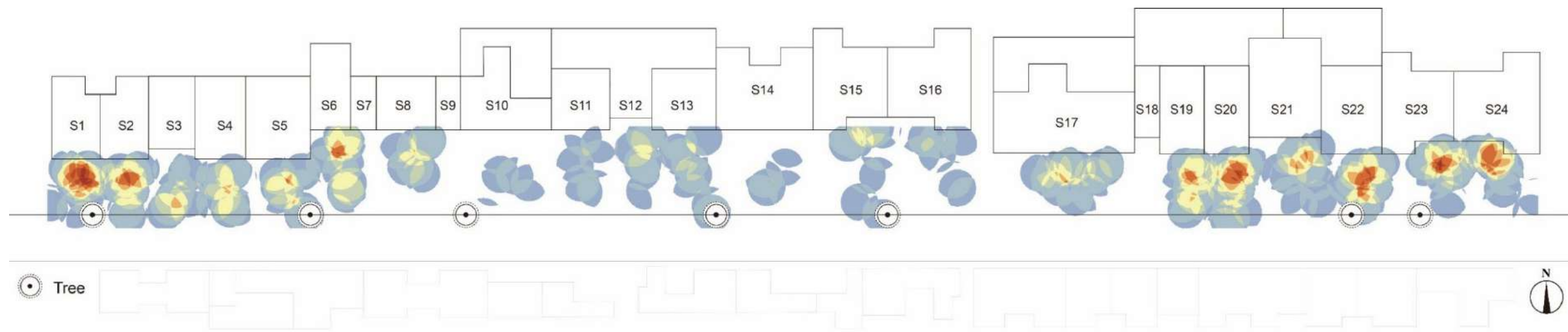


Figure 126 Engagement duration of three activities in Leisue Street I



0 2 4 8 12 16 Meters

Figure 127 Behavior mapping of three activities in Leisure Street 2

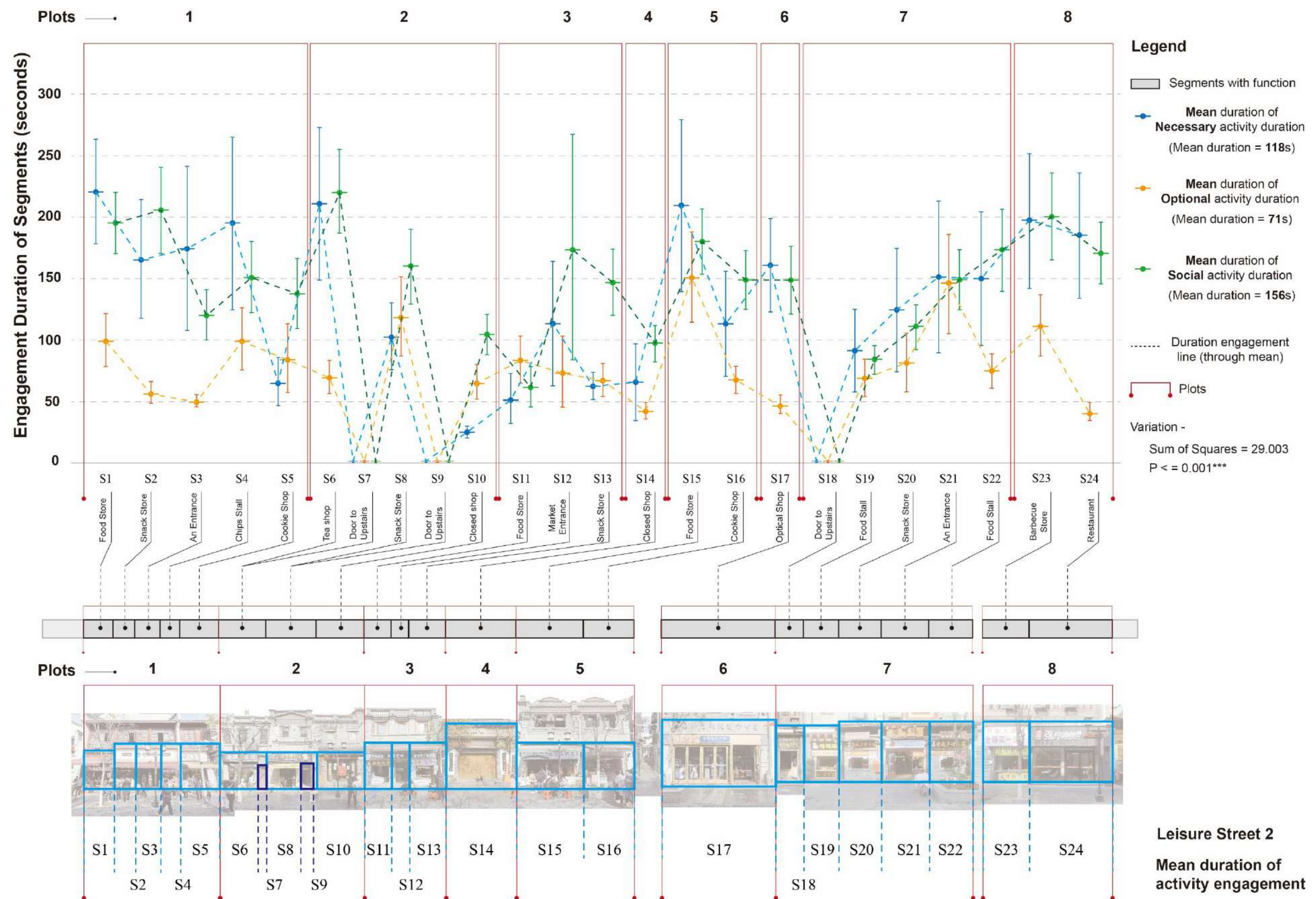


Figure 128 Engagement duration of three activities in Leisure Street 2



Figure 129 Behavior mapping of three activities in Everyday Street I

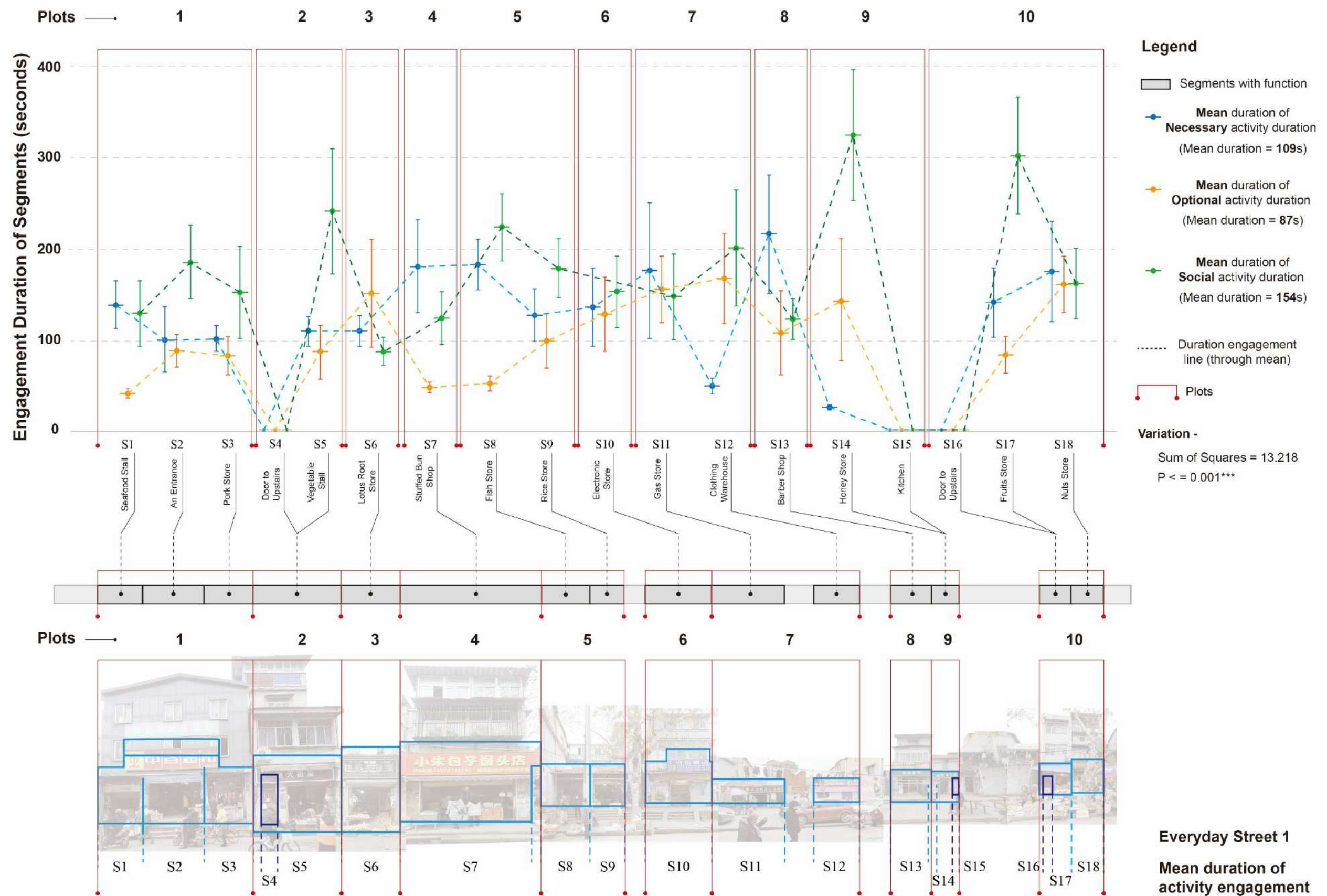
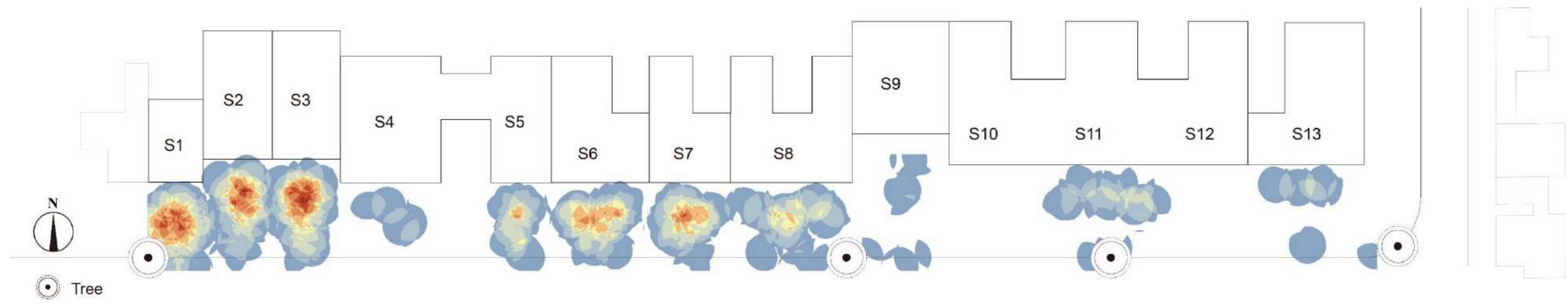
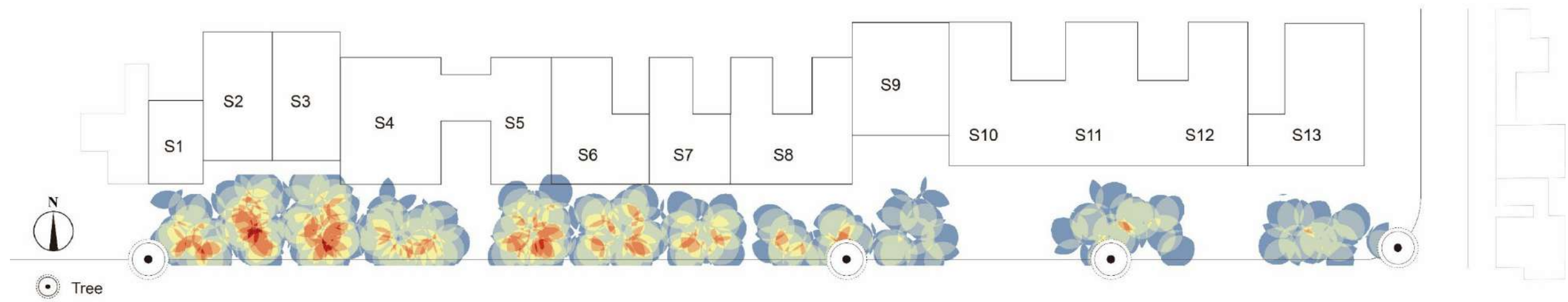


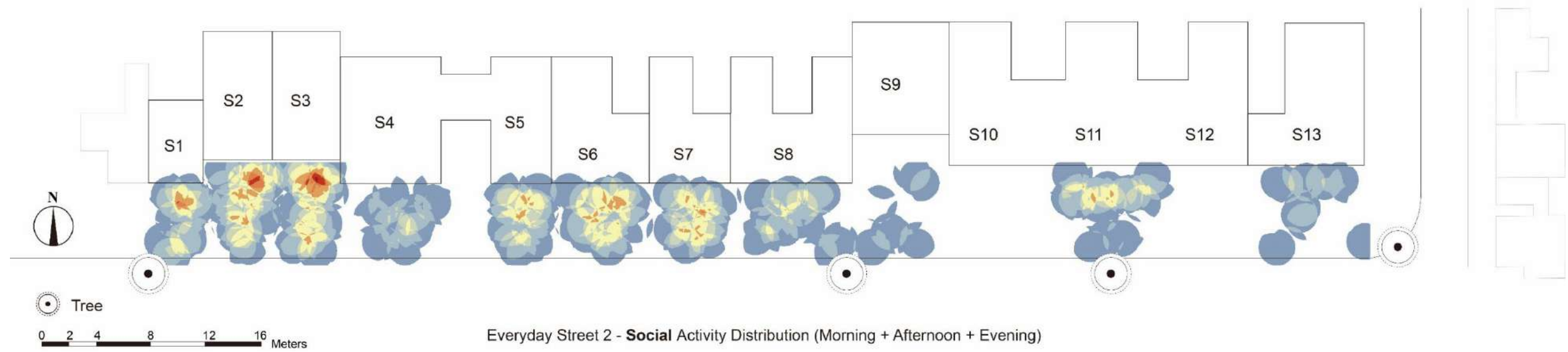
Figure 130 Engagement duration of three activities in Everyday Street I



Everyday Street 2 - **Necessary** Activity Distribution (Morning + Afternoon + Evening)



Everyday Street 2 - **Optional** Activity Distribution (Morning + Afternoon + Evening)



Everyday Street 2 - **Social** Activity Distribution (Morning + Afternoon + Evening)

Figure 131 Behavior mapping of three activities in Everyday Street 2

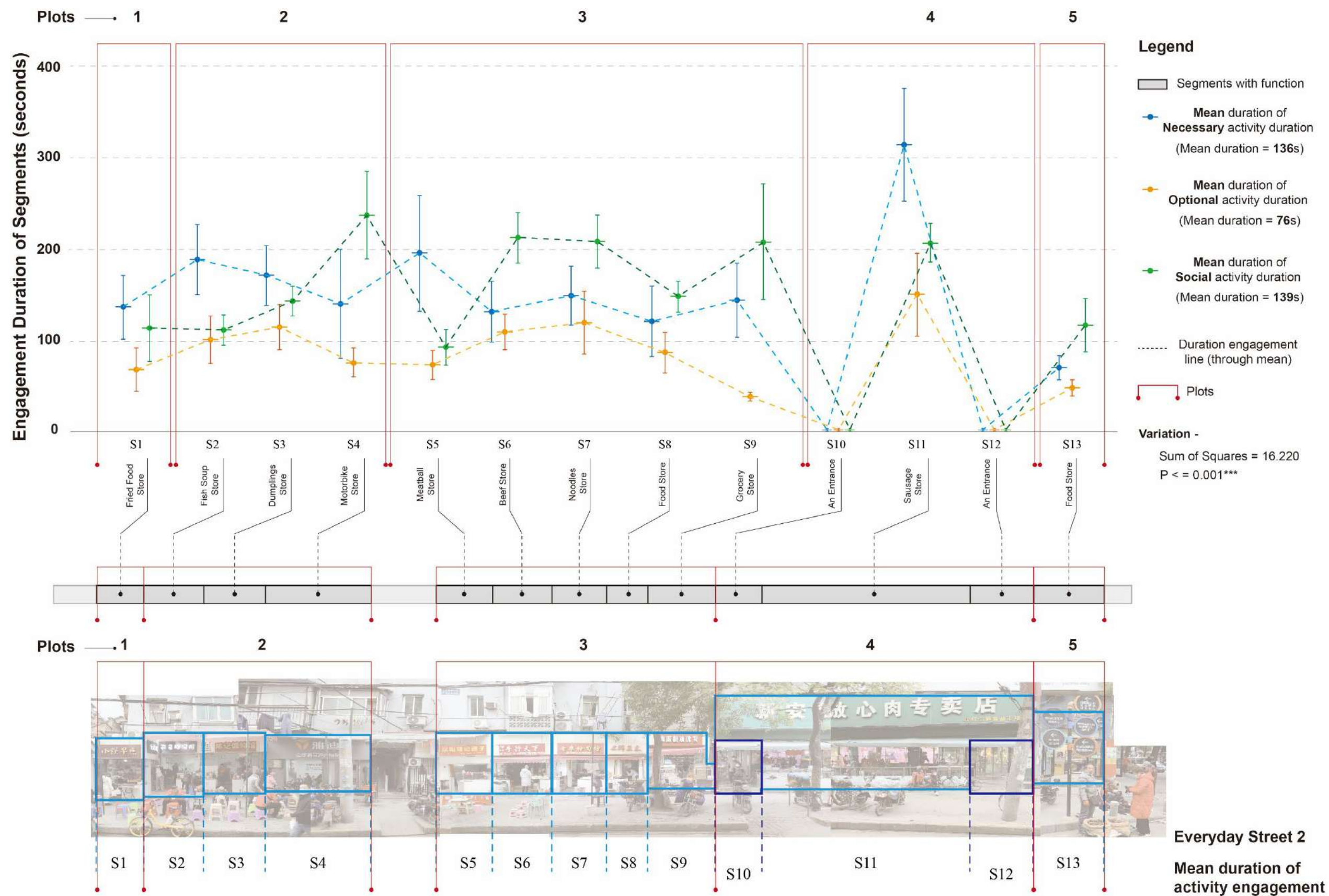
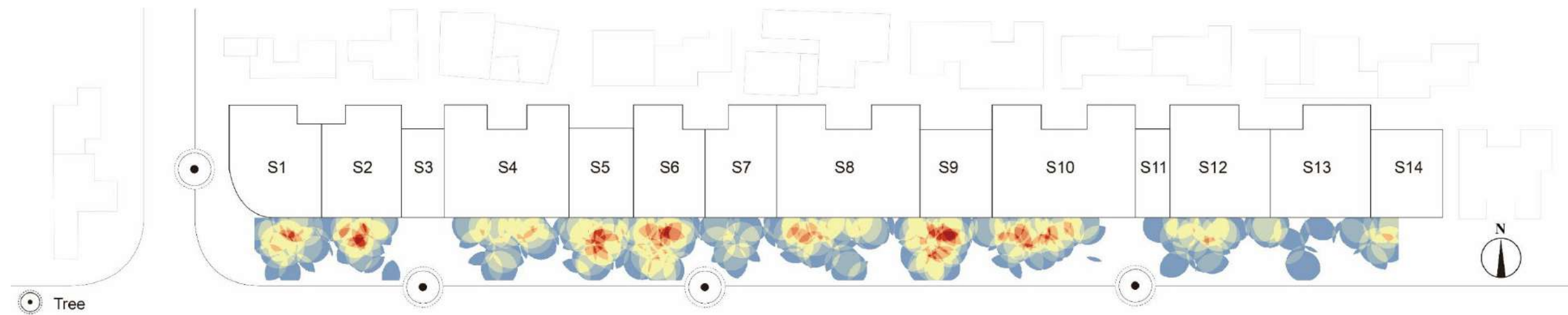


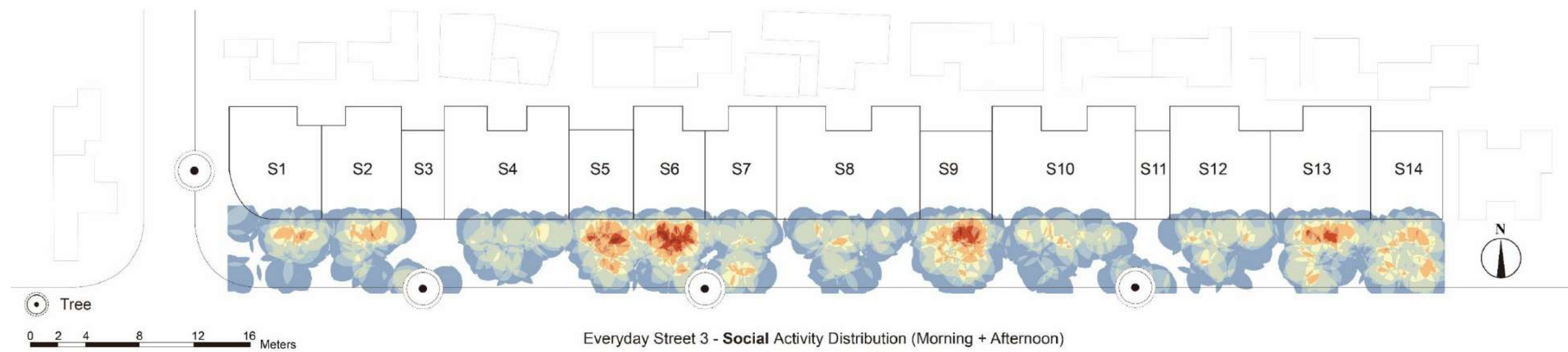
Figure 132 Engagement duration of three activities in Everyday Street 2



Everyday Street 3 - **Necessary** Activity Distribution (Morning + Afternoon)



Everyday Street 3 - **Optional** Activity Distribution (Morning + Afternoon)



Everyday Street 3 - **Social** Activity Distribution (Morning + Afternoon)

Figure 133 Behavior mapping of three activities in Everyday Street 3

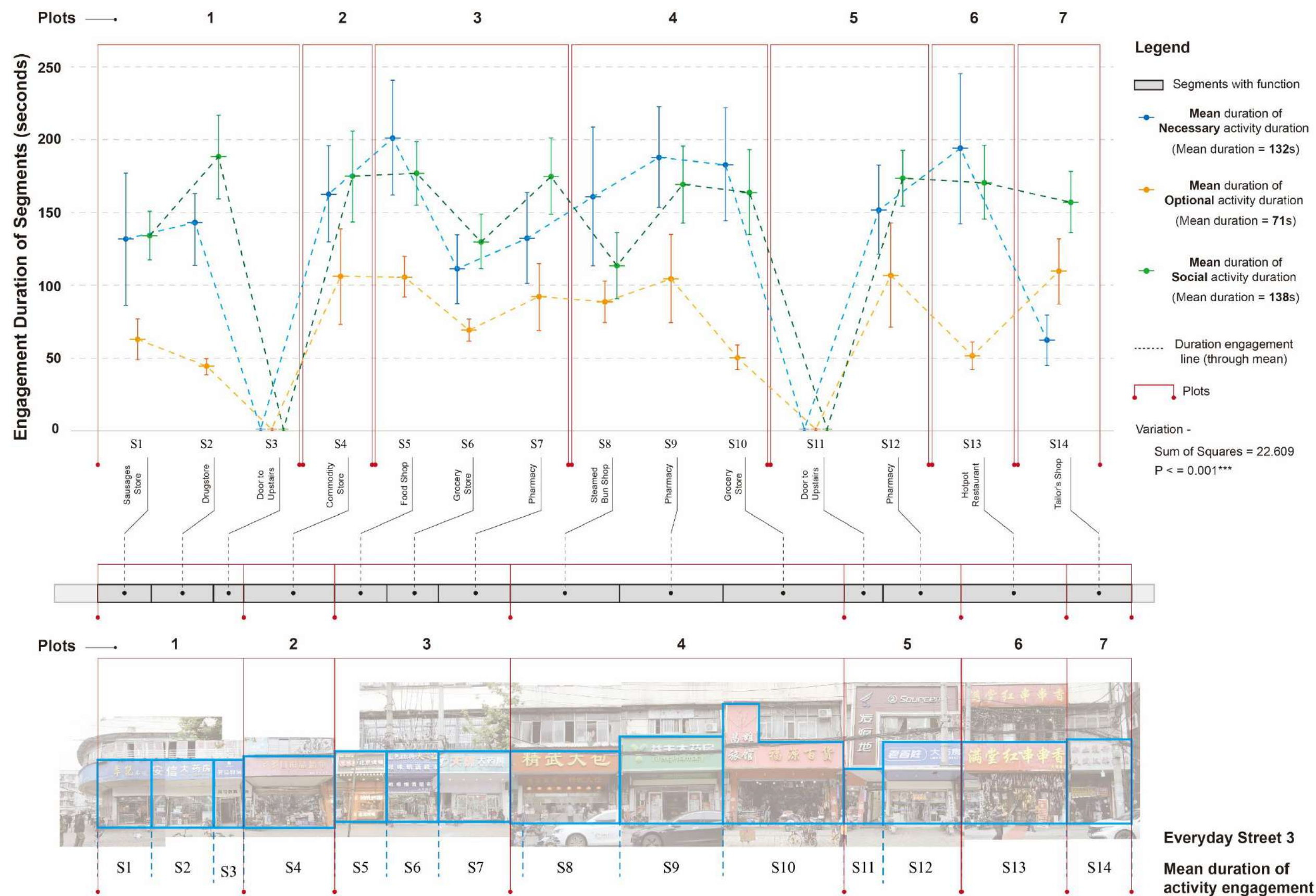
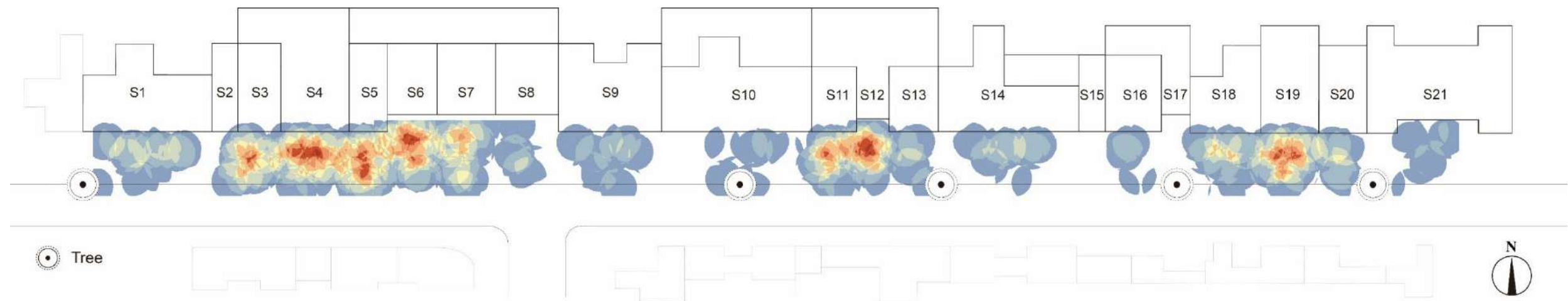


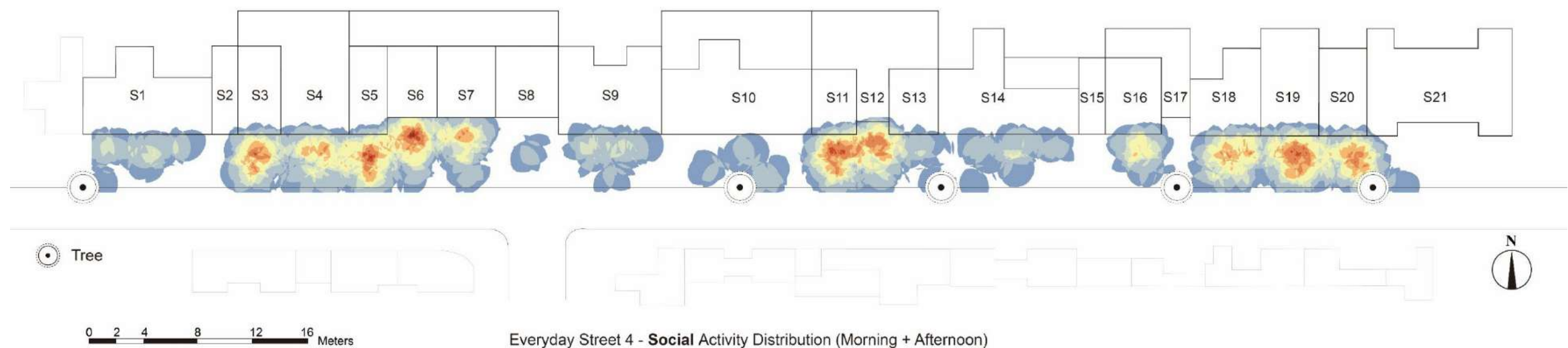
Figure 134 Engagement duration of three activities in Everyday Street 3



Everyday Street 4 - **Necessary** Activity Distribution (Morning + Afternoon)



Everyday Street 4 - **Optional** Activity Distribution (Morning + Afternoon)



Everyday Street 4 - **Social** Activity Distribution (Morning + Afternoon)

Figure 135 Behavior mapping of three activities in Everyday Street 4

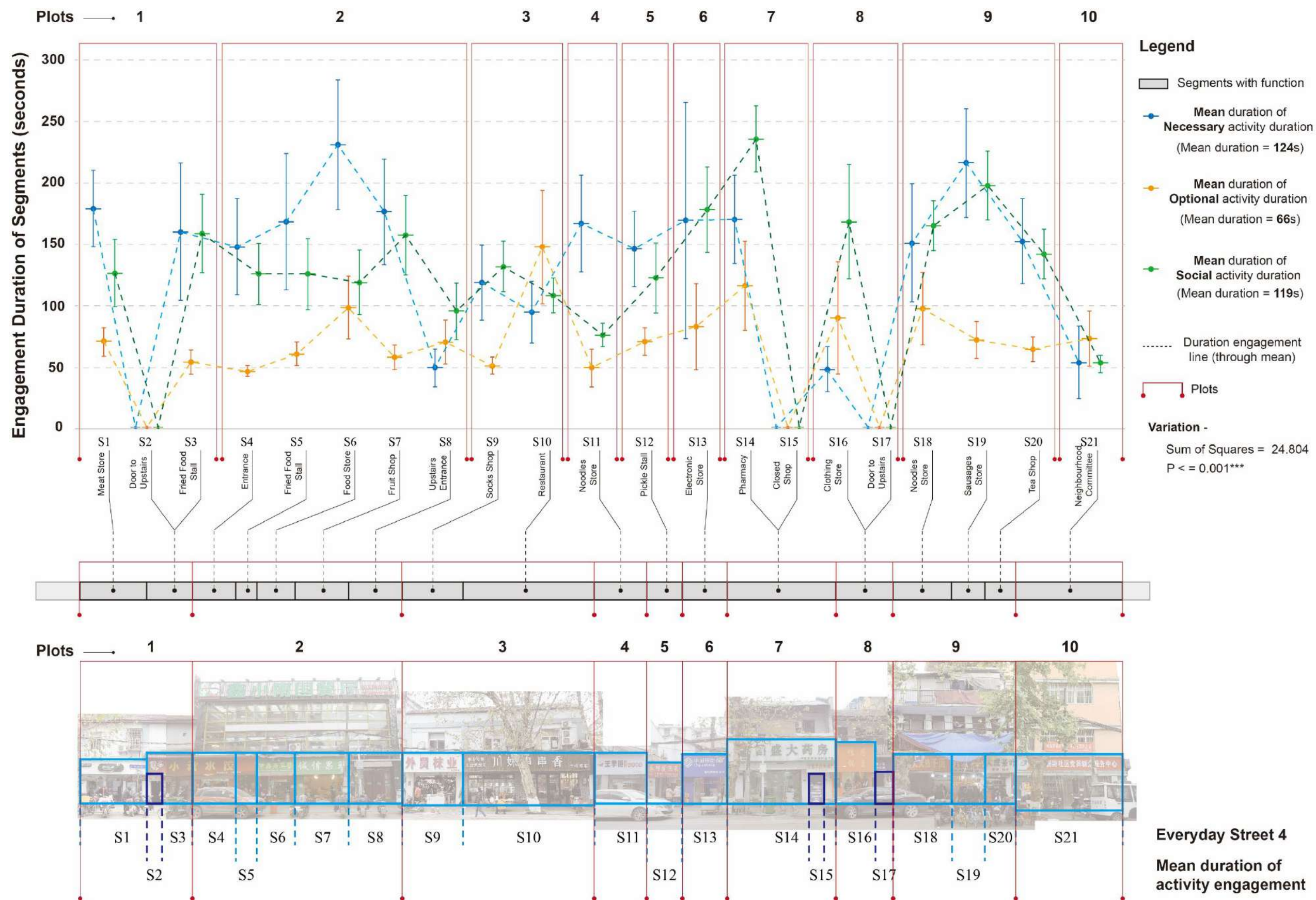


Figure 136 Engagement duration of three activities in Everyday Street 4

Findings discussion – Does activity type (necessary, optional, social) affect engagement with segments along street edges?

The behavior mappings highlight how street inhabitants engage with ground floor interfaces through three distinct activities, further complemented by the engagement duration of specific task. This visual evidence strongly supports the ideas proposed by Gehl (2010) and Mehta (2019), emphasising the significance of everyday activities during peoples' interaction with street edge ground floors. Built upon this, the insights gained add considerable weight to the argument that street edge thinking should shift from an overall understanding along their extent, towards a more nuanced scale – territorial segments. This shift arises from the understanding that the intensity of activities varies disproportionally within each segment. This can be seen through the segment 18-21 in Everyday Street 4. This also provides opportunity to consider if such activities are influenced by socio-spatial attributes of street edges. Although most segments experience high engagement from street inhabitants, there exists distinctions between street edges. It is clearly noticeable that optional and social activities are more intense in Leisure Streets than Everyday Streets (see Heatmaps Figure 125 – Figure 135). Conversely, necessary activity in Everyday Streets exhibit denser engagement than in Leisure Streets. This discrepancy is shaped not only by street function and type, but potentially influenced by socio-spatial attributes of territorial segment. This relationship is further reflected in the engagement duration diagrams.

Equipped with this insight, is the opportunity to investigate how activity duration significantly varied among the groups. This can be combined with behavior mappings to quantitatively illustrate the degree of engagement duration. A comprehensive view of duration across these street edges revealed that engagement duration for necessary and social activities tends to be higher than optional one, particularly in Everyday Streets (see Duration Extent Diagrams). The reason for this is Everyday Streets cater

to daily requirements and needs, fostering a stronger sense of attachment for street inhabitants who frequently conduct diverse activities, either fleeting or enduring. This nuanced perspective on activity tasks, coupled with respective engagement duration, addresses a previous empirical challenge in quantifying this aspect. And it also provides further insights to explore the relation between activity engagement and socio-spatial qualities.

Apart from the understandings that different street types and activity groups are capable of influencing engagement duration, plots, as a building form assemblage of territorial segments, also play a crucial role in shaping activity engagement. Noticeable the example of this, developing from the way in which necessary and social tasks primarily dominate activity engagement, can be seen through diagrams of mean duration of each segment across six streets as well. These visualisations indicate how plot is composed by segments nested into it. Significantly they have illustrated considerably variation between segments which nested into the same plot. A striking example is Plot 9 in Everyday Street 4 (Figure 136), where segment 18 (noodle store), segment 19 (sausage store), and segment 20 (tea shop) exhibit substantially higher engagement compared to other plots within the same street. Specifically, in segment 19, segment owners provided a canopy that creates a public-private gradient from the inside to outside space. Although there may not be direct evidence to assert that engagement duration is directly affected by structural plots, it is undeniably linked to the socio-spatial attributes and function expression of built segments within the overall street edge. Again, activity duration is not only influenced by a singular segment, but also plots act as an essential role in the scale of morphological structure, promoting activities along street edges and within segments.

6.2.4 Theme 2. 4 – Does time of day (morning, afternoon, evening) affect engagement with segments along street edges?

Method

The approach taken is mixed-method approach, this includes video recording and onsite observation. Similar to Theme 2. 3, Geographic Information System (GIS) was employed as the primary way to demonstrate activity distribution of different time periods – morning, afternoon and evening (Part 2 Video recording and onsite observation; Chapter 5). This method seeks to visualise when activities took place, and how activities distribute. Through this, such detailed behavior mappings of different time periods in each segment across six street edges were graphically manifested, the resultant mappings were manifested through comparing activity distribution, concentration and intensity. It presented a visual understanding of how pedestrian engage with street edges at different time periods. According to the recording and observation, the mean duration of different periods can be coded and computed. In doing so, the standard deviation of each activity task was calculated to statistically interpret their variations within segments and along street edges. Meanwhile, SPSS was applied to fit Kruskal-Wallis test model to the data calculation.

Results

Over the following pages are presented –

Figure 137 – Behavior mapping of different time periods in **Leisure Street 1**

Figure 138 – Engagement duration of different time periods in **Leisure Street 1**

Figure 139 – Behavior mapping of different time periods in **Leisure Street 2**

Figure 140 – Engagement duration of different time periods in **Leisure Street 2**

Figure 141– Behavior mapping of different time periods in **Everyday Street I**

Figure 142 – Engagement duration of different time periods in **Everyday Street I**

Figure 143 – Behavior mapping of different time periods in **Everyday Street 2**

Figure 144 – Engagement duration of different time periods in **Everyday Street 2**

Figure 145– Behavior mapping of different time periods in **Everyday Street 3**

Figure 146 – Engagement duration of different time periods in **Everyday Street 3**

Figure 147 – Behavior mapping of different time periods in **Everyday Street 4**

Figure 148 – Engagement duration of different time periods in **Everyday Street 4**

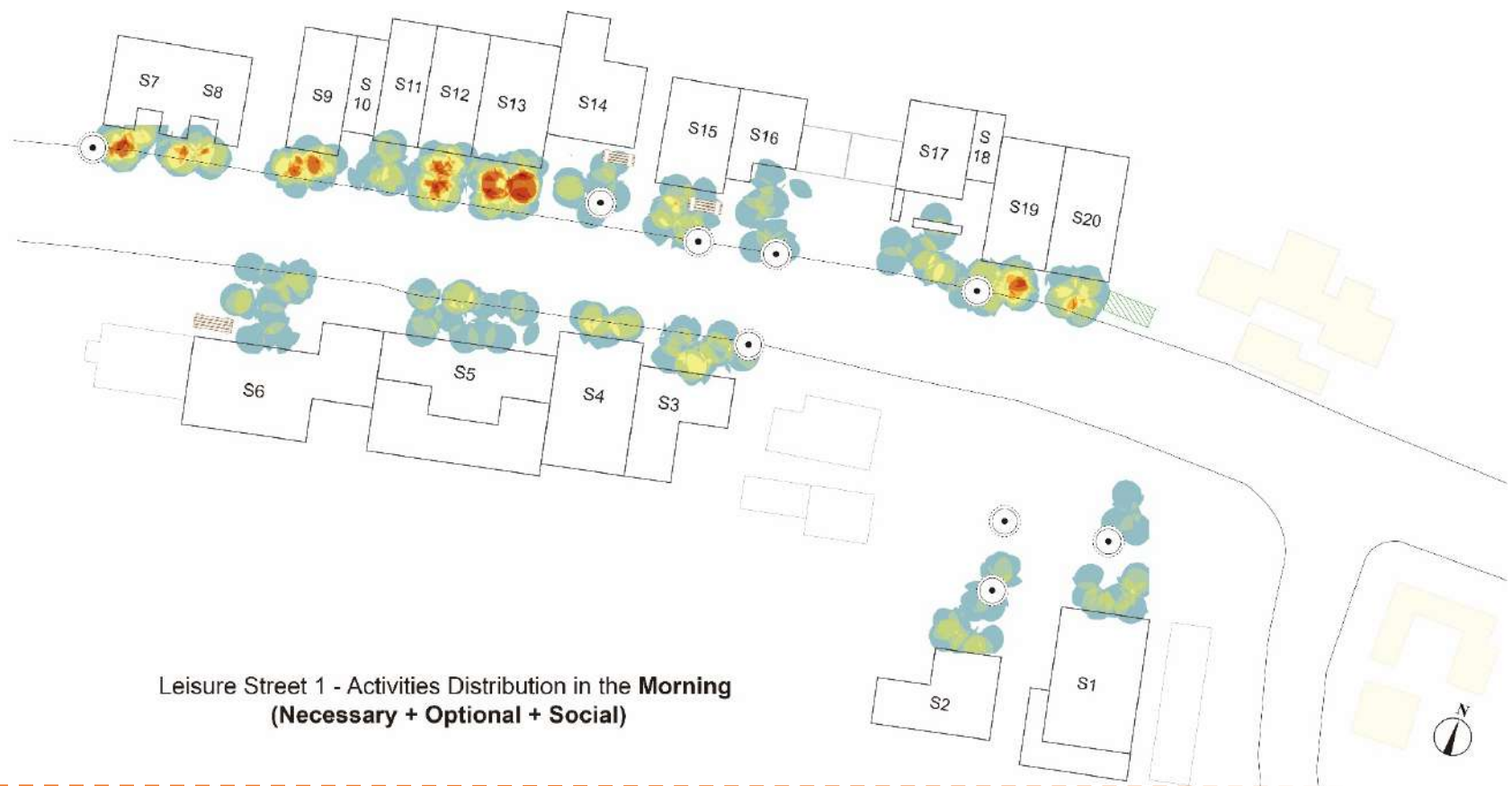


Figure 137 Behavior mapping of different time periods in Leisure Street I

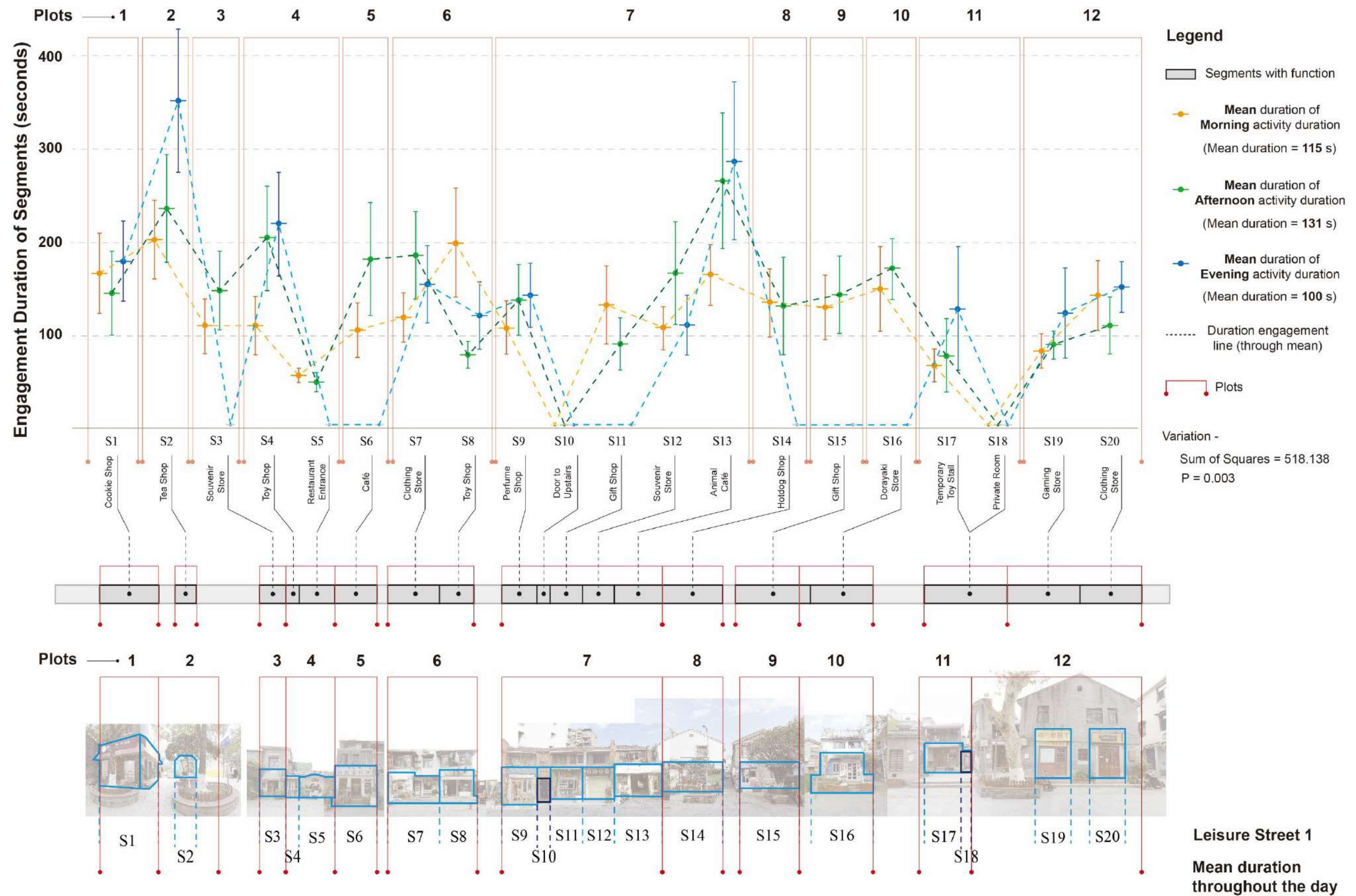
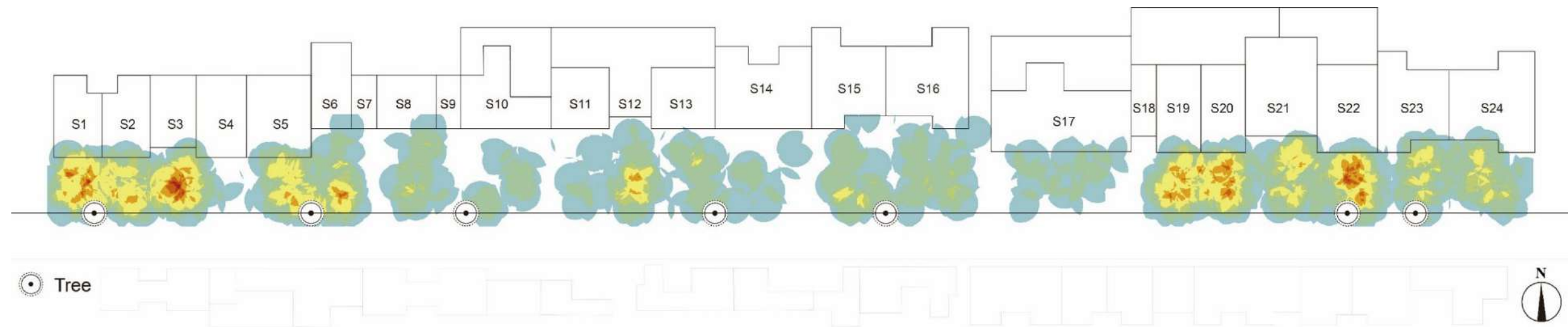


Figure 138 Engagement duration of *Morning* / *Afternoon* / *Evening* periods in Leisure Street I



Leisure Street 2 - Activities Distribution in the **Morning (Necessary + Optional + Social)**



Leisure Street 2 - Activities Distribution in the **Afternoon (Necessary + Optional + Social)**



0 2 4 8 12 16 Meters

Leisure Street 2 - Activities Distribution in the **Evening (Necessary + Optional + Social)**

Figure 139 Behavior mapping of different time periods in Leisure Street 2

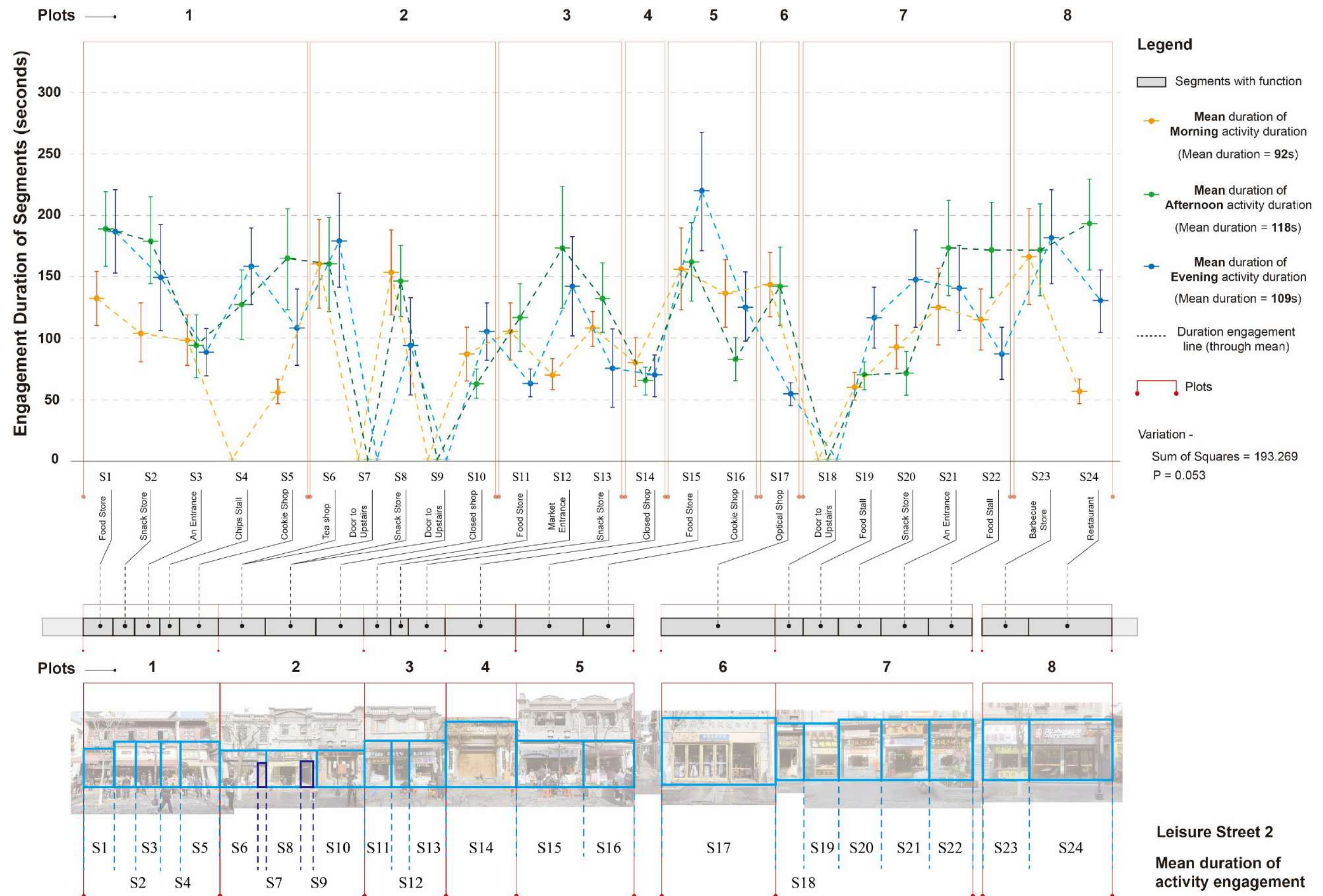


Figure 140 Engagement duration of *Morning* / *Afternoon* / *Evening* periods in Leisure Street 2

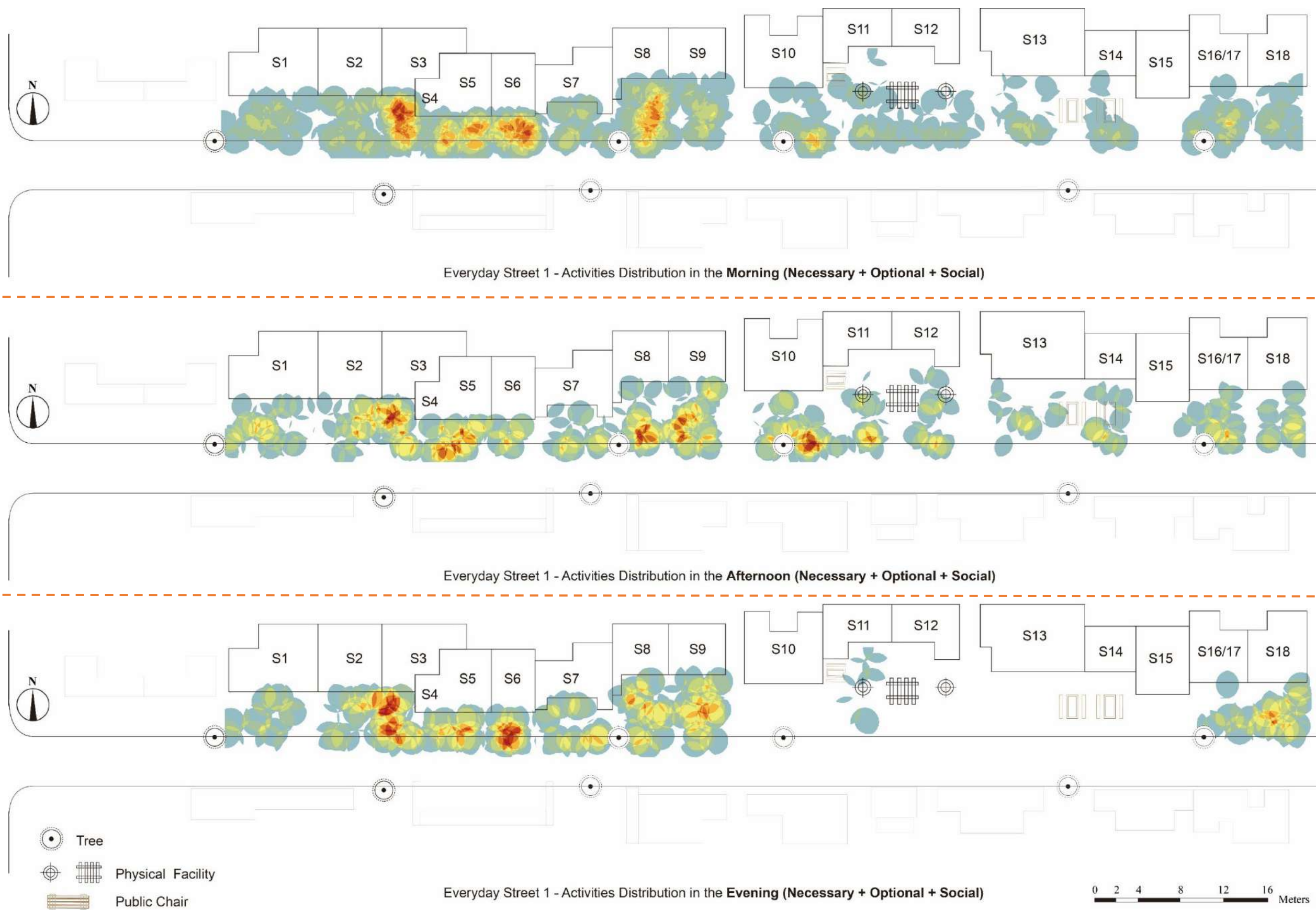


Figure 141 Behavior mapping of different time periods in Everyday Street 1

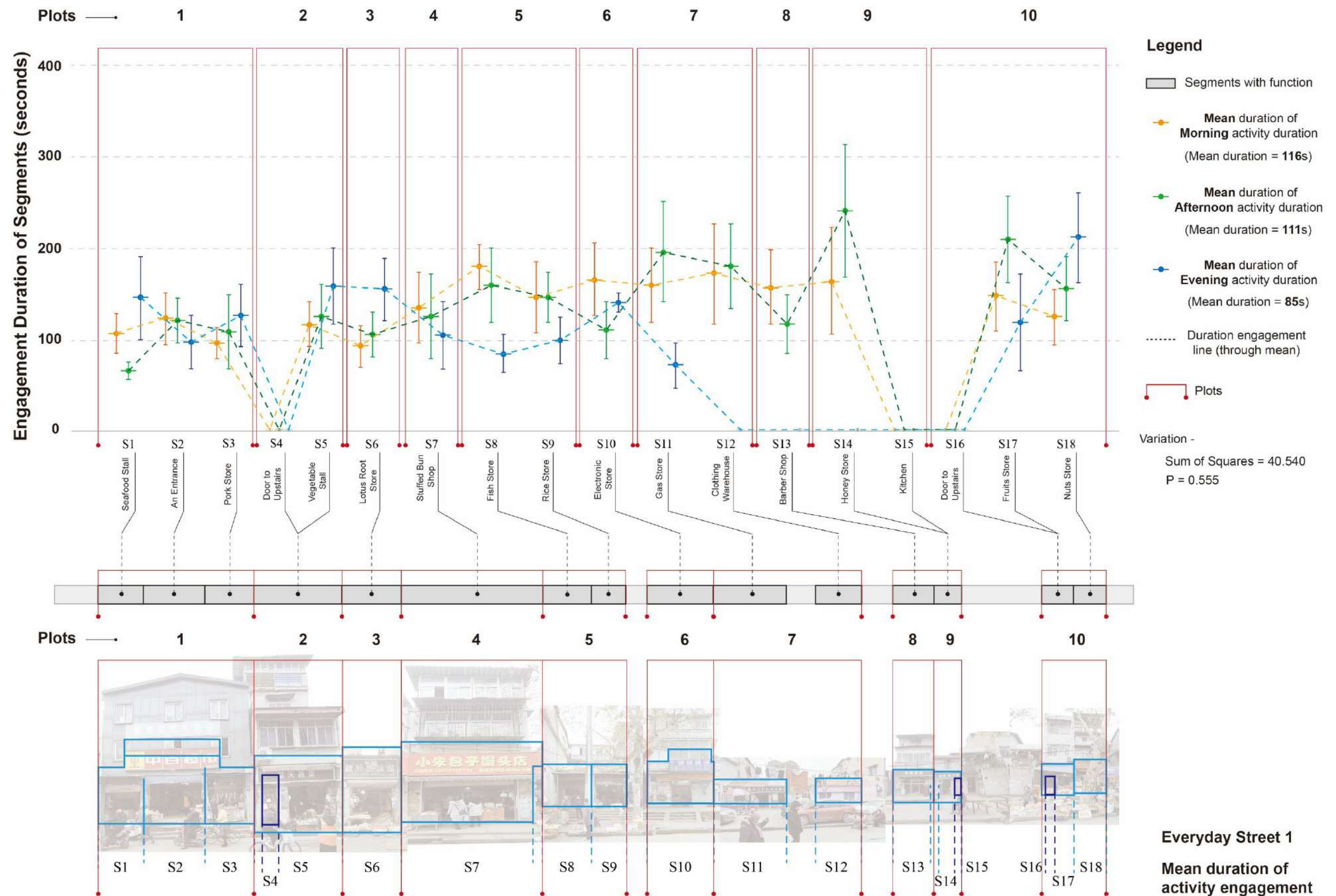


Figure 142 Engagement duration of *Morning* / *Afternoon* / *Evening* periods in Everyday Street 1

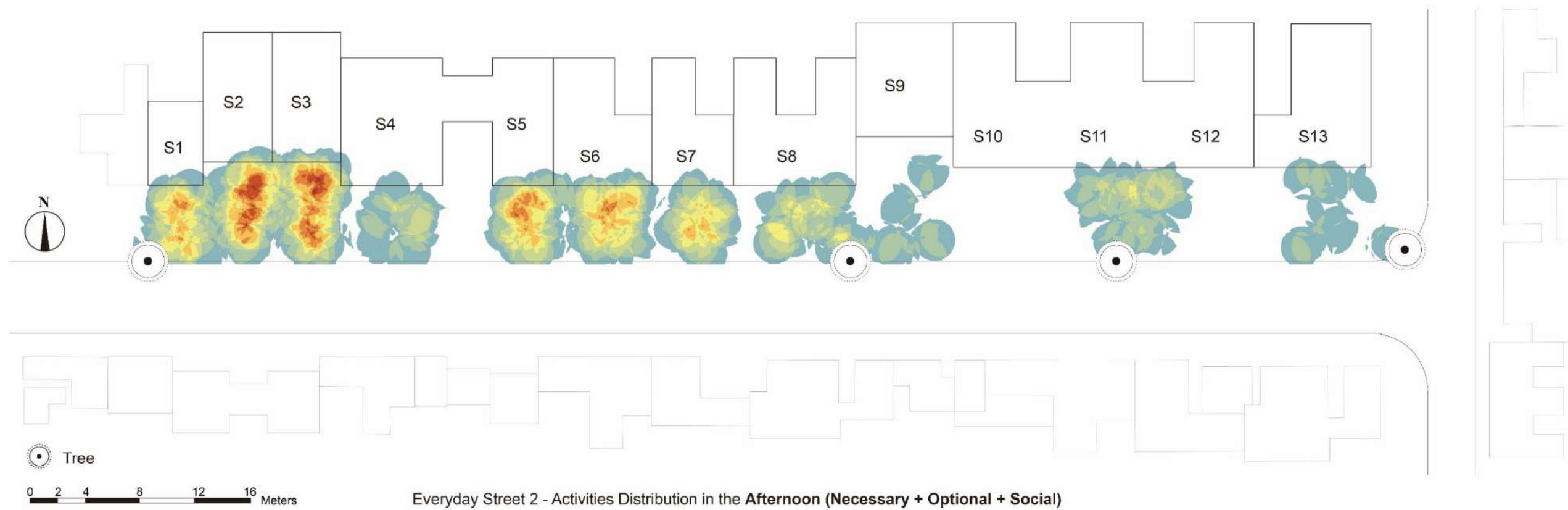
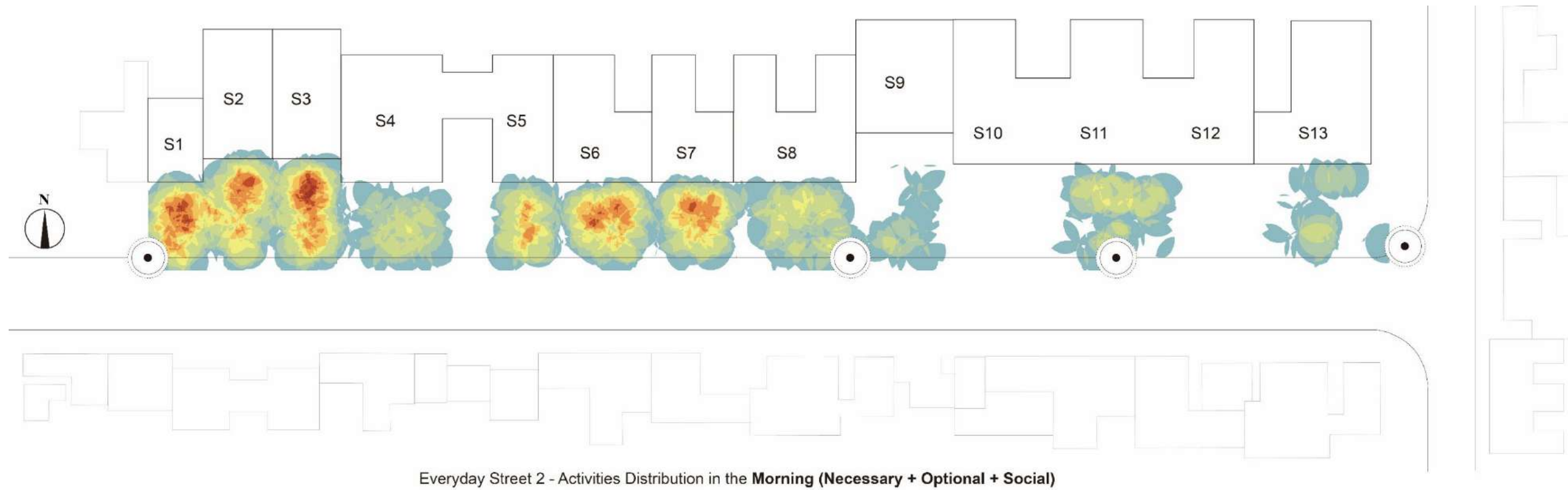


Figure 143 Behavior mapping of different time periods in Everyday Street 2

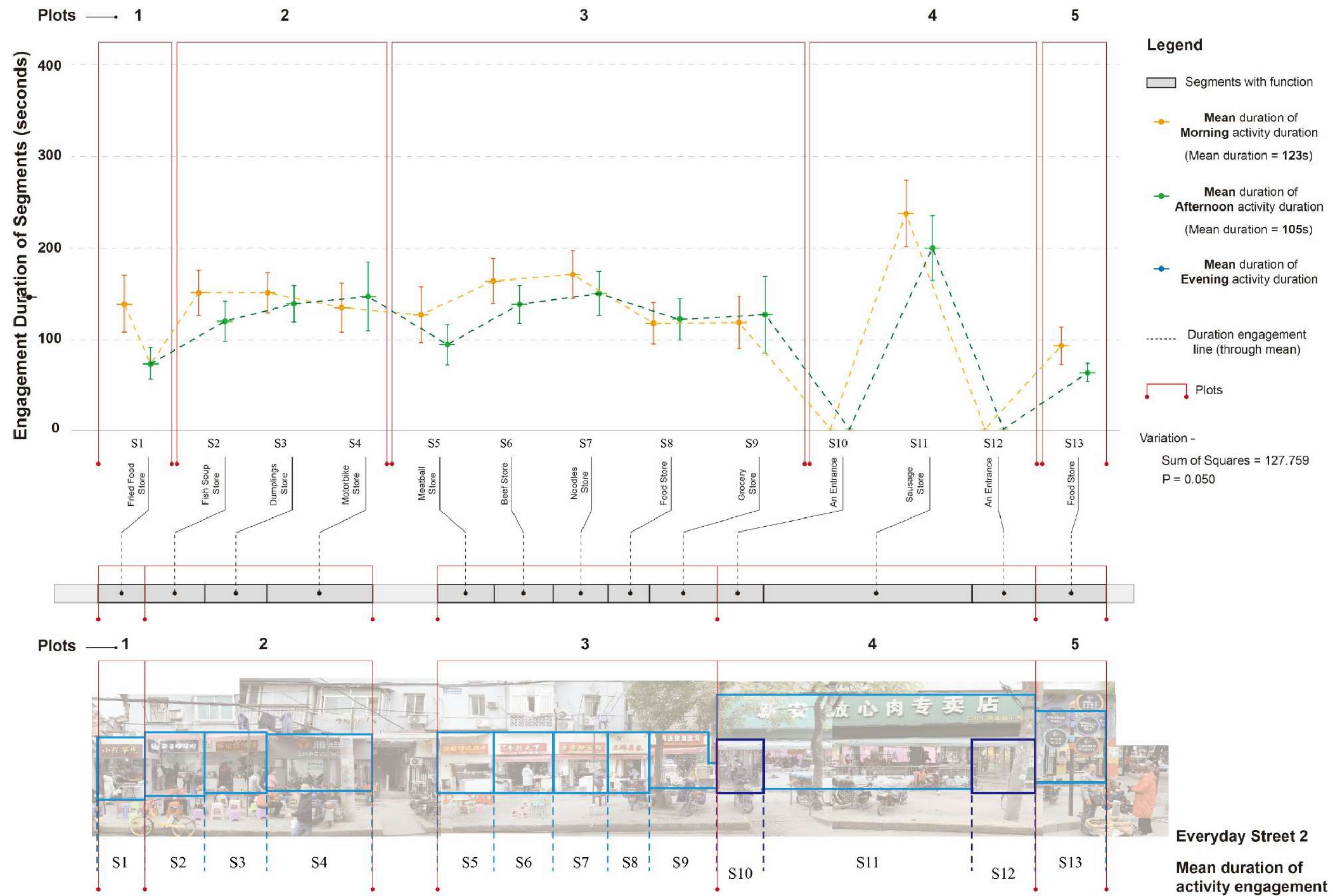


Figure 144 Engagement duration of *Morning* / *Afternoon* / *Evening* periods in Everyday Street 2

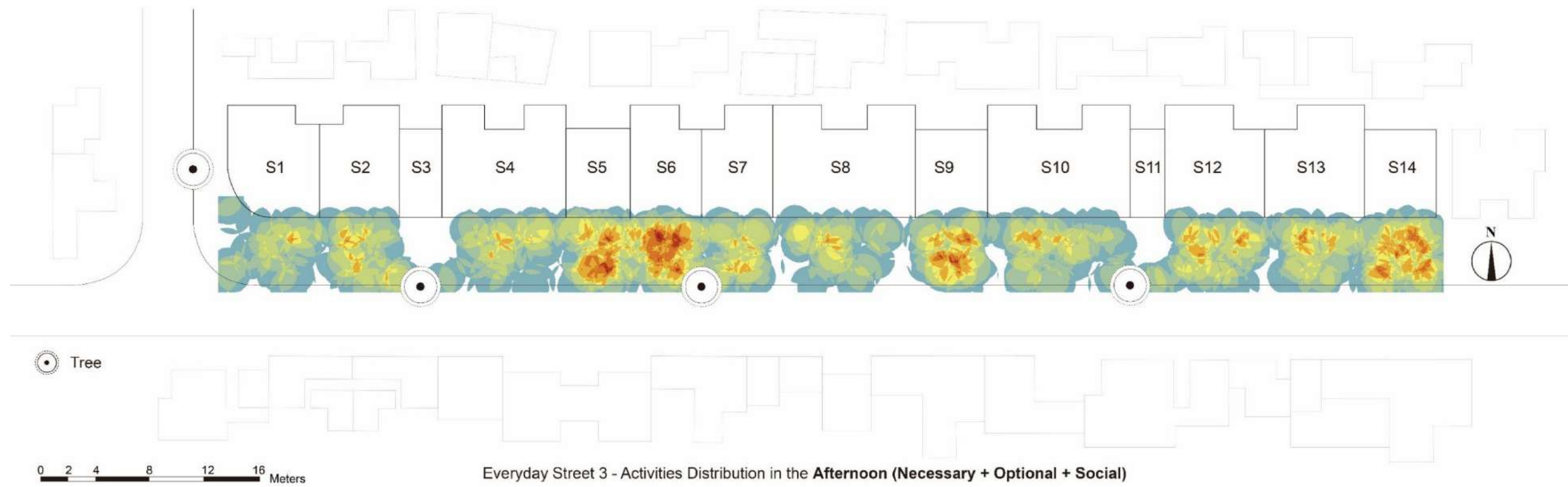


Figure 145 Behavior mapping of different time periods in Everyday Street 3

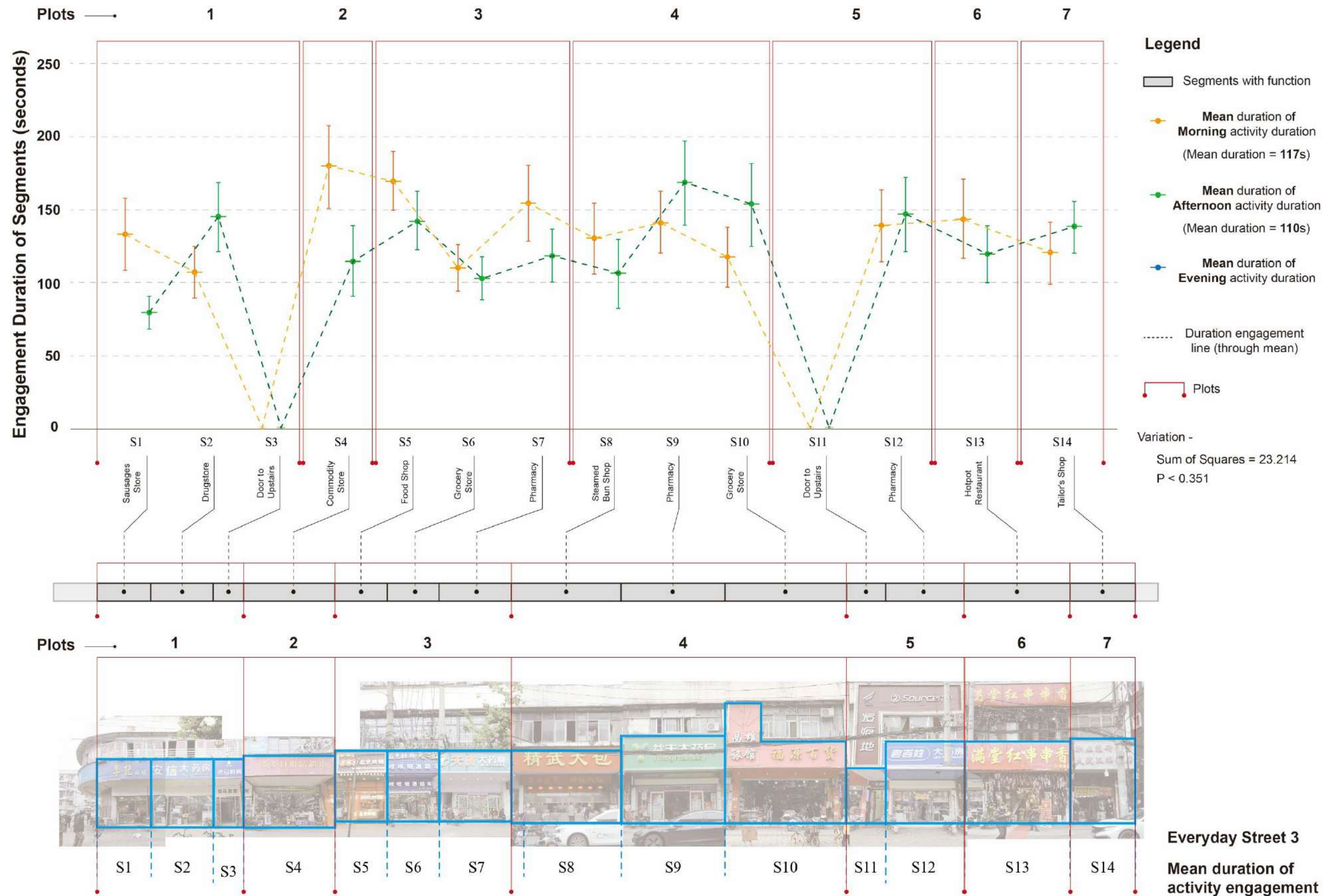
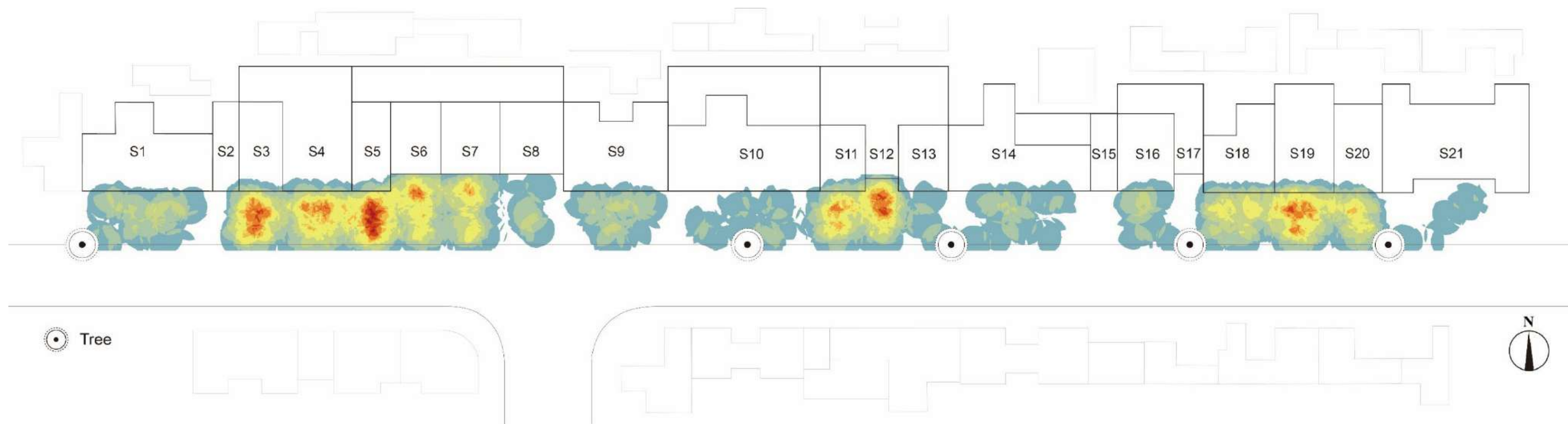
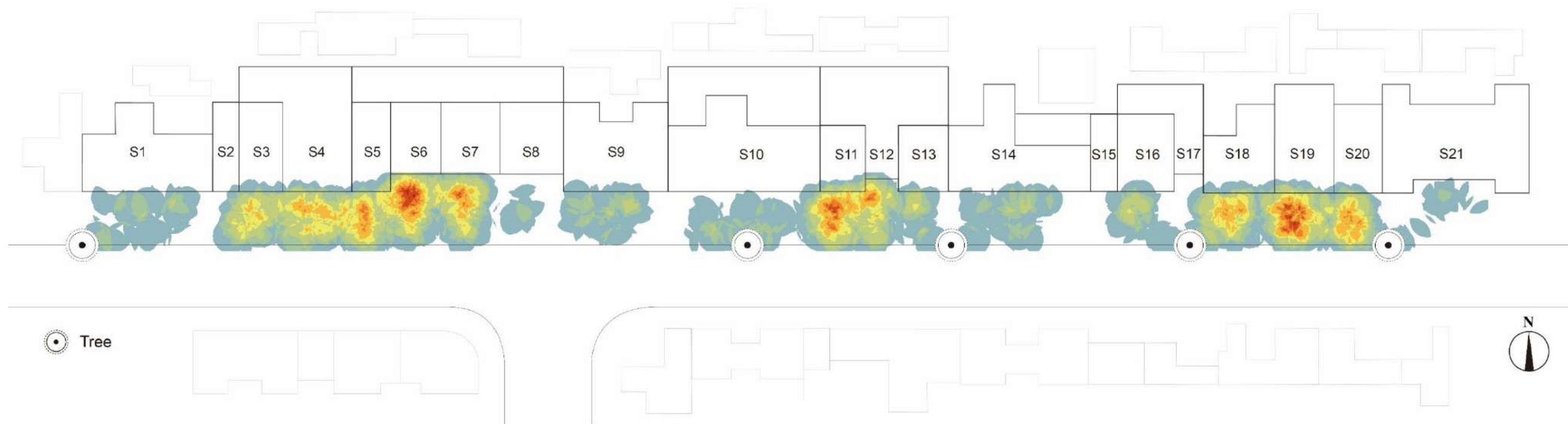


Figure 146 Engagement duration of Morning / Afternoon / Evening periods in Everyday Street 3



Everyday Street 4 - Activities Distribution in the **Morning (Necessary + Optional + Social)**



0 2 4 8 12 16 Meters

Everyday Street 4 - Activities Distribution in the **Afternoon (Necessary + Optional + Social)**

Figure 147 Behavior mapping of different time periods in Everyday Street 4

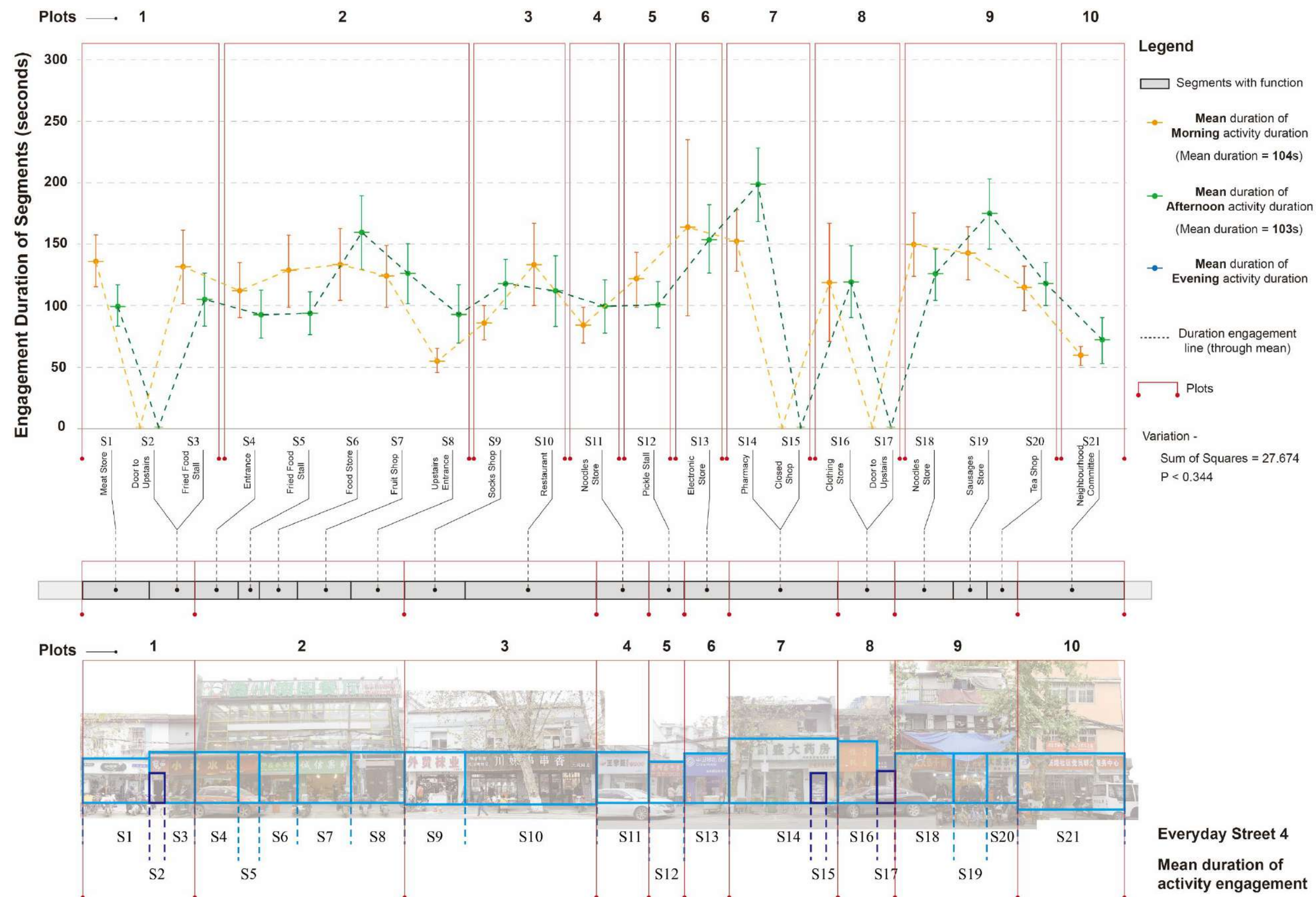


Figure 148 Engagement duration of *Morning / Afternoon / Evening* periods in Everyday Street 4

Findings discussion – Does time of day (morning, afternoon, evening) affect engagement with segments along street edges?

The behavior mapping heatmaps presented (Figure 137 – Figure 147) demonstrate how street inhabitants engage with ground floor interfaces across different time periods. This is further complemented by specific engagement duration, providing a quantitative measure of the extent of engagement along the street edges. Within the visualisations, it can be noticed that the afternoon timeframe has higher amounts of engagement duration in Leisure Streets (Figure 138 and Figure 140); while in Everyday Streets, it was primarily dominated by morning period. This discrepancy reflects the varying intentions and requirements of street inhabitants at different time of the day. This analysis provides a detailed understanding of the interplay between time periods and engagement duration, shedding light on a dimension that has been challenging to empirically quantify in previous studies, while opening up new avenues for investigating engagement fluctuations in relation to street edges.

Based upon the general analysis, it is rational that activity time periods are primarily influenced by street type, and potentially connect to socio-spatial complexities of territorial segments. This is highlighted by the substantial variation in engagement duration within a segment across different time periods. And it is apparent that a collective of segments within a plot can significantly impact overall engagement along the street edge. Notable the instance of this can be seen through the plot 7 within Leisure Street I, where segment 13 (animal café) experiences high engagement in the evening, although the overall engagement is comparatively lower than during the morning and afternoon periods (Figure 138). This provides an insight that activity duration not only relates to localised expression, but edge extent coherence (Thwaites et al., 2020). Essentially, this emphasised that segments should not be regarded as an individuality, but an entirety with socio-spatial natures that a variety of plots collaborate, in a way that can impact engagement duration at different times of the day.

In addition to the insights gained regarding the relationship between engagement duration and the overall coherence of street edge, these visualisations offer further depth into how activity duration can be affected by other socio-spatial attributes, particularly at segment scale. This is also evident in the engagement duration extent shown above, where certain segments with rich socio-spatial attributes exhibit high engagement combined with heatmaps. For instance, segment 1 (food store) of Leisure Street 2 illustrates how a loose space is effectively occupied by moveable tables and chairs provided by segment owners, creating a semi-public/private space that encourages pedestrian to stop and engage. Likewise, in segment 19 (sausage store) of Everyday Street 4, shopkeepers have erected a canopy, establishing a complex public-private gradient from the internal to external space. This not only enhances spatial depth but fosters social interaction and engagement. Again, it is too difficult to regard street edge and segment as completely isolated entities. Understanding of socio-spatial attributes is crucial for delving into the complex interplay between engagement, the overall edge extent, and specific locality segment.

The discussion above highlights the intricate relationship between engagement duration at different time periods and segments along with street edge, individually or collectively. This understanding indicates that street edges, as assemblage of socio-spatial attributes, spanning built plots / plinths, territorial segments, and street length, wield significant influence upon street inhabitant activities. It reaffirms the idea that the importance of street edge is manifested through natures of extent, laterality and locality, which in turn influence the engagement density and duration fluctuations within different segments. Built upon this consideration, engagement duration of segments at different time periods provides opportunity to regard street edge as a distinguishable place with volume for various activities and social interactions, rather than merely a meaningless line without thickness (Alexander et al., 1979).

Overall, this preliminary investigation has sought to delineate the intricate interplay

between time periods and street edges, setting the groundwork for socially responsive street edge framework. The findings drawn stem from empirical analysis, and resonated with the ideas proposed by Gehl (2010), Dovey (2017), Thwaites *et al.* (2020) and Simpson *et al.* (2022), who claimed that pedestrian engagement is profoundly impacted by ground-floor interfaces and street edges. Through visualising and mapping engagement and duration throughout six street edges, it once again validates the pivotal role of street edges and segments in shaping everyday engagement. Such insights beckon further research in subsequent phases.

Theme 2 – Findings Summary

The analysis, encompassing diagrams of *what*, *when* and *where* activities, behavior mapping heatmaps, and statistical visualisations detailing engagement durations, offers detained insights into how pedestrians engage with street edges and territorial segments. It is evident that the scale of segment holds a crucial influence over everyday activities of people and their engagement with ground floor interfaces of street edges. Moreover, these findings emphasised the significance of various scales of street extent in shaping activity tasks and engagement duration. And it also reveals that, due to the pedestrians vary, they used it primarily dependent upon their needs and desires. As a result, this practical understanding directly addressed the research questions forwarded within current section. Moving forward (Theme 3), it will delve into whether pedestrian engagement is influenced by socio-spatial attributes, building upon the foundations established in Theme 1 and Theme 2.

6.3 Theme 3: Understanding the relationship between socio-spatial attributes and engagement duration

Built upon the Theme 1 and 2, the current section aims to examine if there is a relationship between socio-spatial attributes (material, spatial and social dimensions)

and engagement duration with public-private interfaces, in-line with the corresponding research questions. Each specific attribute, material (distinctiveness, temporality), spatial (openness, articulation), and social (occupation, appropriation), will be discussed in detail.

6.3.1 Theme 3. I

- a. Does ***distinctiveness*** attribute affect user's activity duration?
- b. Is distinctiveness influential across ***necessary / optional / social*** activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. SPSS was adopted to fit ordinal regression and linear regression models in combination with Pearson's correlation to the data (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5). This was in order to analyse the influence of *distinctiveness* upon user activity engagement. Ordinal regression model was employed to examine whether the average duration of user engagement was impacted by segment *distinctiveness* (mean scores from Theme 1). Linear regression was also applied to further examine the relationship between this attribute and the duration of activity. Prior to fitting the models, the average duration of three activity types (necessary, optional and social) within each segment was transformed through Square Root (sqrt) calculation in order to meet the normal distribution. Following this, the average score of *distinctiveness* was entered as the dependent variable, which was evaluated by researcher and other three urban scholars (introduced in Theme I. I). The independent variable was the average engagement duration of three activity types. In doing so, *p*-value and *r*² value were generated. Pearson's correlation was subsequently employed to calculate co-efficient (*r* values) to assess the strength of a linear relationship between five scales of *distinctiveness* and the duration of each activity task. The results were visualised

through bar charts and scatterplots.

Results

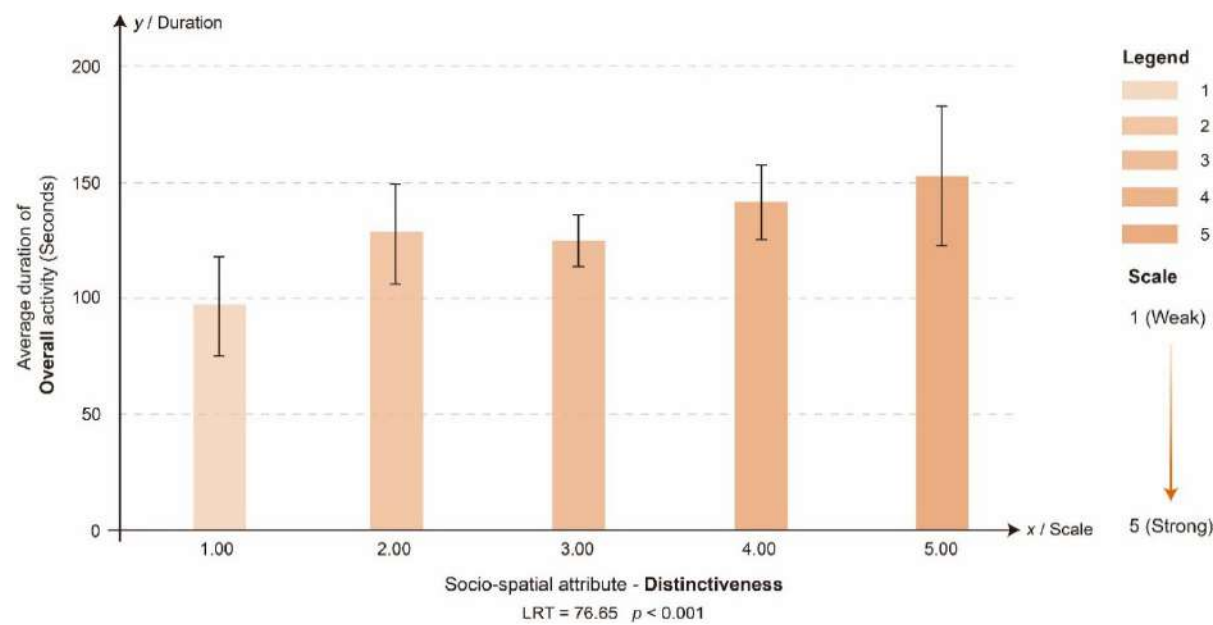


Figure 149 The influence of **Distinctiveness** quality upon the activity duration

Error bars represent 1 standard error

Distinctiveness had a highly significant influence upon the duration pedestrians engaged with street edge segments, with duration of activity increasing as distinctiveness increased (Likelihood ratio test (LRT) = 76.65, $p < 0.001$). The average duration varied by 55.84 seconds (96.58 seconds for Scale 1 vs. 152.42 seconds for Scale 5) (Figure 149). This attribute is generally associated with physical affordances and form manifestations of street edge segments. The pedestrian engagement duration was thus greatly related to varying segment's quality.

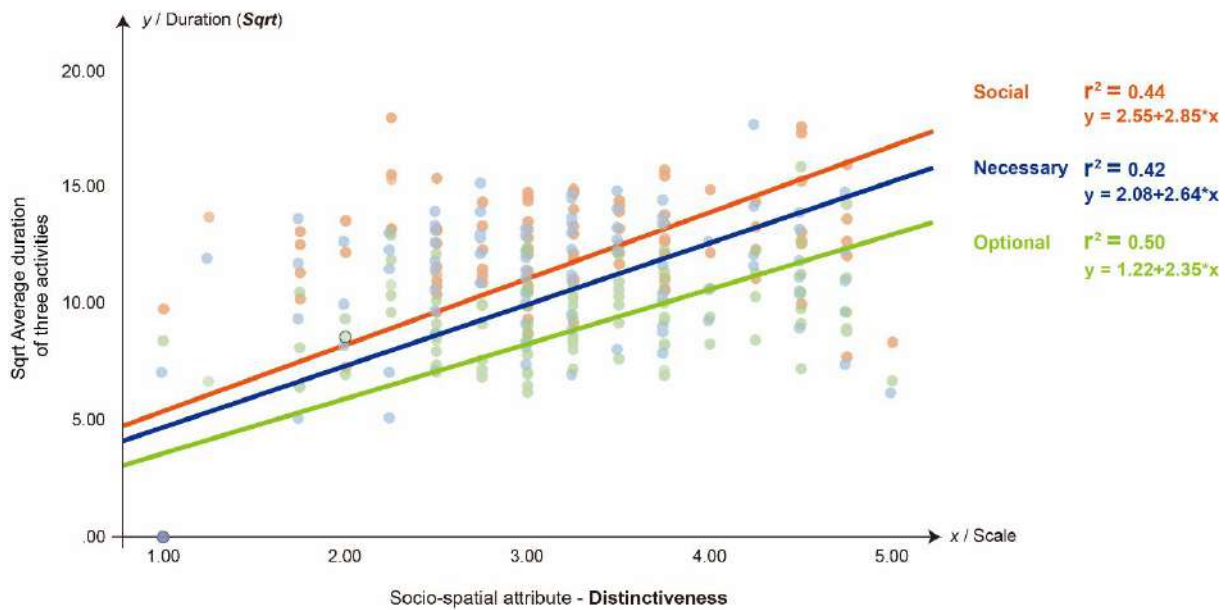


Figure 150 The correlation between **Distinctiveness** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Distinctiveness and, necessary activity ($r = 0.65$, $r^2 = 0.42$, $p < 0.001$); optional activity ($r = 0.71$, $r^2 = 0.50$, $p < 0.001$); and social activity ($r = 0.67$, $r^2 = 0.44$, $p < 0.001$).

Findings Discussion – The influence of segment distinctiveness

The results demonstrate a notable correlation between distinctiveness and the duration of pedestrian engagement with segments. Higher level of distinctiveness was shown to correlate with a longer duration of activity (Figure 149). Study findings also reveal that the correlation occurs regardless of what activity being undertaken (necessary, optional and social) (Figure 150). These results evidenced the assertion made by Thwaites *et al.* (2020), who emphasised the importance of distinctiveness in segment engagement. The current investigation not only adds empirical validity to this conception, but provides a deeper understanding of how distinctiveness relates to different activities within a Chinese urban village context. This insight transcends the

conventional belief that segment functions determine pedestrian engagement with segments (Gehl et al., 2006; Karssenberget al., 2016), but taking distinctiveness nature into consideration.

Furthermore, understanding how this attribute influences everyday activities and engagement duration has been overlooked and challenging to quantify, particularly in Chinese urban villages. The current research strives to address this gap, offering practical insights into how distinctiveness, manifested through high- / low-level physical affordances (highlighted in Theme I. 2) within territorial segments, profoundly impacts pedestrian engagement with street edges and segments. The rationale behind this lies in the fact that these material objects and physical components of segments provide opportunity for people engagement, whilst enriching the street environment they inhabited. This finding aligns with the argument proposed by Mehta and Bosson (2021), highlighting the crucial role of these tangible expressions in stimulating everyday social interactions and promoting street life. This understanding acquired also echoed with Dovey and Pafka's (2017) argument of function mix grouped by visit / live / work triangles, further exploring how inhabitant's everyday necessary, optional, and social activities are intertwined with distinctiveness from a nuanced street edge perspective.

As detailed earlier, segments that stand out not only possesses easily recognisable functions, but exhibit distinctive material features that are conducive to promoting social engagement with street edges. This can be noticeable observed through Figure 151), segment 13 (animal café) of Leisure Street 1; segment 15 (food stall) of Leisure Street 2; and segment 17 (fruit store) and 18 (nut store) of Everyday Street 1. All of these instances show noticeable distinctiveness, resulting in longer engagement duration compared to other segments. Notably, these highly engaging segments often feature spatial porosity and lateral organisation, smoothing the transition from interior to exterior space through high or low-level affordances (detailed in Theme I. I). In doing so, they unintentionally create a semi-public/private space that stimulates pedestrian

engagement with the object and materiality housed in it. This will be further elaborated in the subsequent sections on *articulation* and *openness*. Here, it has empirically evidenced the significance of territorial segment's distinctiveness in capturing people's attention. Through exploring the impact of physical affordance upon street edge engagement and duration, this study provides quantitative foundations to complement existing studies, affirming the pivotal role of street characteristics in shaping pedestrian experiences (Gehl et al., 2006; Mehta & Bosson, 2021).

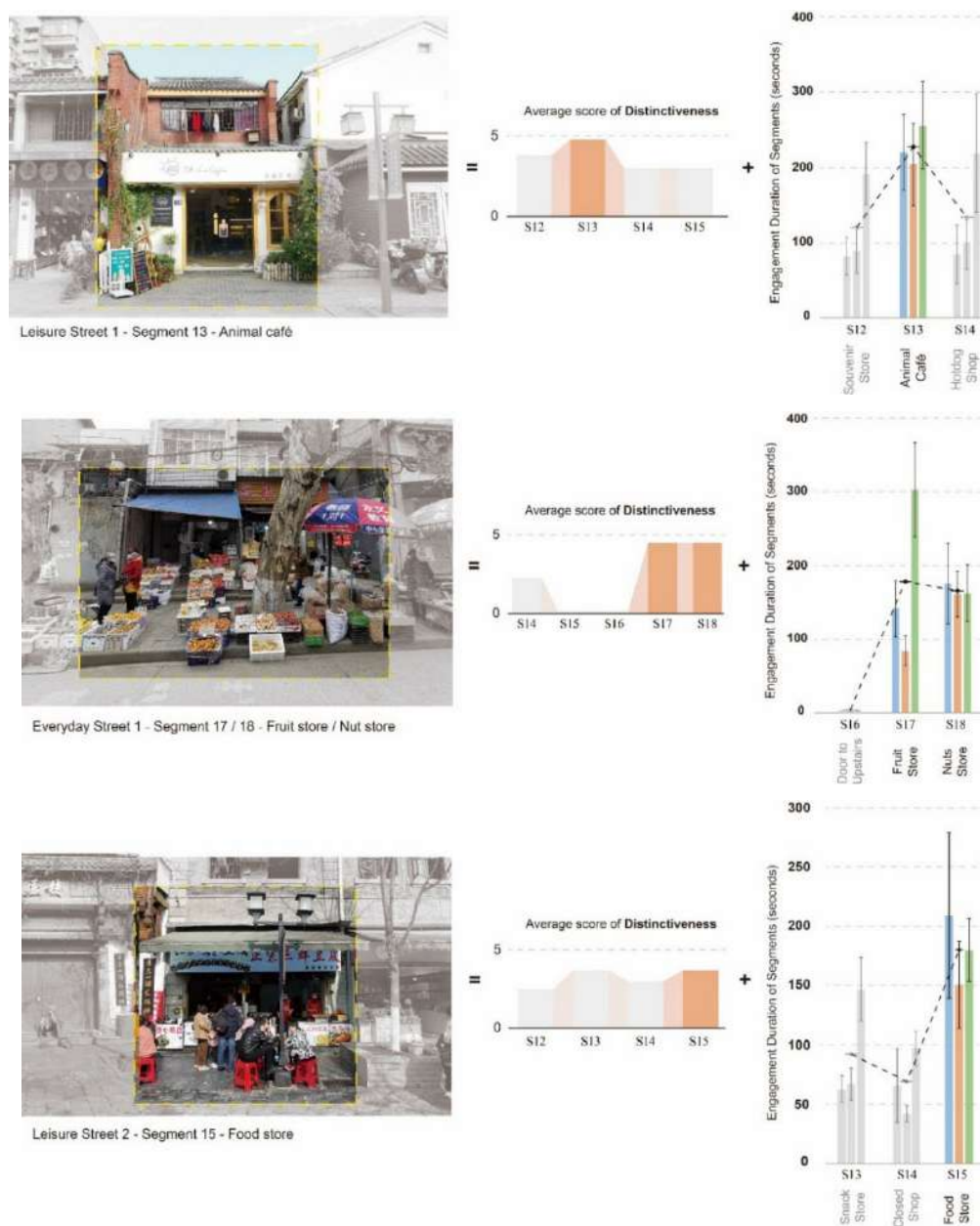


Figure 151 Territorial segments with high distinctiveness score and pedestrian's duration

The investigation into the relationship between distinctiveness and varying activities has highlighted how this attribute holds significant potential to enhance social engagement with territorial segments. This is a crucial insight to conceptually establish the socially responsive street edge environment, and it has been validated through the everyday activity recordings during the current research. It infers that the motivation of inhabitant engaging is influenced by an optimal environment, which then projects to the extent of engagement within a segment. Regardless of high-level or low-level material forms, this characteristic is essentially intertwined with other qualities within a segment, including temporality, spatiality and sociality, which will be explored in the subsequent sections.

6.3.2 Theme 3. 2

- a. Does **temporality** attribute affect user's activity duration?
- b. Is temporality influential across **necessary** / **optional** / **social** activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. The same statistic procedures and ways were applied as conducted in Theme 3. 1, whilst examining the relationship between **temporality** attribute and activity engagement with street edge segments (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5). As discussed in Theme 1. 2, the impact of temporality quality is difficult to fully explore through the recordings. The reason for this is that such quality heavily relates to time-scale, but within current research, it records several videos of each segment at given time. Through using the video recordings in combination with knowledge of how segments periodically adapted and changed, it provides in-depth understanding of temporality and pedestrian engagement to influence upon pedestrian duration.

Results

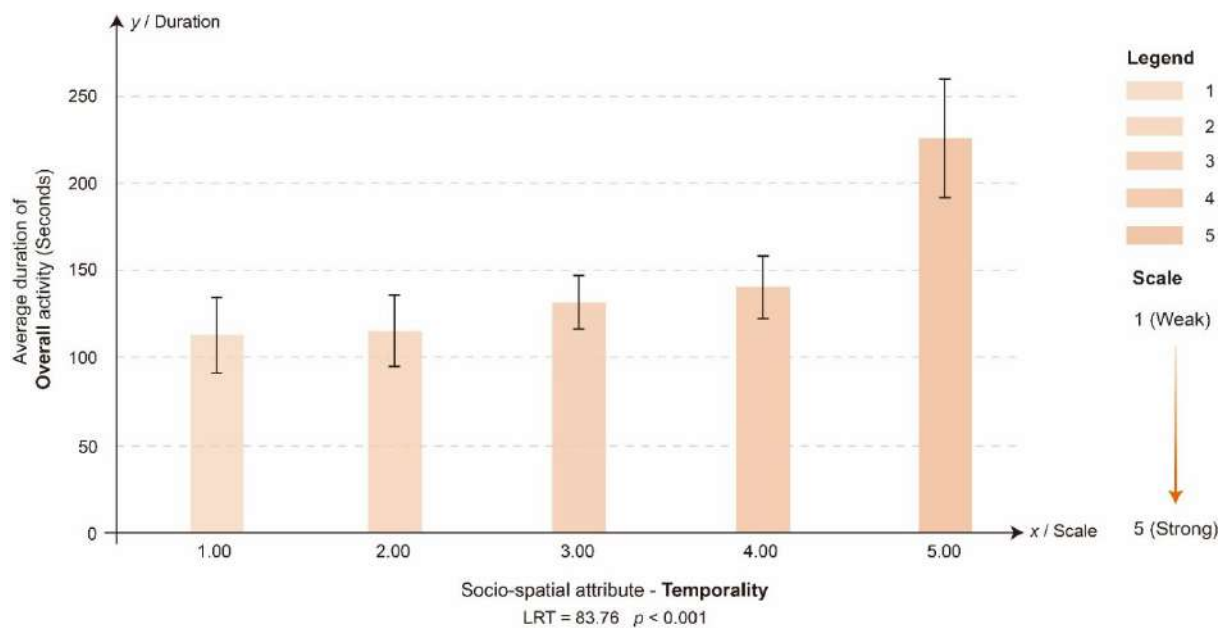


Figure 152 The influence of **Temporality** quality upon the activity duration

Error bars represent 1 standard error

Temporality had a highly significant influence upon the duration pedestrians engaged with street edge segments, with duration of activity increasing as temporality increased (Likelihood ratio test (LRT) = 83.76, $p < 0.001$). The average duration varied by 112.82 seconds (113.11 seconds for Scale 1 vs. 225.93 seconds for Scale 5) (Figure 152). This quality is generally related to a segment's capacity for periodic change and adaptability through time.

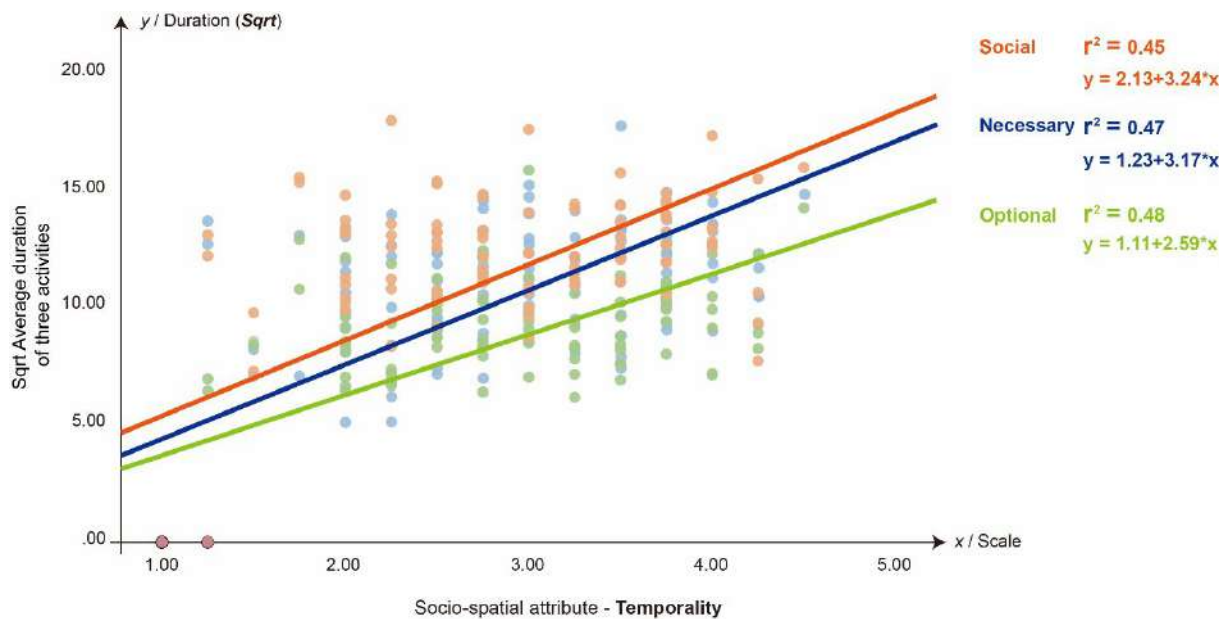


Figure 153 The correlation between **Temporality** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Temporality quality and, necessary activity task ($r = 0.69$, $r^2 = 0.47$, $p < 0.001$); optional activity ($r = 0.69$, $r^2 = 0.48$, $p < 0.001$); and social activity ($r = 0.70$, $r^2 = 0.45$, $p < 0.001$).

Findings Discussion – The influence of segment temporality

The results show that levels of temporality significantly influence the duration of pedestrian engagement with segments. Higher levels of temporality correspond to longer activity duration (Figure 152). Study findings also revealed that this correlation occurs regardless of the activity being undertaken (Figure 153). This suggests that temporality might be linked to different degree of looseness and territoriality, indicating multiple uses and flexibility within segments that impact on inhabitant participation. Temporality extends beyond the regular daily rhythm of opening and closing segments in line with working hours along the streets (Bobic, 2004). Within the current research, it places greater emphasis upon segment's adaptability and flexibility, closely related

to physical affordances manifested through temporal or time-scale way. This specifically explores how inhabitants' engagement is affected by this quality.

According to the transitional edge evaluation (Theme I. 1) and activity duration (Theme 2. 2), it is evident that the segments scoring high and experiencing the most engagement are those able to accommodate periodic change and adaptability properly. This is consistent with the insights forwarded within temporality dimension (Theme I. 3) and, when combined with user engagement duration, highlights the impact of intervention temporality, function temporality, as well as re-design temporality upon inhabitant experience.

Intervention temporality can be understood as a form of physical affordance connected with time-scale. Such interventions are generally related to material elements that generate a long-term impact through quick to implement or small-scale changes. This underscores the interconnectivity between the form of temporality and interest of distinctiveness, further affirming the significance of physical manifestation in people engaging. Segments that usually contained intervention temporality tend to be more engaging compared to others along the street edge. This explains why cafés, food stalls or others, which were attentively decorated by segment owners to exhibit their products, greatly attract pedestrian attention. Beisdeis, due to the pedstrains vary, they used it primarily dependent upon their needs and desires. A striking example is segment 13 (animal café) of Leisure Street 1 (Figure 154). Beyond its function, it has substantial small-scale and high-level materiality, such as a variety of billboards, plant settings, and fence. Another notable instance is segment 11 (sausage store) of Everyday Street 2 (Figure 155), which pedestrian attention can be caught through window shopping and product display. These two notable examples vividly show greater engagement associated with temporal materiality. As Mehta (2007) contended, street vibrancy and liveliness are significantly influenced by varying affordances. Thus, these subtle yet regular changes in intervention temporality play a crucial role in

pedestrian engagement, either visually or physically.

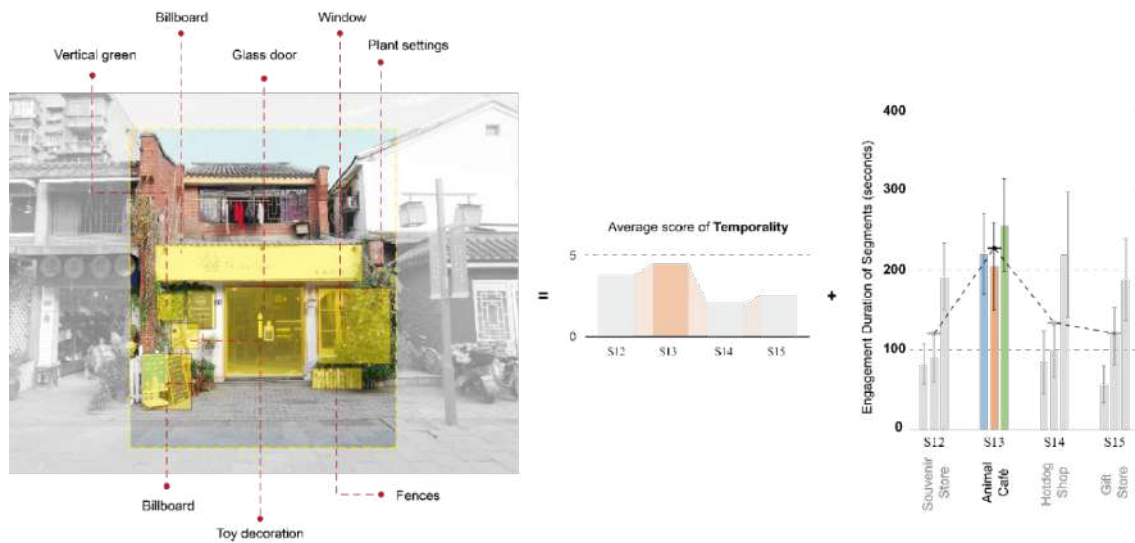


Figure 154 Intervention temporality of segment 13 (Café) of Leisure Street 1

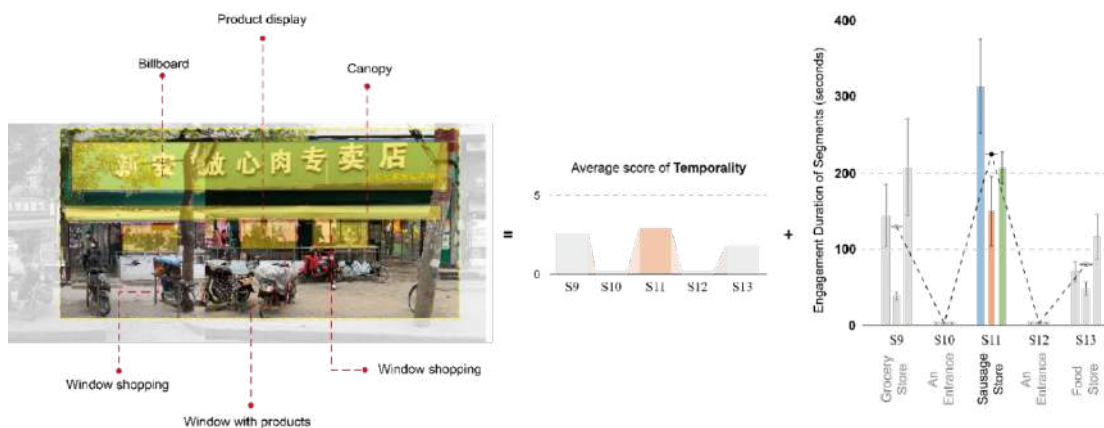


Figure 155 Intervention temporality of segment 11 (Sausage) of Everyday Street 2

Another notable form of temporality is *function change* within segments. This entails providing a fresh experience and territorialisation for street inhabitants along the street edge. This shift often arises from the limited adaptability and flexibility of the original segments. During revisits to the case study site after data collection, it was noticed that several segments had completely changed their functions. For instance, a previously closed shop transformed into a localised speciality store of Leisure Street 2 (Figure 156). This transformation was not solely influenced by shopkeeper's decision, but by the enriched socio-spatial complexities that stimulate social interaction. Likewise,

segment 16 of Everyday Street 4 transitioned from a clothing store to dumpling shop. The reason for this is segment owners decided to transform their business strategy, but more importantly, it could offers more opportunities for public engagement through this shift (Figure 157). Given the temporality feature of original territorial segments, they generally lacked the capacity for periodic adaptability and shift, resulting in lower levels of engagement compared to their surroundings. Overall, these changes represent intriguing ideas that emphasise the pragmatic significance of new territorialisation manifested through this temporality pattern.

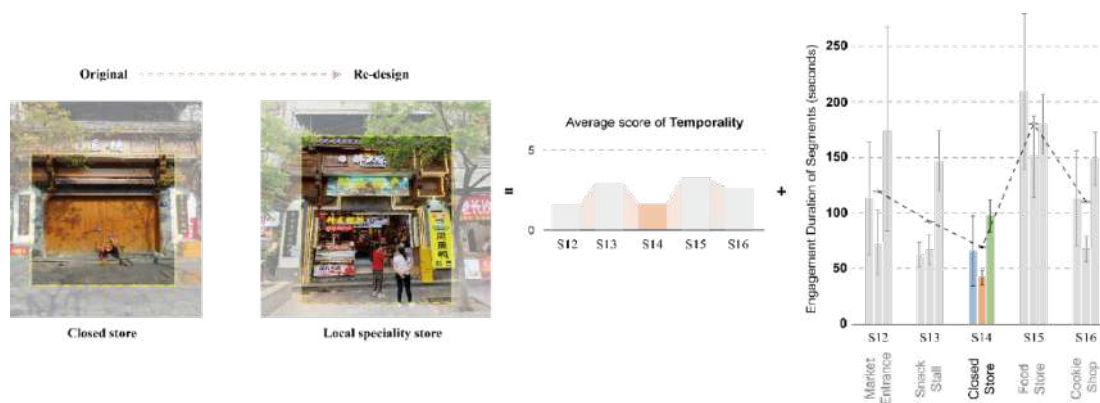


Figure 156 Function temporality of segment 14 of Leisure Street 2

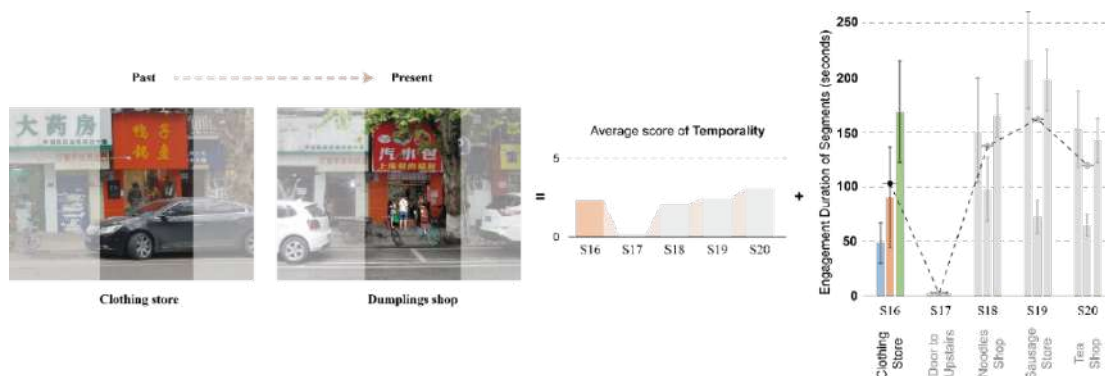


Figure 157 Function temporality of segment 12 of Everyday Street 4

In addition to the two temporality forms discussed above, *re-design temporality*, exemplified through the segment renovation from interior to exterior, offers another manifestation of temporality. Segment re-design usually involved re-territorialisation along the street edge, providing potential opportunity for inhabitant engagement and

promoting more social communication (Gehl, 2010). This impact can be noticed through the segment 14 (hotdog store) of the Leisure Street 1, evolving from a disengaged space to a distinctive one through temporality refurbishment (Figure 158). Similarly, segment 7 (stuffed bun shop) had rearranged its layout between indoor and outdoor, occupying the street edge interface to enhance spatial porosity of depth (Figure 159). This insight has echoed with Franck and Stevens' (2007) assertion that soft edges can mitigate the abruptness between public and private spaces. It is important to note that these two original segments exhibited lower engagement according to the activity duration. The potential reason for this is due to the original characteristics barely attracted pedestrian's attention to engage with. Such relatively large-scale changes, thus, attempt to promote sustained participation in varying activity tasks. however, due to the limitations of segment changing during research period, further investigation is needed to solidify these understandings in the future.

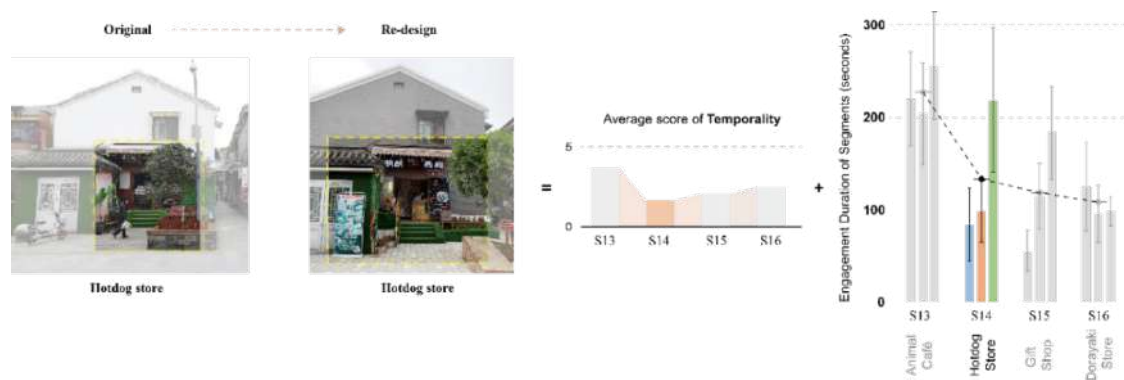


Figure 158 Re-design temporality of segment 14 of Leisure Street 1

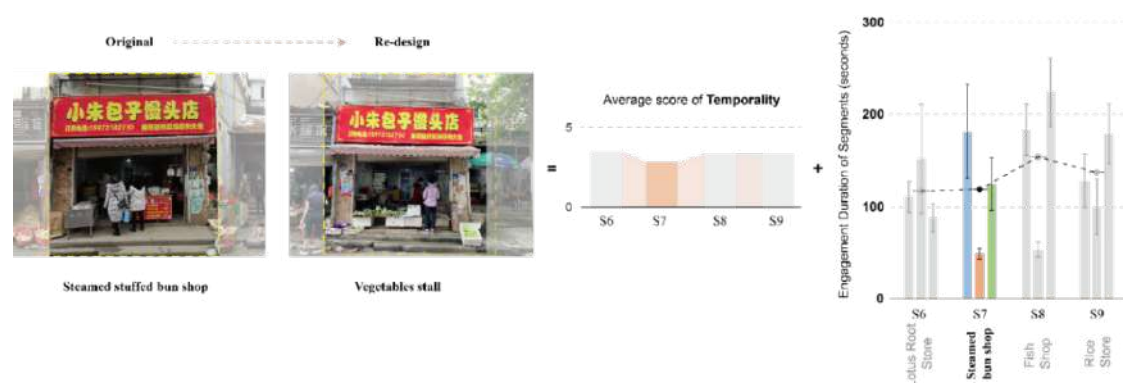


Figure 159 Re-design temporality of segment 7 of Everyday Street 1

Generally speaking, either large- or small-scale interventions and shifts within a segment tend to generate new social interaction and vitality, stimulating pedestrian engagement through visual or physical stimuli. Consequently, segment undergoing such changes tend to display greater engagement compared to those that were continuously static and unchanging of their physical forms for a long time. Insights from this part add new perspectives to temporality, emphasising its collaborative role with distinctiveness in encouraging social engagement.

6.3.3 Theme 3. 3

- a. Does ***openness*** attribute affect user's activity duration?
- b. Is openness influential across ***necessary / optional / social*** activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. It also conducted the same procedures and ways that were used in Theme 3. 1 (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5), whilst exploring the relationship between *openness* of varying scales and activity engagement with street edge segments. Through video recordings in combination with photographs displayed, it allows for an investigation of how a variety of segments were manifested through such transitional quality along the street edges, which project to activity duration.

Results

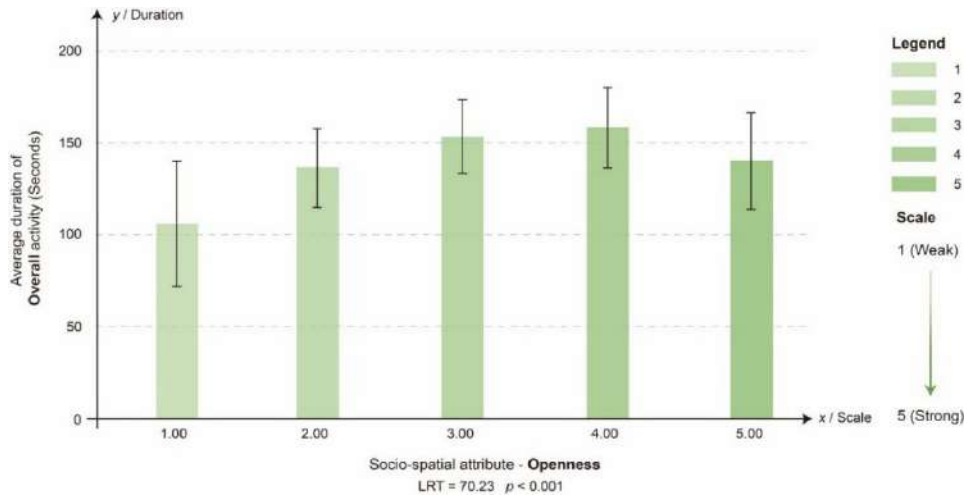


Figure 160 The influence of **Openness** quality upon the activity duration

Error bars represent 1 standard error

Openness had a highly significant influence upon the duration pedestrians engaged with street edge segments, with duration of activity increasing as openness increased (Likelihood ratio test (LRT) = 70.23, $p < 0.001$). The average duration varying by 46.42 seconds (94.43 seconds for Scale 1 vs. 124.89 seconds for Scale 4) (Figure 160). This feature more relates to visual and physical accessibility of segments, which facilitate pedestrian engagement duration.

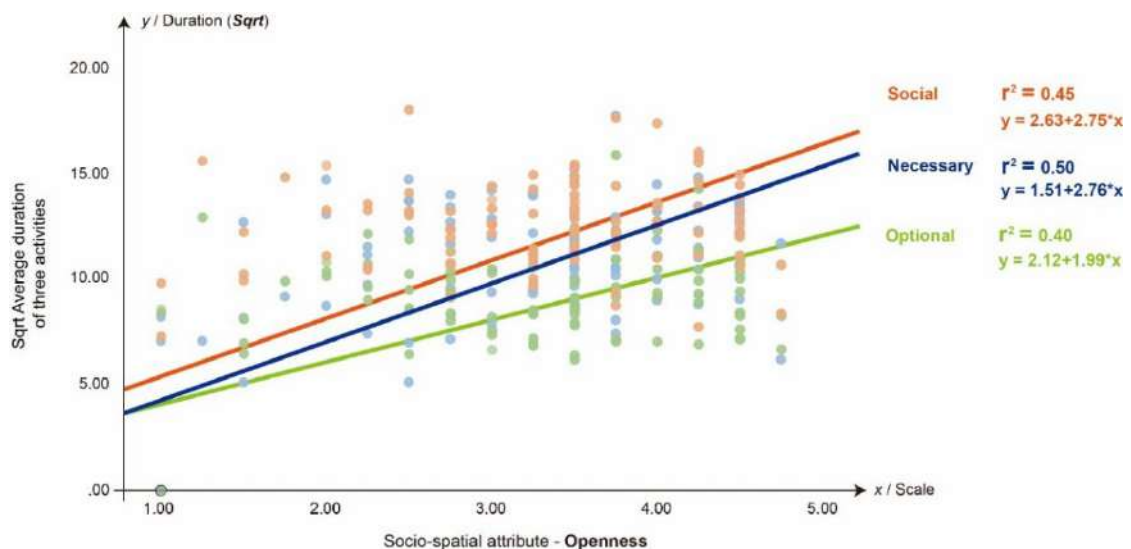


Figure 161 The correlation between **Openness** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Openness quality and, necessary activity task ($r = 0.50$, $r^2 = 0.50$, $p < 0.001$); optional activity ($r = 0.45$, $r^2 = 0.40$, $p < 0.001$); and social activity ($r = 0.46$, $r^2 = 0.45$, $p < 0.001$).

Findings Discussion – The influence of segment openness

The results clearly indicate that the level of openness had a significant impact upon engagement duration of segments. And segments characterised by high degrees of openness were shown to accommodate a longer duration of activity (Figure 160), regardless of what activities being undertaken (Figure 161). These results align with the ideas proposed by Gehl (1986) and Lopez (2003), who emphasised the key role of wide-open thresholds in determining the extent of activity engagement. Within the current study, it not only adds empirical validity to their concepts but delves deeper, illustrating how openness correlates with differing activities. Such insights move beyond the conventional notion that segment function was the primary factor impacting pedestrian engagement.

Openness, as a distinguishable lateral feature of segments, is closely tied to levels of *permeability* and *transparency*. Thwaites *et al.* (2013) have stated that permeability as physical accessibility and sensory experiences, including visual, olfactory and audible interactions between two adjacent realms. on the other hand, transparency is usually manifested through elements like windows, (curtain) doors, as well as other material forms that promote visual engagement. *Permeability*, across the edge space of segment from the interior to exterior, exists everywhere rather than being independent. This quality also interconnected with distinctiveness attribute to provide social opportunity. Segments that exhibit smooth lateral transition, facilitated by various affordances, tend to be the most engaging with the street edges. A striking instance is segment 8 (fish store) and 9 (rice store) of Everyday Street 1 (Figure 162). Here, segment owners adeptly occupy the edge space, which not only display the products

but foster potential social connections by bridging two separate realms. Another noticeable example can be seen in segment 6 (noodle store) and 7 (food store) of Everyday Street 2. Users were allowed to appropriate the open-ended space through moveable chairs provided by segment owners, effectively dismantling the intangible barrier between the indoor and outdoor (Figure 163). *Through this, diverse activities were behavioried by different groups with varying intentions, segment owners organise moveable chairs to occupy space, and pedestrians use these moveable charis for sitting resting, or sitting talking with friends.* These two compelling instances highlight that the greater permeability of these transitional realms, the higher the level of activity engagement between the building and street.



Figure 162 Level of **Permeability** of segment 8 and segment 9 of Everyday Street 1

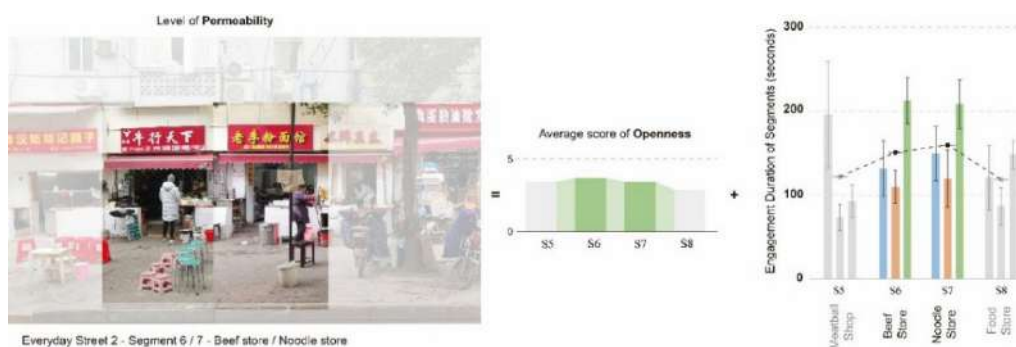


Figure 163 Level of **Permeability** of segment 7 and segment 8 of Everyday Street 2

Transparency, akin to permeability, is another form of openness that shares similar characteristics. Beyond physical accessibility, transparency is primarily associated with visual stimulation between indoor and outdoor realm. This feature is also linked with a segment's distinctiveness factor, either high-level or low-level physical affordances

introduced earlier in Theme I. 3. Segments that present varying levels of glazing, such as windows or doors, tend to draw engagement for longer durations than those lacking this feature. This is evident in segment 6 (café) and 7 (clothing store) of Leisure Street I (Figure 164). Disproportionally distributed windows and doors not only create lateral depth to encourage inhabitants lingering and observing within a segment, but manifest certain degree of public-private gradient. This insight aligned with the idea forwarded by Cullen (1979) and Thwaites *et al.* (2013), who argued that transparency affords pedestrians to experience the interaction between *here-ness* and *there-ness*. Another obvious example, besides, is segment 5 (food store) of Everyday Street 3 (Figure 165). This open-ended threshold between inside and outside was softened by a large window with glowing font, providing people opportunities for active engagement, in visual or olfactory way. Such understandings add new practical evidence to ideas discussed by Whyte (1988), Jacobs (1993), Porta and Renne (2005), and Gehl (2010), all of whom emphasised the significance of transparency in mediating interactions between the building and street, subsequently reflecting upon pedestrian duration.

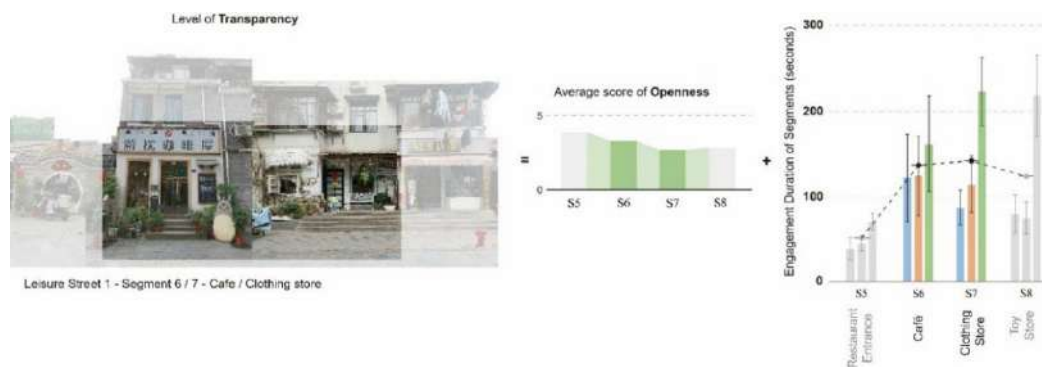


Figure 164 Level of **Transparency** of segment 6 and segment 7 of Leisure Street 1



Figure 165 Level of **Transparency** of segment 5 of Everyday Street 3

The findings discussed above provide empirical evidence that engaging segments not only have physical accessibility but rich visual attraction. Through this, such insights obtained through the everyday activities have validated the importance of openness quality, which in turn reflect upon pedestrian engagement with street edge segments. The examples demonstrated above reveals that there is no need for a segment too open. The reason for this is such segment could show a certain degree of *spatial expansion*, and *hide and reveal*, which will be explicitly discussed in the following section. And this also explains why Scale 3 and 4 are higher than Scale 5, Which is noticeable in Figure 164 and Figure 165.

6.3.4 Theme 3. 4

- a. Does **articulation** attribute affect user's activity duration?
- b. Is articulation influential across **necessary / optional / social** activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. It also adopted the same ways and progresses that were applied in Theme 3. I (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5), whilst exploring the relationship between *articulation* of varying scales and activity engagement with street edge segments. Through video recordings in combination with photographs displayed, it allows for an exploration of how these segments were manifested through such transitional lateral quality along the street edges, which project to activity duration.

Results

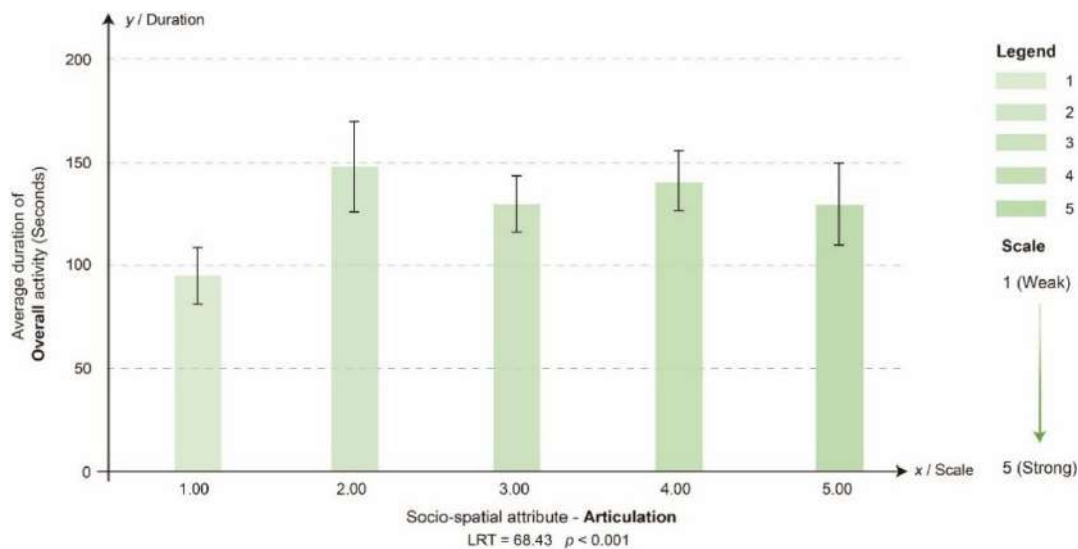


Figure 166 The influence of **Articulation** quality upon the activity duration

Error bars represent 1 standard error

Articulation had a highly significant influence upon the duration pedestrians engaged with street edge segments (Likelihood ratio test (LRT) = 68.43, $p < 0.001$), with duration varying by 52.36 seconds (94.78 seconds for Scale 1 vs. 147.14 seconds for Scale 2) (Figure 166). This feature greatly relates to a segment's spatial expansion and hide and reveal, which promote pedestrian engagement duration.

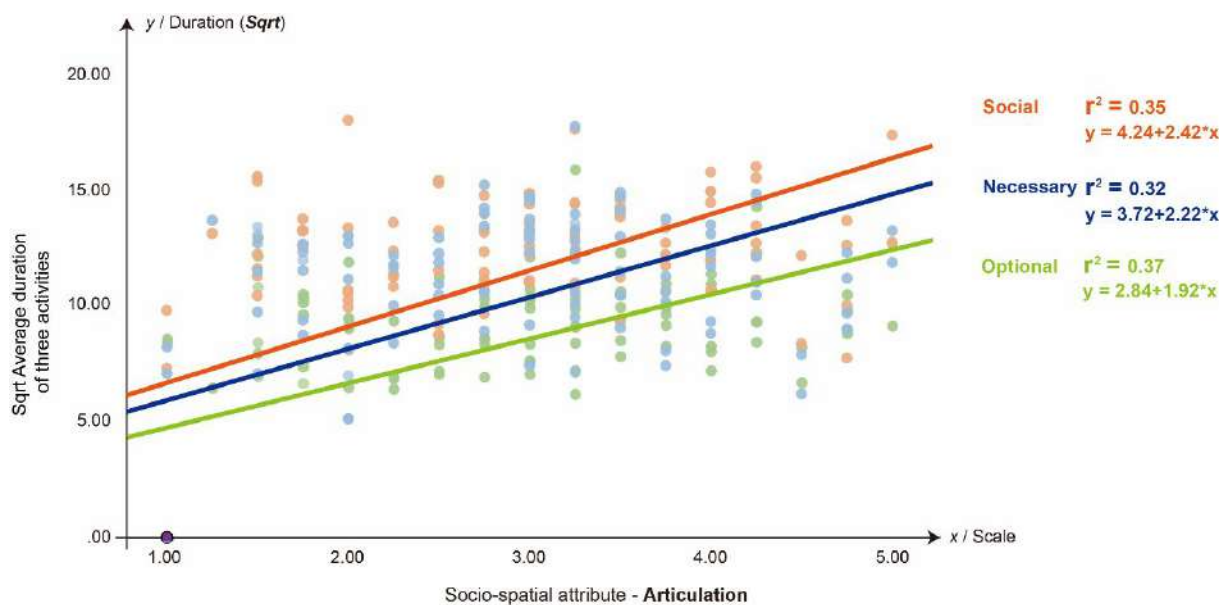


Figure 167 The correlation between **Articulation** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Articulation quality and, necessary activity task ($r = 0.57$, $r^2 = 0.32$, $p < 0.001$); optional activity ($r = 0.60$, $r^2 = 0.37$, $p < 0.001$); and social activity ($r = 0.59$, $r^2 = 0.35$, $p < 0.001$).

Findings Discussion – The influence of segment articulation

The results indicate a significant influence of articulation levels upon pedestrian engagement with segments. Figure 166 highlights a huge difference between each scale. Intriguingly, pedestrians averagely spent more time on scale 2 than other higher levels (from scale 3 to scale 5). Compared with other socio-spatial attributes, the goodness of fit of articulation property ($r^2 = 0.38$) was not as sound as them (Figure 184). In terms of the statistical analysis (Figure 167), it reveals a positive correlation for all levels, yet the goodness of fit for each activity is comparatively less robust than for other socio-spatial qualities. The results, within the current study, prompt a detailed consideration of how the articulation quality influence people's engagement with street edges.

Articulation can be recognised as a discernible lateral depth along street edge, usually manifested through setback or projection of a segment (Thwaites et al., 2020). This property is closely associated with *spatial expansion*, potentially influencing social interaction and offering opportunities for *hide and reveal*. Differing degrees of spatial expansion or retreat, thus, also associated with distinctiveness of interest within a territorial segment concerning physical affordances, granting individuals the choice of exposure or privacy for diverse activities. Segments exhibiting various degrees of spatial expansion, manifested through physical features like canopies or elements extending between the building and street, usually show greater engagement compared to those lacking such characteristics. This, again, relates to distinctiveness complexity ultimately encouraging pedestrians to engage with street edges. A striking example is segment 9 (perfume store) of Leisure Street 1 (Figure 168). The segment

is designed with a semi-enclosure space that clearly express lateral expansion, creating a transitional space between the building and street, adorned with various plant settings and toy installations. Similarly, this can also be seen through the segment 18 (noodle store), 19 (sausage store) and 20 (tea shop) of Everyday Street 4 (Figure 169). In these instances, segment owners provided large canopies, establishing a temporary semi-public or -private space that facilitate pedestrians to congregate. These examples emphasised that segments with greater lateral expansion tend to experience prolonged engagement duration within them.



Figure 168 Level of **Spatial Expansion** of segment 9 of Leisure Street 1

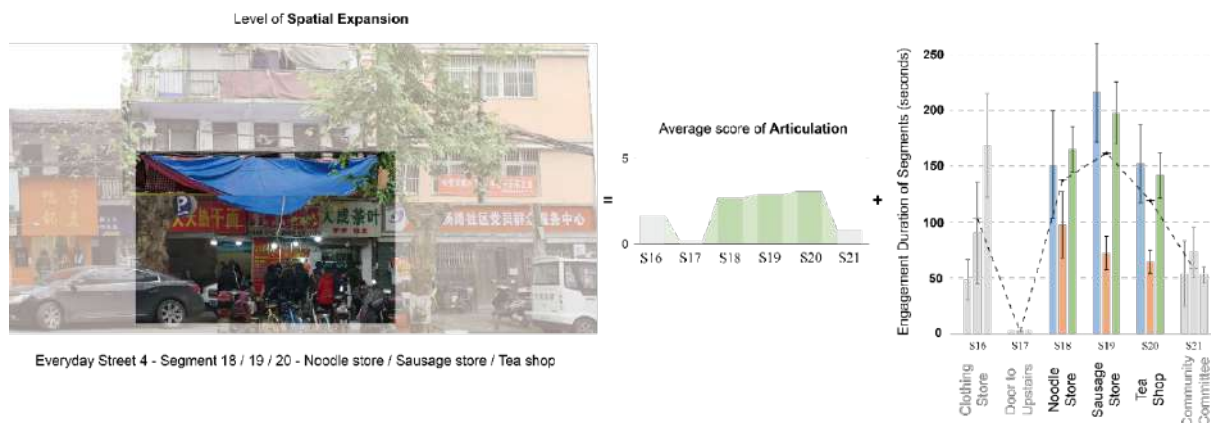


Figure 169 Level of **Spatial Expansion** of segment 18 / 19 / 20 of Everyday Street 4

Apart from spatial expansion, *hide and reveal* is another spatial element of public-private gradient of articulation attribute. This feature allows people to choose between being public or private when to be sociable (Thwaites et al., 2013). It introduces varying

degrees of spatial porosity into the street environment where people interact. This can be seen through segment 7 (clothing store) of Leisure Street 1 (Figure 170). Here, step setback offers a degree of privacy while allowing for interaction with neighboring spaces. This could involve overheard conversations, faint music from a nearby café, or observing passersby. Another notable example is segment 5 (vegetable stall) of Everyday Street 1 (Figure 171). The placement of products straddling the indoor and threshold gives the segment owners the option to be hidden-ness from unwanted contact, or to be revealing-ness based upon their preference (Jacobs, 1993; Martin, 1997; Thwaites et al., 2013). These instances provide empirical insight into how this quality significantly influences engagement and duration of street inhabitant. Overall, such space often has higher demand on segment’s territorialisation, indicating that segments are dynamic and evolutionary, rather than static (Thwaites et al., 2020).

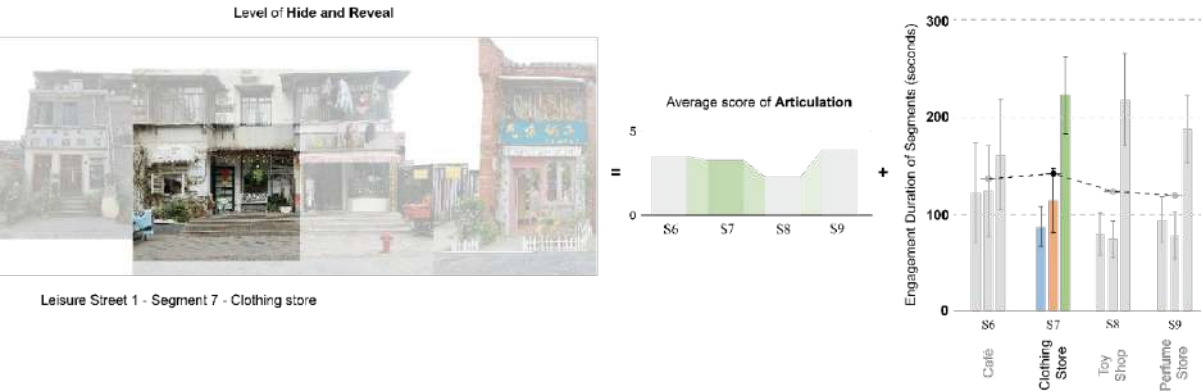


Figure 170 Level of *Hide and Reveal* of segment 7 of Leisure Street 1

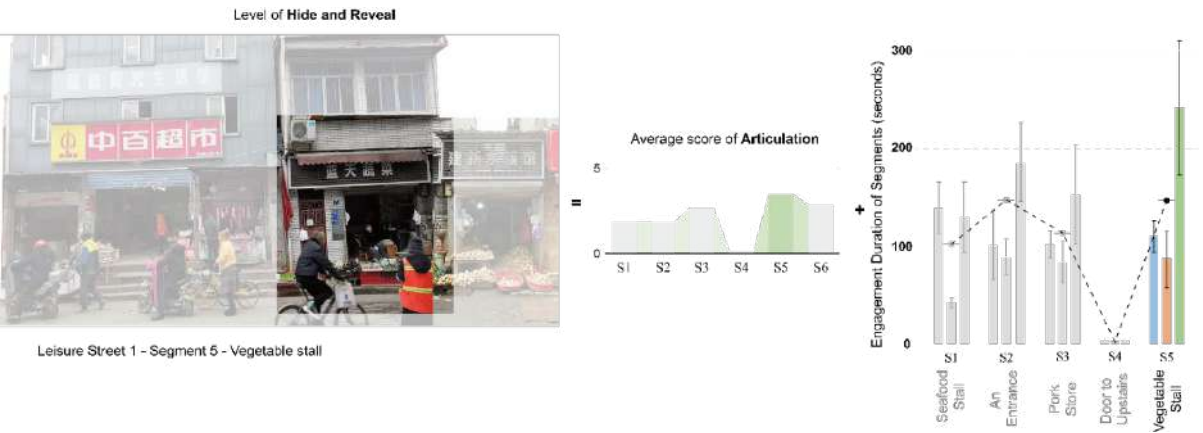


Figure 171 Level of *Hide and Reveal* of segment 5 of Everyday Street 1

In terms of exploring the relationship between articulation and varying activity tasks, the understandings gained through the real-world study have empirically emphasised the significance of segment's laterality. Activity duration of each score is relatively consistent compared with other attributes. This, in turn, manifests that lateral depth created by spatial affordances has the potential to impact activity engagement and duration within territorial segments along street edges across the scores, which can be seen through Figure 170.

6.3.5 Theme 3. 5

- a. Does *appropriation* attribute affect user's activity duration?
- b. Is appropriation influential across *necessary* / *optional* / *social* activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. It also used the same ways and procedures that were applied in Theme 3. I (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5), whilst exploring the relationship between *appropriation* of differing scales and activity engagement with street edge segments. Through video recordings in combination with photographs displayed, it allows for an investigation of how these territorial segments were manifested through such transitional locational feature along the street edges, which reflect upon activity duration.

Results

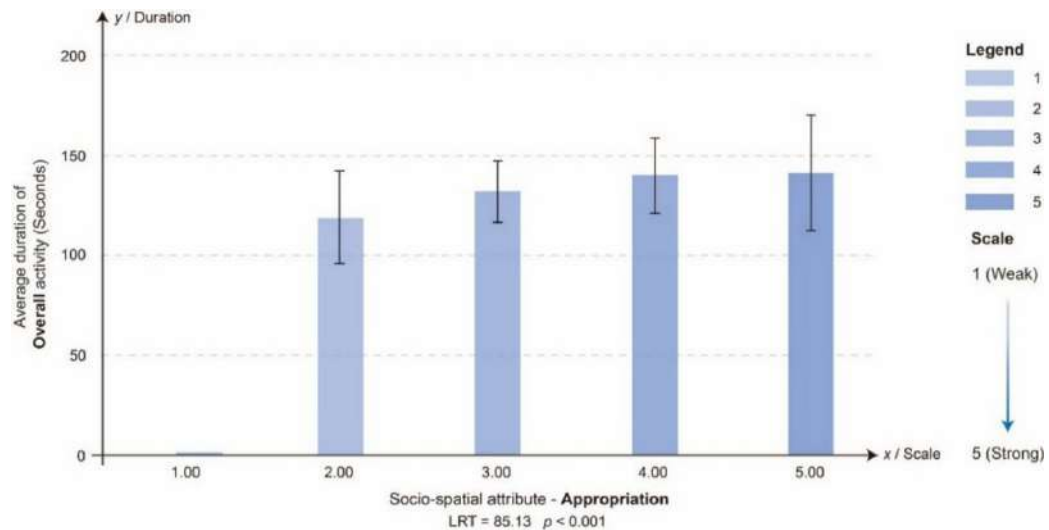


Figure 172 The influence of **Appropriation** quality upon the activity duration

Error bars represent 1 standard error

Appropriation had a highly significant influence upon the duration pedestrians engaged with street edge segments, with duration of activity increasing as appropriation increased (Likelihood ratio test (LRT) = 85.13, $p < 0.001$). The average duration varied by 141.18 seconds (0 seconds for of Scale 1 vs. 141.18 seconds for Scale 5) (Figure 172). This quality more relates to a segment's looseness and social interaction. The appropriation quality, therefore, has greatly impact upon users' engagement duration.

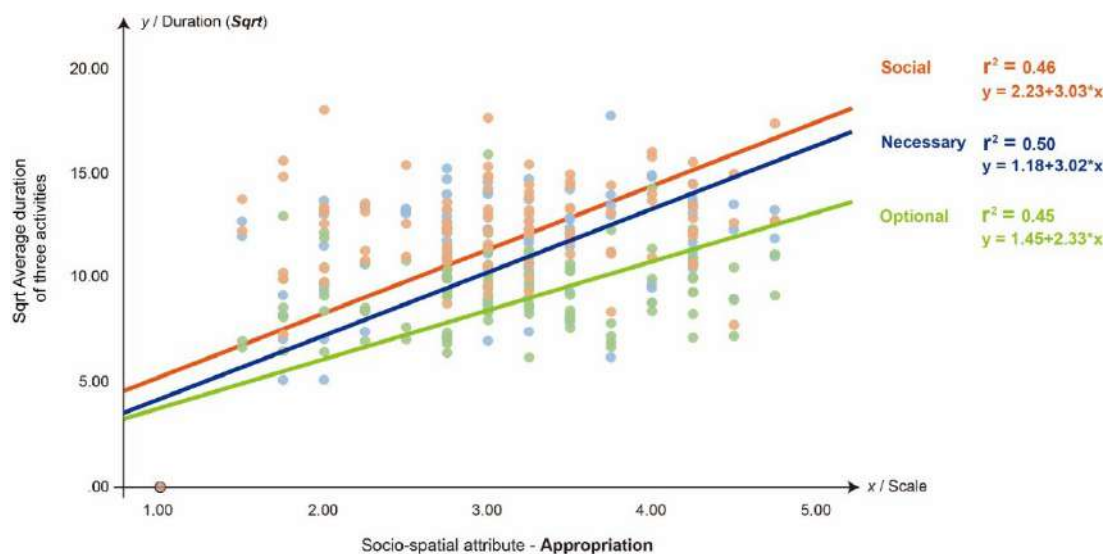


Figure 173 The correlation between **Appropriation** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Appropriation quality and, necessary activity task ($r = 0.76$, $r^2 = 0.50$, $p < 0.001$); optional activity task ($r = 0.67$, $r^2 = 0.45$, $p < 0.001$); social activity task ($r = 0.68$, $r^2 = 0.46$, $p < 0.001$).

Findings Discussion – The influence of segment appropriation

The results illustrate that levels of appropriation had a significant influence upon the duration of pedestrian engagement with segments. Figure 172 shows high engagement throughout all scales except scale I, reflecting a strong goodness of fit ($r^2 = 0.53$) as seen in the statistical analysis (Figure 184). Following this, each specific activity task presents a positive correlation with robust goodness of fit (Figure 173). These results have resonated with the notions proposed by Thwaites *et al.* (2020), emphasising that territorial appropriation is closely associated with a segment's looseness, which, in turn, facilitates social interaction. The current investigation delves into how the duration of activity is influenced by appropriation quality, and the importance of such property within street edge segments.

Appropriation quality, a distinct attribute of localised segments, is inherently linked with *looseness*. Franck and Stevens (2007) argued that loose space can be considered as a realm that is ambiguous, freedom through use, and diverse possibilities. Loose space, besides, has the potential to be a stage of encounter, sparking spontaneous and unexpected actions. It is readily appropriated to express its flexibility and adaptability. Through this, differing degrees of *social interaction* can be facilitated by such feature, holding implication for promoting sense of attachment (Thwaites et al., 2020).

Connected to the way permeability allowed the physical accessibility of a segment to be engaged is the way *looseness* stimulated multiple possible engagement with the segments. In other words, segments that presented certain levels of looseness, manifested as open-ended or without identified function, were generally engaged to a

greater extent than those that did not. This is, again, associated with complexity of pedestrians' intentions, providing opportunities for the expression of both individual and collective identity. Built upon this insight, a notable example is segment 8 (Fish store) / 9 (Rice store) / 10 (Electronic store) / 11 (Gas store) of Everyday Street 1 (Figure 174). It can be found that a variety of activities were generated in realm between the segment and street, such as street dwellers gathered to play cards or chitchat, infusing the street with a temporary sense of looseness. Or similarly, street vendors appropriated the unidentified edge space to exhibit and sell their products. Beyond this, another prominent instance is segment 6 (beef store) and 7 (noodle store) of Everyday Street 2 (Figure 175). Shopkeepers provided an abundance of movable chairs, transforming this area from its original vacant space into a loose space. Here, pedestrians engaged in various activities, such as dining or resting, to facilitate social interaction. These instances reflect a group of segments that demonstrate varying levels of looseness through localised flexibility and adaptability. This have echoed with the ideas argued by Habraken (1998), Madanipour (2003, 2010), as well as Dovey and Raharjo (2010), underscoring the importance of looseness in infusing social vitality through innovate uses and creative approaches.

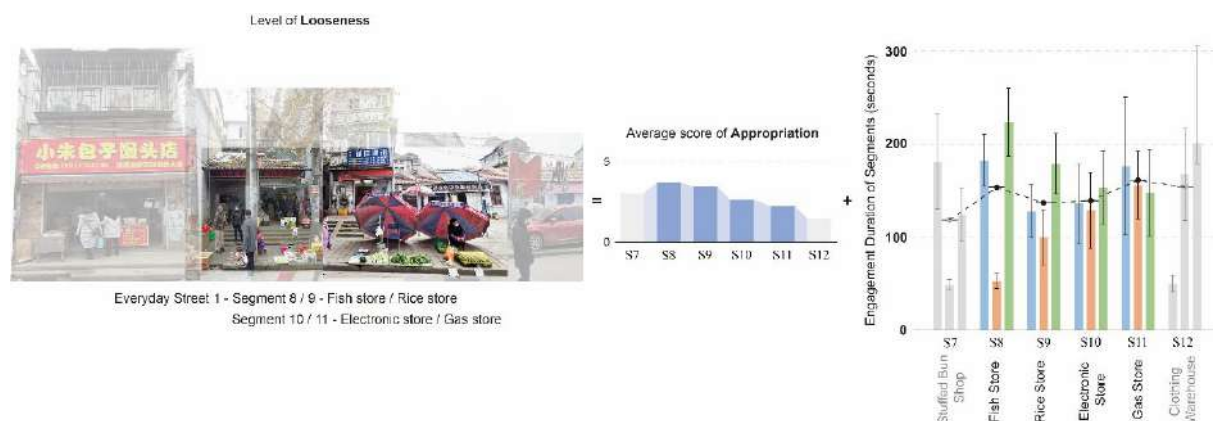


Figure 174 Level of **Looseness** of segment 8 / 9 / 10 / 11 of Everyday Street 1

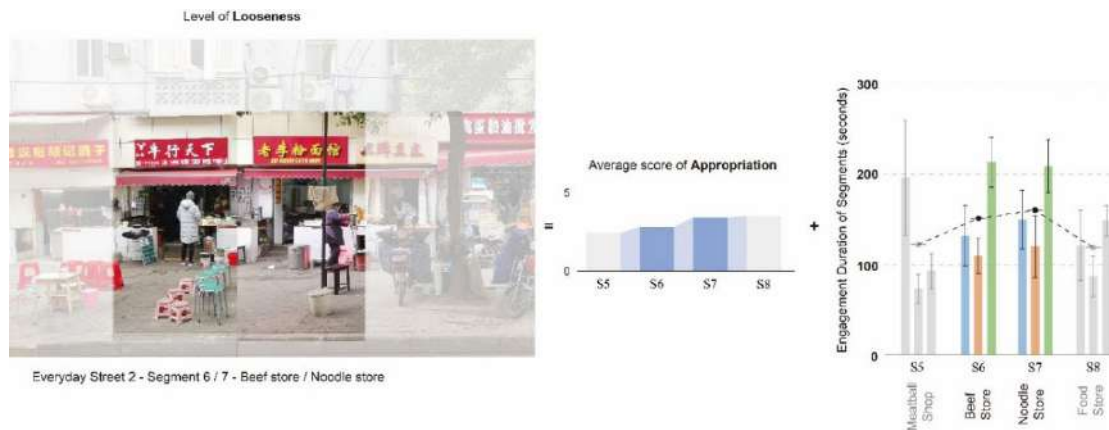


Figure 175 Level of **Looseness** of segment 6 / 7 of Everyday Street 2

Based upon the above discussion, it is evident that this quality aims to provide fertile ground for *social interaction*, thereby influencing engagement duration. Through this, it is intricately linked to the distinctiveness of interest within a territorial segment, directly impacting how pedestrian engage with street edges. This is because certain segments can attract pedestrian engagement, facilitating fleeting or enduring encounters that contribute to social identity and cohesion (Thwaites et al., 2013). This insight is exemplified by segment 14 (Hotdog store) of Leisure Street 1 (Figure 176). Physical affordance, such as tree seats and street chairs, attracted a lot of street inhabitants to engage with this space. Likewise, segment 21 of Leisure Street 2 (Figure 177) served not only as an entrance but featured a temporal stall to highlight its distinctiveness compared to surroundings. This arrangement enhanced the connection between the indoor and outdoor. These segment instances, overall, vividly demonstrated the potential for social interaction, which is closely tied to varying levels of looseness. Following this, such insights contribute fresh empirical understandings in alignment with the perspective of Hoogland (2000), Franck and Stevens (2007) and Thwaites *et al.* (2013), who maintain that sense of place could be forged through spontaneous social encounters with inhabitants.



Figure 176 Level of ***Social interaction*** of segment 14 of Leisure Street 1



Figure 177 Level of ***Social interaction*** of segment 21 of Leisure Street 2

In terms of findings discussed above, overall, it can be obtained that territorial segments engaged with a longer duration often have capacity to attract pedestrians conducting unexpected behaviors, which form a temporary loose space. The discussion also emphasised that social interaction is connected with segment distinctiveness to heighten the importance of looseness for people engaging, whilst highlighting how such physical affordances influence segment engagement. In this way, it, in turn, reveals that those closed or harshly divided segments barely offer loose space to promote potential social interaction (Figure 74 and Figure 75). And this evidences why the score of 1 is so low as a result of few activities generated in these segments.

6.3.6 Theme 3. 6

- a. Does **occupation** attribute affect user's activity duration?
- b. Is occupation influential across **necessary** / **optional** / **social** activity task?

Method

The approach taken is mixed-method approach, this includes video recording and socio-spatial evaluation. It also adopted the same procedures and ways that were applied in Theme 3. I (Part 2 Video recording and measuring socio-spatial attributes; Chapter 5), whilst exploring the relationship between *occupation* of differing scales and activity engagement with street edge segments. Through video recordings in combination with photographs presented, it allows for an investigation of how these territorial segments were manifested through such localised expression along the street edges, which reflect upon activity duration.

Results

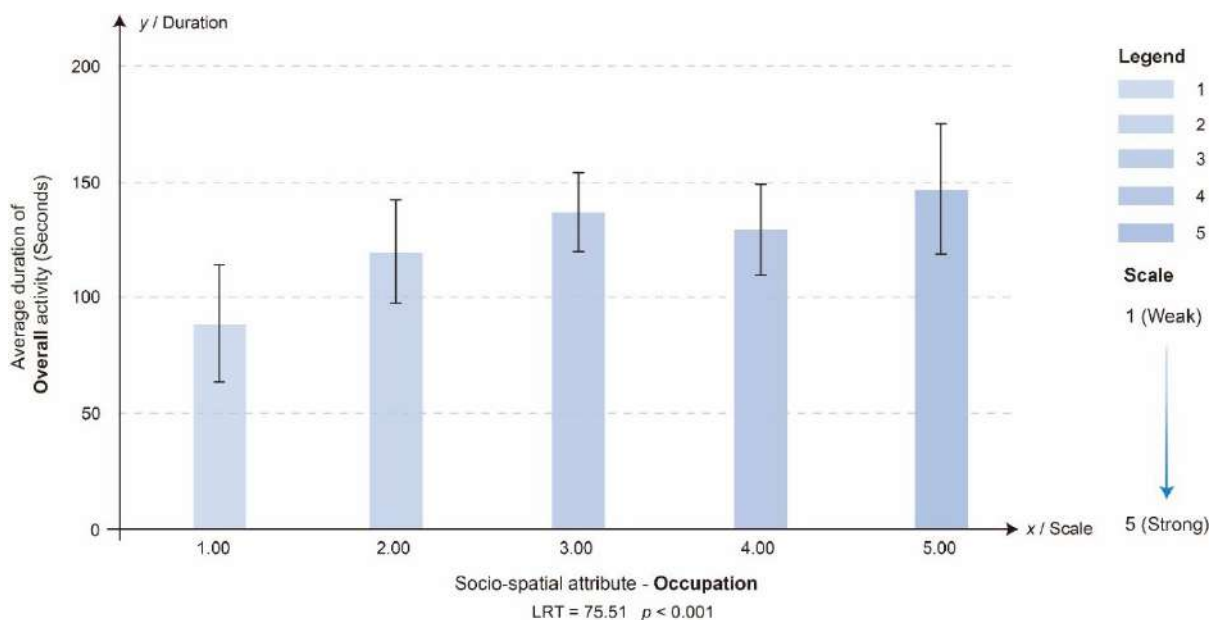


Figure 178 The influence of **Occupation** quality upon the activity duration

Error bars represent 1 standard error

Occupation had a highly significant influence upon the duration pedestrians engaged with street edge segments, with duration of activity increasing as occupation increased (Likelihood ratio test (LRT) = 75.51, $p < 0.001$). The average duration varied by 57.99 seconds (88.84 seconds for Scale 1 vs. 146.83 seconds for Scale 5) (Figure 178). This feature primarily relates to a segment's enclosure and social activity. The occupation quality, thus, has greatly impact upon pedestrian engagement duration.

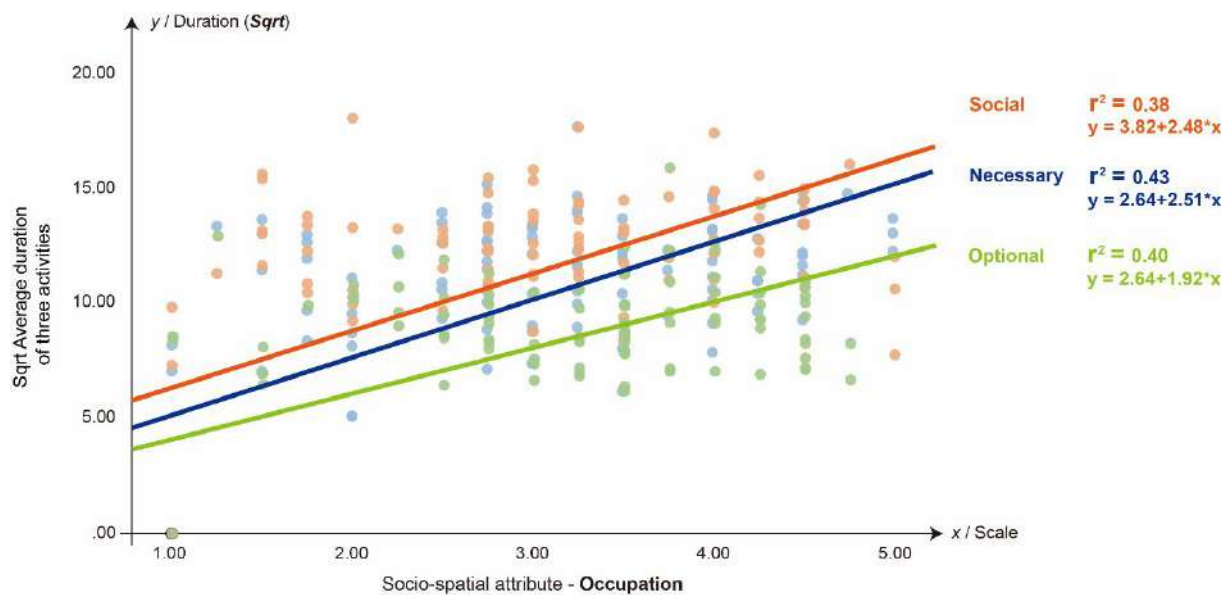


Figure 179 The correlation between **Occupation** quality and average duration of activity engagement with street edge segments

The output showed that there is a significant positive correlation between Occupation quality and, necessary activity task ($r = 0.66$, $r^2 = 0.43$, $p < 0.001$); optional activity ($r = 0.62$, $r^2 = 0.40$, $p < 0.001$); and social activity ($r = 0.62$, $r^2 = 0.38$, $p < 0.001$).

Findings Discussion – The influence of segment occupation

The results show that a significant correlation between the level of occupation and the duration of pedestrian engagement with segments. Higher levels of occupation

corresponded to extended durations of activity (Figure 178). Moreover, as the level of occupation increased, there was a noticeable trend of prolonged engagement duration. In-depth analysis (Figure 179) reveals that while all activities presented a positive correlation, the goodness of fit for each activity was relatively less robust than other socio-spatial qualities, as evident in Figure 184. These results offer a compelling opportunity for a comprehensive exploration of how occupation quality influence people's engagement with street edges.

Occupation, as a characteristic of segment, refers to its recognisable localised expression along street edge, which is usually manifested through *enclosure* of a segment (Thwaites et al., 2020). This nature is inherently linked to the threshold between interior and exterior, thereby stimulating social activities and opportunities for hide and reveal. A certain degree of enclosure facilitates the creation of identifiable lateral semi-public/private space within a territorial segment, in response to vibrant social interactions and distinctive *territoriality* and *personalisation*.

Segments that presented varying levels of enclosure, in conjunction with high- / low-level of physical affordance (Theme I. 3), such as billboards, products or plant settings etc., tend to more engaged than those lacking it. This quality not only involves material complexity to convey its distinctiveness, but intertwines with lateral depth to express spatial expansion, forming semi-public/private space. For instance, segment 9 (perfume store) and segment 16 (dorayaki store) in Leisure Street 1 exhibited a prominent spatial expansion through fence, art decoration and nature elements, creating a transitional sub-space that enhances social interaction for pedestrians (Figure 180). Conversely, segment 16 (dorayaki store) presented another form of laterality – spatial retreat – to shape a setback enclosure (Figure 181). Such crinkled space offers a sense of protection through semi-enclosure, allowing users to choose socialising or hiding. These two eminent instances illustrate the varying forms of enclosure can create spatially distinct sub-spaces, making them more recognisable

and engaging. This, in turn, holds implication for territorialisation and personalisation, which will be discussed in the following paragraph.

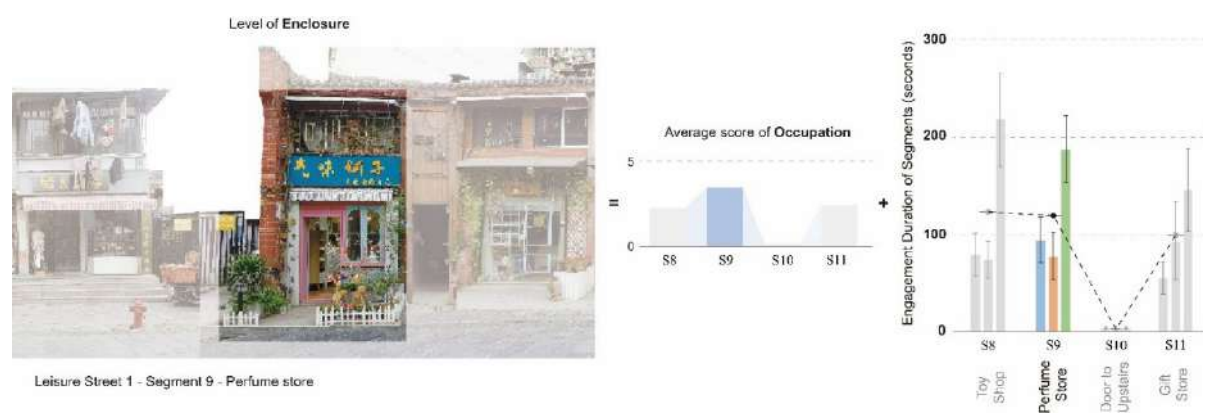


Figure 180 Level of *Enclosure* of segment 9 of Leisure Street 1

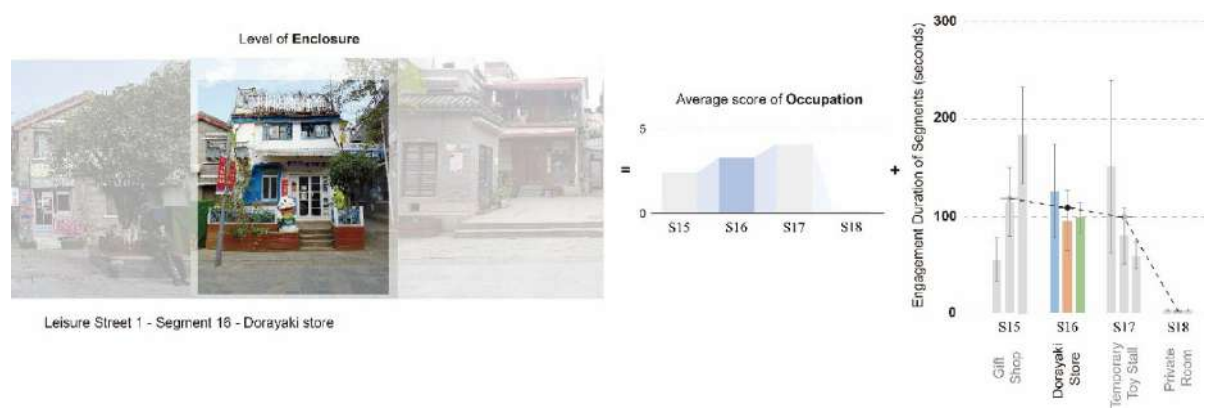


Figure 181 Level of *Enclosure* of segment 16 of Leisure Street 1

Connected to the way enclosure allowed the lateral porosity of a segment to be engaged is the way *territoriality* stimulating pedestrian active engagement with the segments. In other words, users were encouraged to express their personalisation through territorialisation, significantly influencing their engagement duration along street edges. This space is in-between the public and private territories, striving for a balance between private control and public use (Altman, 1975; Thwaites et al., 2013). A prominent example can be seen through segment 17 (fruit store) and 18 (nut store) of Everyday Street 1 (Figure 182). Although the street edge intrinsically stands for a shared space, both shopkeepers exhibited territorialisation through displaying product

to signify the potential social activity and interaction. In doing so, this realm serves as a showcase, offering insights into the everyday rhythms and lifestyle of the segment owners. Another illustration is found in segment 4 (commodity store) and 5 (food store) of Everyday Street 3 (Figure 183). These segments exhibit varying degrees of territorial depth through factors such as open entrance space and clear transparency. This provides opportunities for pedestrians to engage in intensive interaction through occupying or personalising such transitional space, either physically or visually. Such insights empirically validate the ideas forwarded by Newman (1973), Altman (1975), Hoogland (2000), Franck and Stevens (2007), as well as Thwaites *et al.* (2013), all of whom emphasise the significance of territorialisation and personalisation along street edges. It also indicates that none of street edges were able to be proportionally engaged throughout the whole extent, in contrast to their surroundings.



Figure 182 Level of **Territoriality** of segment 17 / 18 of Everyday Street 1

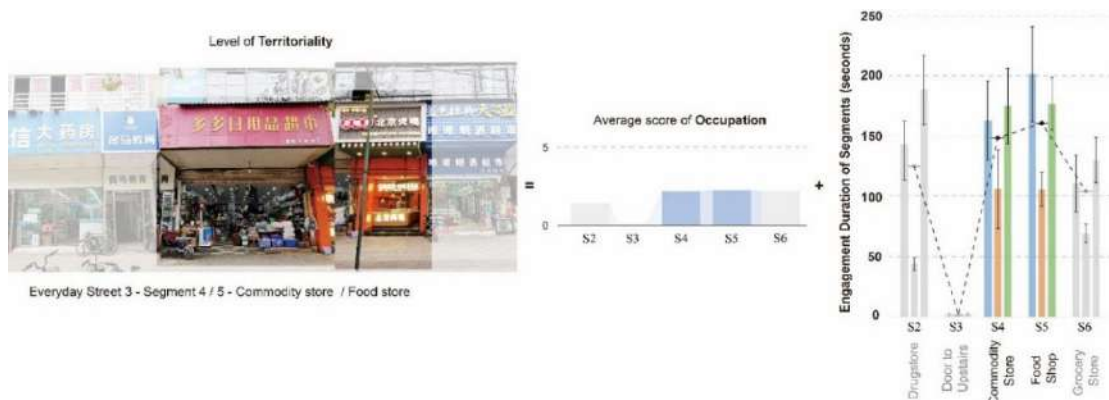


Figure 183 Level of **Territoriality** of segment 4 / 5 of Everyday Street 3

Based upon the findings discussed above, overall, the insights gained through the real-world investigation suggest that occupation quality have the potential to impact engagement with street edge segments. Significantly, research findings also highlighted how physical affordance and territoriality contribute to social activity, which in turn facilitate social communication and development.

Theme 3 – Findings Summary

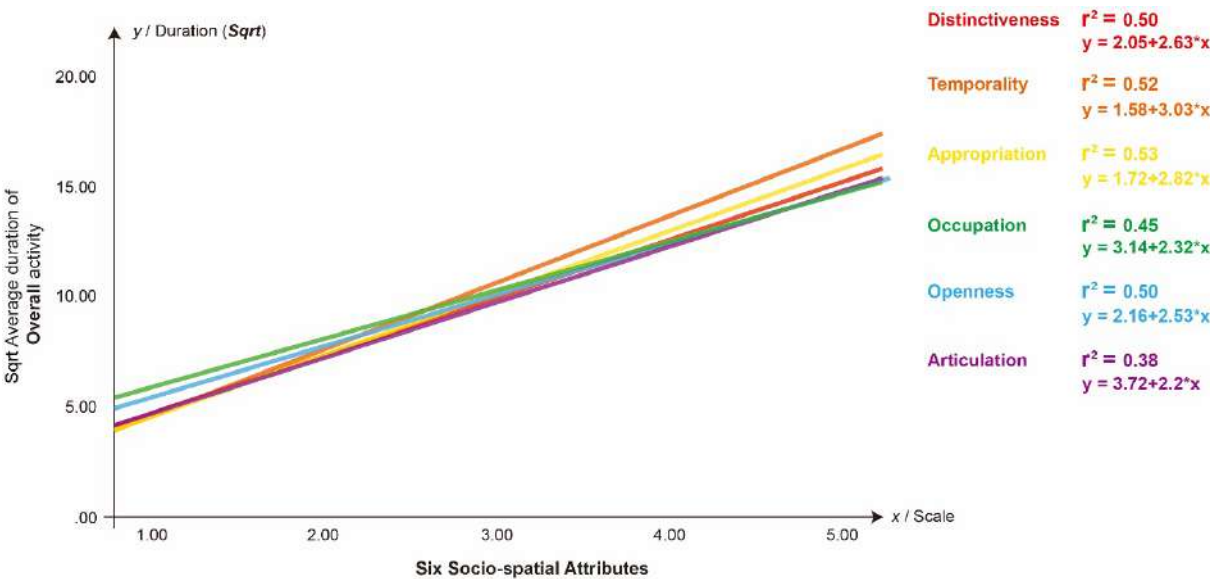
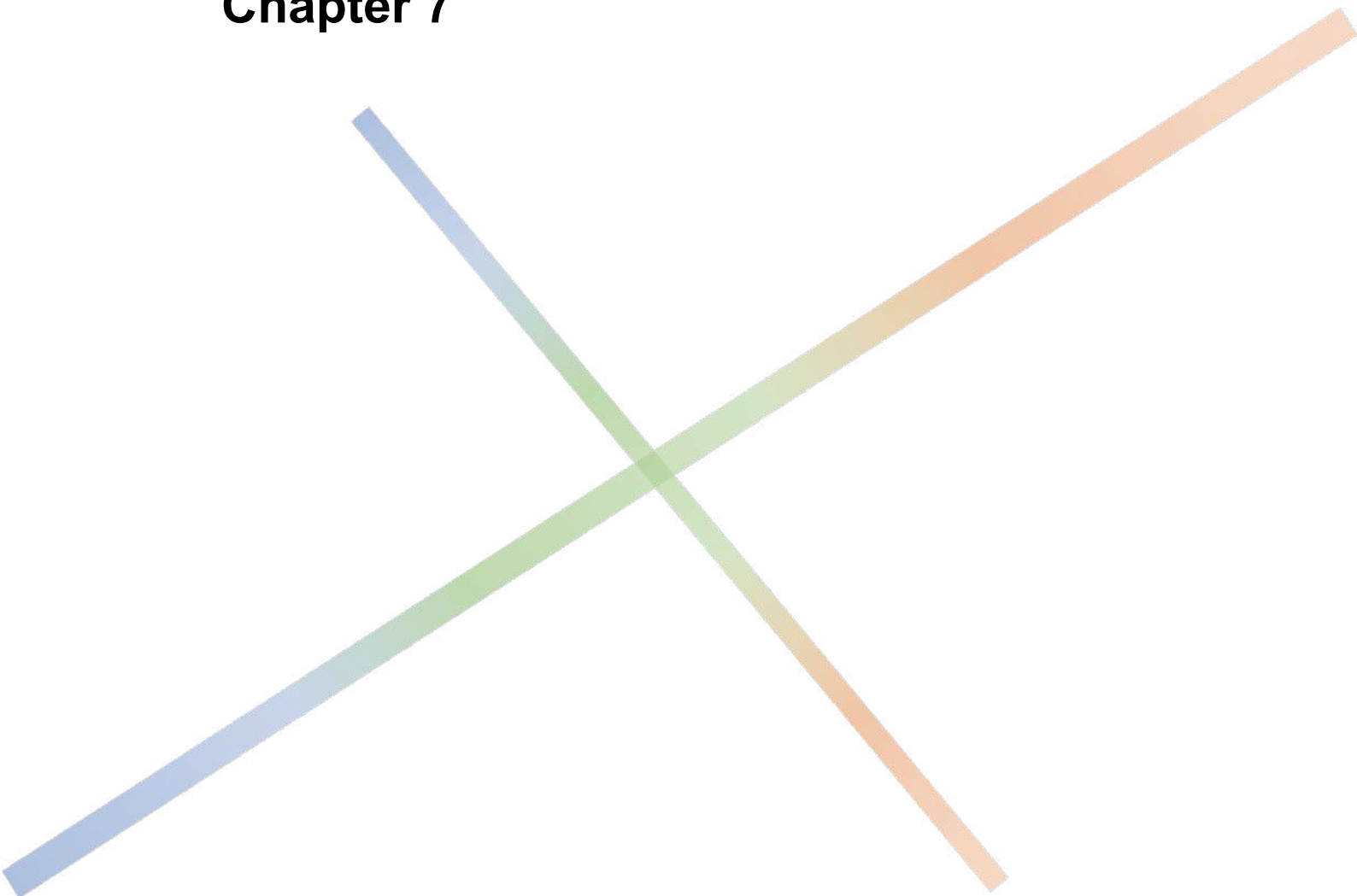


Figure 184 The correlation between socio-spatial attribute and average duration of overall activity engagement with six street edges

As demonstrated above, the findings demonstrate that all six socio-spatial attributes significantly influence upon the duration of pedestrian engagement with street edge segments (Figure 184). This provides substantial evidence that segment’s socio-spatial characteristics play a crucial role in the duration of activities undertaken by street inhabitants within the Chinese urban village analysed, either necessary, optional or social. Upon examination, it becomes evident that all these attributes are, to varying degrees, intertwined with materiality of interest, particularly in *distinctiveness*,

temporality, **openness** and **appropriation**. This is due to the fact that street inhabitants were drawn to segments possessing these qualities, which directly acquire sense of place and self-identity through their everyday behaviors. Although **articulation** and **occupation** properties also interconnected with distinctiveness quality as well, their influence is not as pronounced. The reason for this is space and place associated with these two qualities indirectly shape engagement and facilitate rich social interaction. In summary, the findings not only add insight to the central assertion of Theme 3 – pedestrian engagement will be greatly influenced by socio-spatial attributes of street edge segments, but also emphasise the close relationship with territorial materiality. Overall, the current research have quantitatively examined how socio-spatial attributes influence everyday activities at the scale of street edges and segments, particularly in Chinese urban villages.

Chapter 7



Discussion

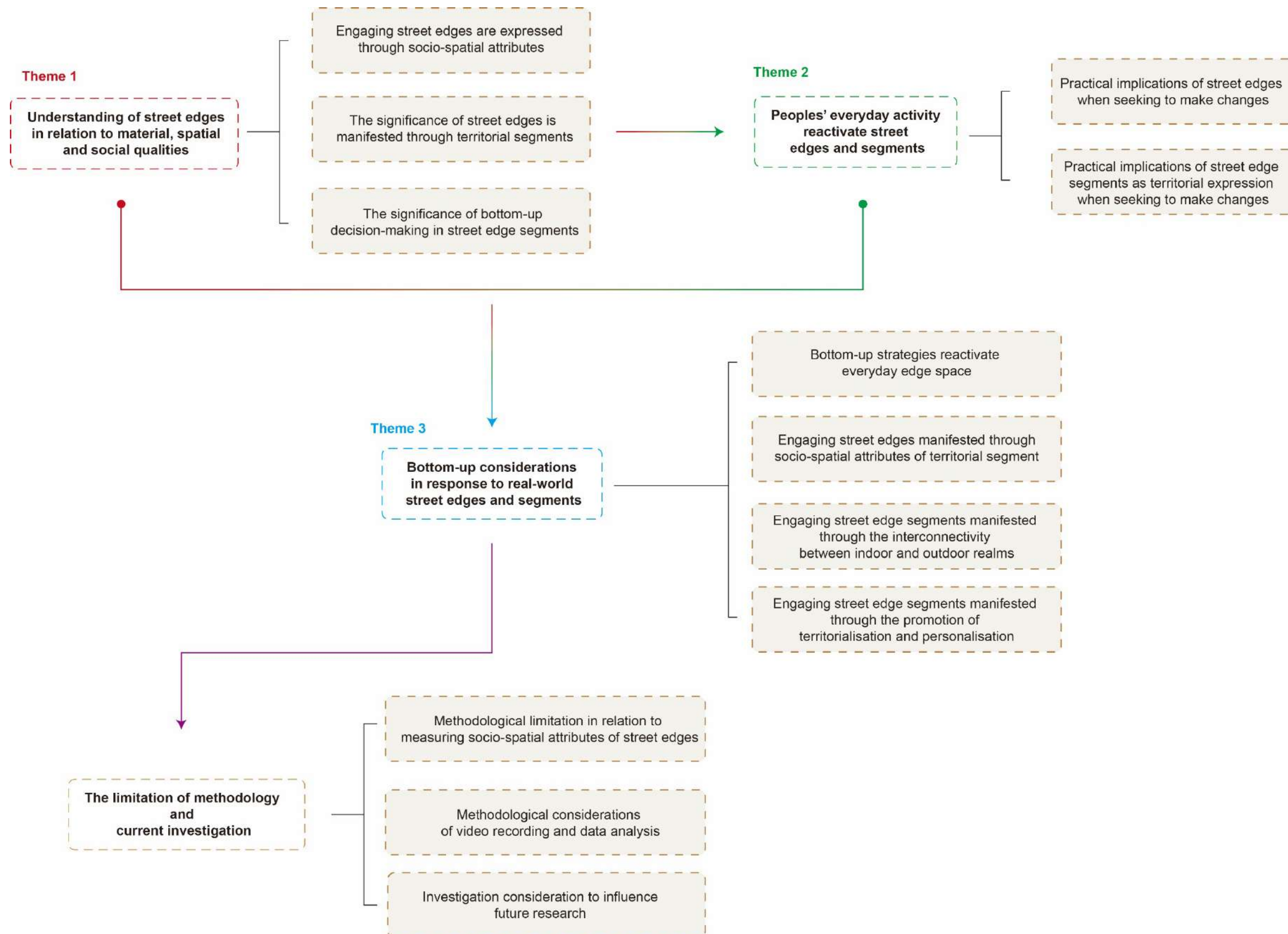


Figure 185 Overall Flow map of Chapter 7

This chapter looks to contextualise the research findings in line with the existing Chinese urban village trends introduced within Chapter 2. The Results (Chapter 7) presented various insights derived from video recording investigation, shedding light upon the significance of socio-spatial qualities embedded in territorial segments for street edge engagement. These insights were in response to research questions raised within each section and were built upon the conceptual street edge framework established in Chapter 3. It is important to note that previous studies have often placed greater emphasis upon theoretical exploration, which has resulted in findings that regularly fail to address real-world issues to generate profound impact in practice. Consequently, the current research strives to develop a framework in response to socially responsive street edges, particularly in the context of Chinese urban village. Moreover, previous studies failed to fully explore street edge issues related to socio-spatial attributes, including rigid localised threshold between inside and outside, a lack of lateral depth, and inactive overall street extent. These issues contribute to the decline and loss of social interaction (Theme 1). The findings acquired from this study thus should pay attention to these aspects, which will be further elaborated upon Theme 2 while drawing insights from Theme 1. Notably, Theme 3 is established from the synthesis of the previous two themes, highlighting the application of bottom-up considerations in addressing real-world street edge challenges. Lastly, it is a reflective review of the entire research (Part 4). This part focused on methodological reflections related to video recording as a major data collection approach and its limitations, along with its implications for future study.

7.1 Theme I: Understanding of street edges in relation to material, spatial and social qualities

7.1.1 Engaging street edges are expressed through socio-spatial attributes

The characteristics discussed earlier build upon a broad range of socio-spatial perspectives, delving into the dynamics of human-environment relations. They

highlight how the development of Chinese urban villages has been heavily shaped by large-scale, top-down processes of urbanisation, particularly buildings and streets. The chapters on the existing trends of street edges (Chapter 2) and conceptual street edge framework (Chapter 3) explicitly explore the understanding of socio-spatial qualities that ultimately contribute to vitality of street edges. These qualities encompass *material* (distinctiveness, temporality), *spatial* (articulation, openness) and *social* (occupation, appropriation) attributes of street edges (Thwaites et al., 2020), with a strong emphasis upon understanding their social value. While urban experts may provide professional design and technical guidance as appropriate, the emphasis is upon how street users can contribute through small-scale interventions and adjustment. This underscores the influential role of street inhabitants, not only in engaging with public space, but in recreating and reproducing them in alignment with their intentions and desires (Moreau, 2022). These features highlight the concepts of personalisation and ownership, which have the potential to foster public engagement and collective understanding, enriching the comprehension of space and place.

Throughout the finding discussion, it becomes evident that social actions of users, as they territorially interact with the street through activities and needs, greatly impact the extent to which they engage with street edges and segments. As previously demonstrated, a variety of bottom-up physical affordances serve as an essential factor for segments outstanding (Results Theme 1. 3), which stimulate diverse activities generated within street edges (Results Theme 2. 1). These empirically insights highlight the significance of considering how human activities are shaped by material and spatial manifestation of street edges. According to the Results Theme 2. 3, everyday activities play a vital role in engaging with edges at different levels. This suggested that material forms, in relation to spatial organisation, of street edges and their constituent elements will not be prominent without an understanding of how people socially engage with these realms. Through the material-based analysis, such insights emphasise the importance of street edges which do not become activated without human engagement

(Thwaites et al., 2020).

In the development of street edges, the significance of bottom-up and small-scale interventions should not be neglected, which greatly contribute to social engagement (Gehl, 2010; Mehta and Bosson, 2021). They are *do-it-yourself urban design* within everyday space (Douglas, 2014). Consequently, street edges are not isolated, disconnected entities, or part of building structures; instead, they are a complex and multi-dimensional assemblage of material, spatial and social attributes (Dovey, 2010; Thwaites et al., 2013). To some extent, this resonates the insights forwarded by Dovey (2010), who maintained that flows of desire and everyday needs are the primary motivations within the lived-world. Such insights manifest that collective interest does not pre-exist being-in-the-world waiting to be satisfied (DeLanda, 2006), but generate through public engagement, promoting social interactions in the built environment. It helps understand where people are, why they are engaging these realms, and what they are doing (Simpson, 2018). Through this lens, a comprehensive understanding can be acquired of how everyday space is socially performed, particularly street edges in Chinese urban villages. Overall, such in-depth insights explored, backed by extensive evidence and investigations gained through a variety of analysis, strengthen the comprehension of how street edges are socially engaged in relation to rich socio-spatial features, addressing the points forwarded within the research themes. It also laid the foundation for bottom-up participation in everyday space to promote pedestrian experience from such nuanced scale, paving road for Chinese urban village development. To a broader extent, besides, these insights can also contribute to urban design and planning, shifting the focus away from architecture-driven, towards such socially oriented, especially for inhabitants who live in Chinese urban villages for decades or generations can acquire sense of belonging.

7.1.2 The significance of street edges is manifested through territorial segments

According to the Results findings, it can be noticed that activities show differing levels of engagement and intensity along street edges. These findings establish an understanding that street edges can be considered as a composition of territorialised segments, rather than being regarded as individual entities. Within this situation, it has also revealed that plots and plinths have limited impact upon the extent to which territorial segments were engaged (Simpson et al., 2022). This is because the scale of plots and plinths are regularly identified as morphological structure instead of social function. This new empirical comprehension resonates with the multi-dimensional notions discussed by Dovey (2010), Glaser *et al.* (2012), Thwaites *et al.* (2013); and Feliciotti *et al.* (2016). They have underpinned socio-spatial considerations of ground-floor interfaces, emphasising the significance of this distinct realm for wider social impact. In terms of this, territorial segments in turn shaped street edge and its engagement. Overall, these insights provide an in-depth understanding of how territorial segments should be considered as complex socio-spatial assemblage, which contributes to overall street edge extent.

As discussed earlier in Chapter 3 (Theme I), the material forms of street edge segments are intrinsically tied to human actions, in response to territorialisation and personalisation (Thwaites et al., 2020). They not only demonstrate how segments are shaped through human practices, but contribute to potential pedestrian engagement. The research findings reveal that segments with diverse bottom-up interventions actively encourage pedestrian engagement through territorial occupation. To a large extent, such territorialisation is expressed through the creation of physical affordances, which response to wider social impact of edge segments. Within this, territorial occupation of segments implies that street edges are socio-spatial assemblage instead of mere physical *form* (Habraken, 1998; Thwaites et al., 2013). This also provides personalised opportunities for segment owners. As Mehta and Bosson (2010, p. 781) highlight, “*by personalising a place, people change the environment to meet their needs and specific activity patterns. ... Personalisation of the street front also allows*

for change to occur in an otherwise familiar setting. This provides stimulation and interest and creates a reason to stop and look, enabling possibilities that generate conversation and other social interactions". Through this, personalisation becomes a platform in which a variety of possibilities can be generated in segments. And thus, physical affordances provided are projected through the varying functions housed in street edge segments, whilst showing its territorialisation to street dwellers for engagement. Such ideas afford practical insights into how bottom-up actions approach street edge segments.

Having emphasised the significance of bottom-up practices and territoriality of street edge segment thinking, it is crucial to consider the role of professionals in design decision-making that contribute to segment engagement. Drawing upon the notion of *control levels* in the built environment (Habraken, 1998), it prompts a reevaluation of the relationship between *form* (how the space is structurally organised, and the materials used), *place* (process of occupation and how the space controlled), and *understanding* (how people use it to achieve self-esteem through collective interest), particularly engagement significance of their manifestation. In the context of edge segments, this primarily relates to how such controls are established and expressed in response to morphological structure and territorial experiences (Simpson, 2018). This means that design decision-making hold sway over engagement, either top-down or bottom-up approaches. Such territorialised practices align with Habraken's notion of *place* – process of occupation. Of note is that these processes are fundamentally bottom-up actions, which highlight segments' distinctiveness, whilst manifesting users' intentions and desires (Dovey, 2010). And this also reveals that such practices were built upon *form* foundation constructed by top-down decision-making (Thwaites et al., 2020). In current urban design, there are few opportunities for providing the establishment of physical affordances, thereby restricting the expression of *place*, and human practices to identify territory. Such issues have also detailed in existing Chinese urban design discourse (Chapter 2, Theme 2), where an overemphasis upon

architecture-based trend due to professional decision-making predominantly shapes current street development, instead of accounting for everyday territorial occupation. Significant here is to understand how decision-making actions positively impact segment engagement.

Simpson *et al.*'s study (2022) revealed that plots and plinths are scales that have little influence upon people's visual engagement with street edges. Such scales are fundamental component for establishing edge space that forms overall street extent (Glaser, 2012; Thwaites et al., 2020). From an infrastructure perspective, they can be considered as stable building structure shaped by top-down professional tactics to provide *form* construction. These structures, in turn, influence the potential development of territorial segments. This is usually reflected through bottom-up processes of territorialisation, which lead to the creation of engaging segments. Overall, plots and plinths are greatly associated with *form* of building morphology, manifested through segment as a distinctive *place* with socio-spatial natures. Built upon the development of *form* and *place* (Habraken, 1998), segments thus can be conceptualised as an expression of *understanding*, with collective interest and shared ownership along the overall street edge extent (Simpson, 2018). All these processes are delivered through everyday social engagement of pedestrians, who territorially establish and occupy the edge space through bottom-up actions and small-scale interventions (Figure 186). Such practices provide new opportunity for everyday users to recreate and reproduce engaging space to meet their requirements, particularly in Chinese urban villages that are usually identified as informal settlements.

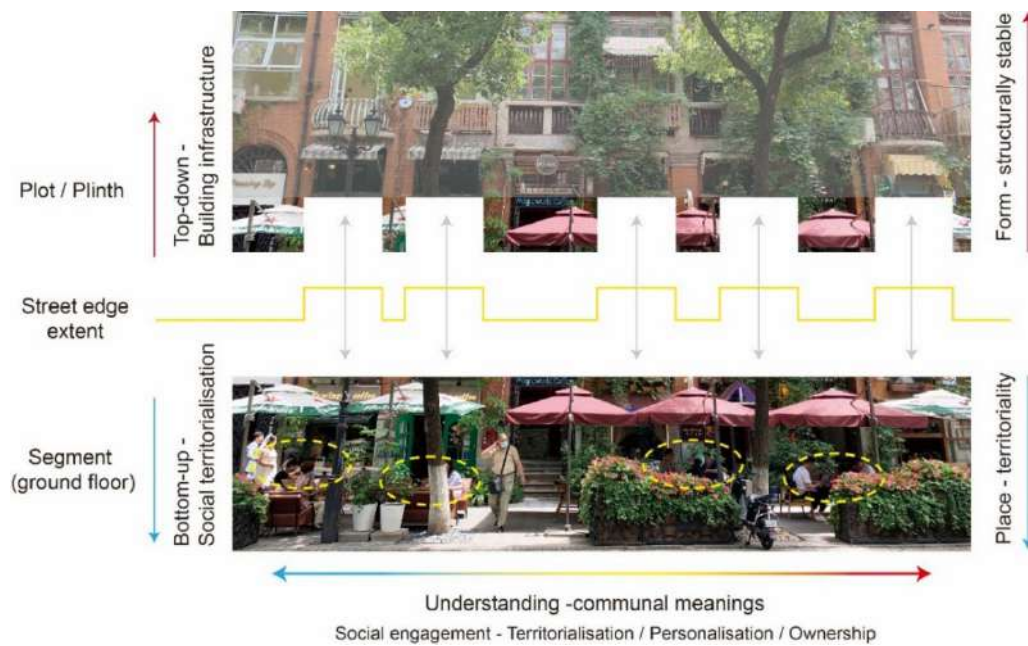


Figure 186 Multi-dimensional street edge manifested through *form*, *place*, and *understanding*

7.1.3 The significance of bottom-up decision-making practices in street edge segments

In Chapter 2, it discussed prevailing trends in urban design, which have predominantly been characterised by top-down actions, emphasising architectural products as identifiable urban image (Lynch, 1964; Gehl, 2010; Porta and Romice, 2010). Under such circumstances, this focus often sidelines social consideration in contemporary urban design and architecture discourses, which potentially restrict the interaction between human and environment (Thwaites et al., 2013). Regrettably, it tends to prioritise form-based over people's experience and their social interactions within physical settings, often driven by the pursuit of rapid urbanisation (Habraken, 1998; Chen and Thwaites, 2018; Carmona, 2021). As a result, these top-down and design-driven interventions lead to a homogenised urban environment, alienating and disconnecting people rather than facilitating social communication on a daily engagement basis (Bobic, 2004; Simpson, 2018).

The empirical insights gained from the current research present an opportunity to re-

consider the significance and validity of such architecture object-based or form-oriented tendency. Meanwhile, it can also re-evaluate the effectiveness of top-down decision-making actions in the existing urban design context, particularly street edges. The current study endeavors to achieve this by establishing an understanding of regular social actions on street edge space, and the extent to which people engage with these realms. It aims for a more balance between top-down and bottom-up decision-making processes in socio-spatial establishment. This highlights that design actions should not solely focus upon conceptual or extravagant project blueprints, or on creating spaces of detachment and alienation that barely afford social experience for pedestrian engaging (Figure 187). Instead, the focus should be upon enabling street inhabitants to actively engage with edge space through bottom-up interventions, whilst manifesting varying everyday activity tasks.



Figure 187 Detachment and alienation street edge presented

Building upon such mind-set, it offers opportunity for bottom-up decision-making to be more feasible in response to accommodating diverse activities in street edges. These include necessary, optional and social activity tasks (Mehta, 2019) to promote sense of place and place identity (Relph, 1976; Thwaites et al., 2013; Dovey, 2014). This ultimately attempts to delve into the interplay between street activities and physical settings, particularly socio-spatial attributes. Through this, bottom-up interventions in street edges have the potential to be long-lasting or pop-up, with an expectation that varying levels of engagement and interaction can generate in people's everyday

encounter (Simpson, 2018). Not everyone may realise or appreciate how these small-scale adjustments and changes are conducive to promoting social experience. For instance, segment owners who occupy street edges exhibit its products (Figure 188) might not take any socio-spatial characteristics into consideration. Within the current study, there is a chance to investigate what elements and qualities are pivotal to stimulate a variety of activities, particularly in Chinese urban village context.



Figure 188 Segment owners exhibit products through occupying street edges

Highlighting the idea of re-production process shifts the emphasis away from professionalised design interventions in street space, such as architecture per se or building structures. This works however towards a more dynamic and forever-developing edge space (Jones et al., 2007a; Porta and Romice, 2010; Feliciotti et al., 2016), characterised by diverse social engagement through small-scale interventions in the built environment. This resonates with assemblage thinking (Dovey, 2010), which emphasises that “*place identity as being in a continuous state of becoming*” (Thwaites et al, 2013, p. 75), *bottom-up appropriations of ‘right to the city’* (Lefebvre, 1996, as cited in Stevens and Dovey, 2019, p. 331), as well as *basic affordances of the environment are perceivable* (Gibson, 1979, as cited in Giesecking et al., 2014, p. 60). In light of such consideration, urban designers are not the person who creates things in the lived-world then waiting to be satisfied (DeLanda, 2006). Instead, they should perform as facilitators, particularly in Chinese urban village context, creating

opportunities to encourage everyday interaction and engagement. Through this, street inhabitants can develop a sense of belonging through collective interest during the collaborative process. Within the current study, overall, these ideas intend to explore how social engagement and behaviors can be promoted through bottom-up decision-making practices in Chinese urban villages' everyday lives. This emphasised a socially dynamic and responsive mind-set, rather than merely limiting in material or spatial structures. The core idea here is not just to design perfect physical settings with material objects, but to focus upon how street dwellers interact with them to influence wider social cohesion and engagement in Chinese urban villages.

7.2 Theme 2 Peoples' everyday activities activate street edges and segments

7.2.1 Practical implications of street edges when seeking to make changes

As detailed earlier, street edges as socio-spatial assemblage have potential implications for making changes to promote social vitality and vibrancy. Such understanding provides empirical insight into conceiving street edge not as a line or interface without thickness (Alexander et al., 1979), but as dynamic spaces with diverse possibilities. It can be flexibly adapted into engagement intensity, based upon the make-up of edge segments and their collaboration, contributing to wider social impact within an edge (Simpson, 2018). This mind-set resonates with street concepts emphasising the interplay between edge *extent*, *laterality* and *locality* (Thwaites et al., 2013), whilst highlighting the importance of social implication. In terms of this, the current research adds a level of practice involving socio-spatial qualities, fostering a multi-dimensional understanding at street edge scale. The challenge of creating engaging street edges for daily life in Chinese urban villages, detailed in Chapter 2, is a prevalent issue in contemporary urban design. This lays the foundation for exploring how this distinctive realm can be effectively expressed and actively engaged with in the future, particularly through bottom-up interventions.

The potential lies in crafting street edges that are not static but dynamic, adapting to social needs rather than rigidly adhering to structural morphology. This approach, as Dovey (2010) argued, involves understanding the flow of desires and possibilities inherent in a space, transcending rigid disciplinary definition. In particular, it relates to how decision-making actions influence upon *lateral* and *localised* qualities of transitional edge spanning indoor and outdoor spaces (Thwaites et al., 2020). As discussed earlier, top-down design decision-making regularly inhibits the emergence and expression of these qualities, whilst restricting the potential opportunity for two adjacent realms to be intertwined. As a consequence, this results in less engaging of street edges. The argument thus points out the need for a balanced approach in street edge design, one that promotes greater interconnectivity across inside and outside, or also known as *public-private gradient* (ibid), rather than structurally hard edges, as Mantho (2014) maintained that –

... certainly the relationship between the exterior space of the street and the interior space adjacent to it should be conceived as an essential relationship.

Mantho, 2014, p. 66

Expanding upon this perspective, it provides opportunity to view street as spaces primed for pedestrians, bustling with public life and various activities, rather than mere conduits for movement (Mehta, 2019). This is departure from the conventional linear, utilitarian streets that predominantly serve vehicular traffic. Such insights, in response to socially responsive significance, could take top-down decision-making into account as a foundation, whilst delving into what bottom-up actions could promote in everyday street edges. These practices can be the stimulation of creating greater interaction between inside and outside. Or, it could be diverse small-scale interventions facilitating engagement with street edges. this echoed with the insights detailed in the existing urban design issues (Chapter 2, Theme 2.1), concerning the issue of who should be responsible for street edge design decision-making. It seeks to explore and balance

the relationship between top-down and bottom-up that contributes to street edge establishment in relation to multi-dimensional qualities across inside and outside, see Figure 189.

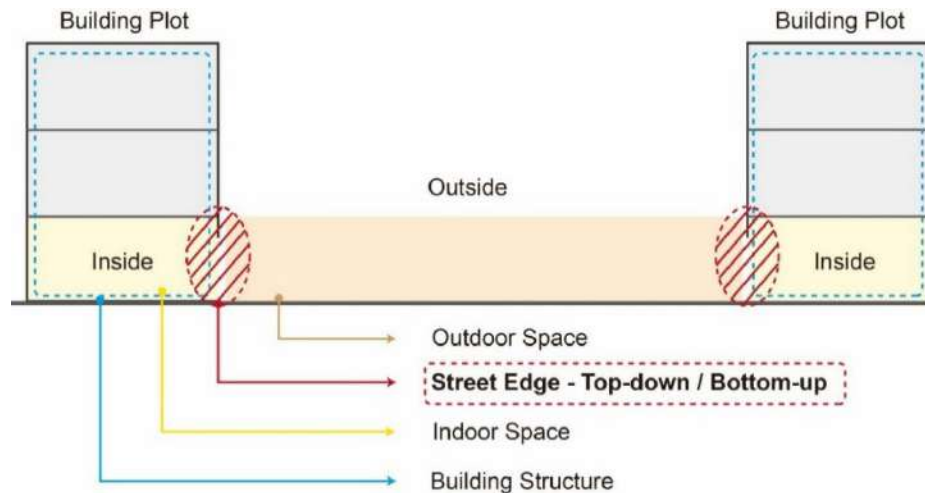


Figure 189 Top-down / Bottom-up decision-making of street edge

In terms of the diagram shown above, it is evident that street edge is a distinctive realm, providing the infrastructure whilst accommodating bottom-up practices. From a socio-spatial assemblage standpoint, the constructed form of street edge has the potential to foster territorialised and personalised expression. It has the potential to balance the relationship between morphological edge establishment (building structure) and social occupation (user re-creation) within two adjacent realms. The goal is to create an appealing street edge that is characterised by collective engagement, intertwined with socio-spatial qualities. Crucial to note is how this ground-floor interface bridges the street and edge, serving as the locus of activity engagement. Such considerations heighten an understanding that top-down tactics are not the sole means to establish engaging edge space, whilst illustrating that physical structure should not be the sole determinants of street edges. Overall, ground-floor interfaces across inside and outside realms are where professional actions are essentially required, but with a more focus upon the multi-dimensional creation from everyday user's needs and desires, particularly in the rapid development of Chinese urbanism.

7.2.2 Practical implications of street edge segments as territorial expression when seeking to make changes

The characteristics of territorial segments, embedded in edge ground-floor interfaces, greatly influence the extent to which pedestrian engage with street edges (Results Theme 3). Both the street edge framework (Chapter 3) and results part (Chapter 7), have demonstrated that street inhabitant engagement is closely related to physical affordances of territorial segments. This offers opportunity for territorialisation and personalisation within a segment, aligning it with function and making it standing out from the surroundings (Simpson, 2018).

Building upon the foundation of affordance notion explored by Gibson (1979), Maier et al. (2009), Mehta and Bosson (2021), a variety of affordances were discussed and examined during the activity engagement investigation. Significant for this here is that distinctiveness emerged as an essential feature in shaping segment establishment and identity. This resonates with the notion of *imageability* (Lynch, 1964; Ewing and Clemente, 2013), highlighting its saliency and visual attention. It also associates with the ability of a segment to be recognisable through high-level factors, such as eye-catching physical objects housed in it; and low-level elements as well, such as minor parts and components of these affordances (Results Theme 1. 3). Such material qualities, in response to soothe the abrupt division between two adjacent realms, are found to be significant for engagement (Results Theme 2. 3). These affordances, either high-level or low-level, are shaped by segment's function and how they collectively impact the overall street extent. Beyond physical affordance, sensory complexity also plays an important role in facilitating street inhabitant engagement. This implies that a segment is able to provide multiple sensory experiences, noticeably including visual complexity (permeability, transparency), as well as sounds or smells that reflect from differing edge segments. Temporality, as discussed earlier, also significantly contributes to street edge experience (Results Theme 3. 2). Shifts and changes, such

as intervention / function / re-design, greatly influence segment engagement. Overall, varying levels of these affordances within a segment, or across a collection of segments, regularly create a more vibrant street life for everyday users (Results Theme 3. 1 – 3. 6). Thus, it manifests how such affordances work in conjunction with other elements, and are experienced by street inhabitants in a forever-developing physical environment, instead of existing in isolation without any changes.

Significant here lies in how individuals, particularly segment owners and street inhabitants, can be motivated to engage with segments, recognising the potential benefits and opportunities offered by segment affordances. In response to this, emerging urban tactics, such as *Everyday Urbanism* (Chase et al., 1999) and *DIY Urbanism* (Finn, 2014), perform as a medium to bridge the connection between top-down and bottom-up practices. It opens up the possibility to emphasise the importance of, and effectively utilise, diverse affordances within street edge segments (Simpson, 2018). Such non-professional approaches are conducive to shaping territorial segments, whilst generating broad social impact when combined to form an engaging and holistic street edge. As discussed earlier, this thought contributes towards addressing the existing urban issues (Chapter 2, Theme 2), and illustrates how top-down and bottom-up actions can practically facilitate street edge engagement. Through such knowledge-based investigation, it has been heightened how segments can be reactivated through the integration of professional expertise and amateur practice at this nuanced scale. And it also emphasised everyday engagement can be significantly influenced by segment territorialisation and personalisation. As a result, this manifests that how theoretical understanding can be translated into pragmatic design languages in the future street design, especially at such nuanced scale in Chinese urban villages.

7.3 Theme 3: Bottom-up considerations in response to real-world street edges and segments

7.3.1 Bottom-up strategies reactivate everyday edge space

The application of transitional edge framework into street edge practice shifts the focus away from architectural object along with its building structure, towards developing a more socially responsive and inclusive decision-making mind-set (Simpson, 2018). It places greater emphasis upon the significance of everyday street users, and the way in which how they engage with street edges. This seeks to create *placeness* within a locality (Relph, 1976) aligning with everyday needs and desires (Dovey, 2010), instead of the predominance of homogenised trends in street environment (Bobic, 2004; Goldhagen, 2017). Of particular significance here is the way that street inhabitants' recognition and perception are the major concern of decision-making actions. This stands in contrast to an exclusive focus upon building per se, with change thus being measured towards everyday users not existing building infrastructure (Gehl, 2010; Glaser et al., 2012; Thwaites et al., 2013; Latham and Layton, 2019). Through this, design decision-making practices intend to be more responsive and fine-grained, in pursuit of people's identity within *becoming* built environment (Dovey, 2010). Within the Chinese urban village context, however, most street edges fail to take this insight into consideration. They regularly feature identical façades, styles and functions, which restrict the potential for people engaging with this socio-spatial realm to generate collective understanding, or also known as *ours* (Thwaites et al., 2022), which argued that –

Ours is, then, the shared commonality, which may have spatial, social and/or material expression, in which people can establish and express self-identity whilst recognising the existence of boundaries that sustain the collective sense of ours important to establishing the ground for recognition necessary to self-esteem.

Thwaites et al., 2022, p. 9

As Thwaites *et al.* (2020) detailed, a potential way to strengthen identity of everyday users, echoing *MYTO* thinking, is to make bottom-up intervention from a human

focused perspective. This approach is in response to re-production / negotiation, and strategies (Leclercq, 2018). Through this, street inhabitants have the opportunity to use and engage with street edge based upon their daily requirements. Although top-down practice still dominates the current urban design processes, particularly in large-scale planning or new building projects, there has been a growing focus upon bottom-up engagement in recent years (Mehta, 2019; Simpson et al., 2022). This shift allows for more nuanced and small-scale interventions that directly respond to people's intention and shared interest. A noticeable example of this can be seen through Li Huangpi Road in Wuhan, where segment owners adopted bottom-up strategies to appropriate and personalise these realms (Figure 190). From the everyday users' perspective, this project prioritises a participatory, human-oriented strategy, with interventions that are grounded in their needs, rather than homogenising the street image.



Figure 190 Wuhan: Street inhabitant appropriation and participation

In response to this, the change of territorial segments, morphologically established in street edge ground floor, greatly influence the extent to which pedestrian engage with (Simpson et al., 2022). The empirical insights gained through the investigation into street edge engagement primarily heighten socio-spatial understanding. These notions emphasise that territorial personalisation and appropriation can be generated in street edges, particularly at human-scale segment level (Glaser et al., 2012), thereby enriching socio-spatial expression that encourages people engagement to a greater extent. Such insights have further highlighted the dynamic interplay between street

edge segments (territorialisation-oriented) and human occupation processes (social-oriented) (Thwaites et al., 2020). Consequently, the focus shifts towards accumulations of smaller and finer interventions that can be easily adapted into street edges, instead of heavily top-down, economically driven design actions. This also holds the potential to infuse street edges with variation and flexibility, countering the homogenisation caused by unified design languages.

To effectively develop this thinking into creating street edges that are more socially responsive to multi-dimensional segments, insights can be obtained from other street examples in Chinese urban village context. These instances reveal how ordinary streets have been changed to make them more identifiable through recreation. Such revitalised street edges usually place greater emphasis upon the expression of segment territorialisation based on morphological infrastructure. Notable example can be noticed in Luo Jiashan Road and Li Huangpi Road in Wuhan (Figure 191). Through illustrating these examples, the aim is not to replicate such design practices or pattern languages, but heighten how these thoughts can be pragmatically adapted into other similar situation, drawing inspiration from these successes. In terms of this, it becomes evident that street edges, along with territorial segments, can be socially engaging from the perspective of human experience (Simpson, 2018), in line with everyday user's intention and needs. This implies, to some extent, that building infrastructure holds the potential for recreation through bottom-up approach and minor adjustment.



Figure 191 Wuhan: Expression of territorial segments along Luo Jiashan Road (left) and Li

7.3.2 Engaging street edges manifested through socio-spatial attributes of territorial segment

The significance of territorialised practices, in relation to personalisation and occupation, have been discussed throughout the current research. It has been elucidated how these practices influence the creation of engaging or disengaging street edges, particularly the expression of socio-spatial qualities within territorial segments. Building upon this, it becomes evident that segments can be reproduced (feasible adjustment) in accordance with segment owner's desire, whilst highlighting its function. Segments that are easily adjusted, at a bottom-up scale, allow for users with differing intentions to adapt into it. This also indicates that segments with greater potential for varied territorialisation, linked with affordances, tend to stimulate social engagement. On the flip side, segments that are incapable of being appropriated or personalized have limited opportunities for territorialisation, which result in street edge homogenisation. This is primarily due to the dominance of top-down actions in establishing architecture objects, particularly ground floor segments like chain-based facilities (Wrigley et al., 2002; Simms et al., 2005; Speck, 2018).

These considerations resonated with the discussion of affordance thinking (Chapter 3, Theme 2. 2). Such mind-set also corresponds with socio-spatial characteristics explored in the current research, encompassing *distinctiveness* and *temporality*; *appropriation* and *occupation*; *articulation* and *openness*. Locating at a segment scale, these features, manifested through territorial actions, significantly conduce to everyday engagement. Territoriality thus that can accommodate such affordances and positively reflect upon street inhabitants has capability to establish an engaging street edge comprised of a series of segments. This allows for street edges and territorial segments to be shaped by differing socio-spatial affordances, instead of merely focusing upon its function or building itself, particularly Chinese rapid development driven by building

infrastructure and architecture.

In recent years, bottom-up strategy has gained popularity in everyday urban design, which attempts to address such existing issues in an innovative and adaptable manner. This is remarkably noticed through the creation of semi-enclosure to provide secondary space (Thwaites et al., 2013) that can be personalised and appropriated (Figure 192). Although such approaches may not be feasible for all street edge segments, they do reveal how a semi-public/private space can be reproduced, providing opportunity for people to easily adapt and use in different ways. This implies that pedestrian experience is closely related to the interaction between inside and outside, particularly territorial establishment of physical affordances, instead of the physical objects themselves. Bottom-up decision-making actions thus can get benefit from this way, seeking to render street edges more sociable and inclusive. As a result, this allows for a wider range of everyday users to participate in territorialised processes, whilst highlighting the bottom-up significance of these affordances for people engagement in Chinese urban village context.



Figure 192 Wuhan: Secondary space of territorial segments along Li Huangpi Road

7.3.3 Engaging street edge segments manifested through the interconnectivity between indoor and outdoor realms

As detailed in the existing trends of Chinese urban design section (Chapter 2, Theme

2. 2), it was forwarded that street edge segments are harshly divided into two separate realms – indoor and outdoor. Although accepting that such division issue is widespread in modern urban development, the discussion contends that a balanced relationship between these adjacent realms needs to be established. The reason for this is such rigid street edge segments have a detrimental impact upon engagement. This idea has also evidenced by numerous urban scholars (Franck and Stevens, 2007; Campbell, 2011; Glaser et al., 2012; Thwaites et al., 2013; Mehta, 2019).

The empirical insight derived from this research emphasises the significant role that ground floor segments play in people's engagement, either physical or visual. Within this consideration, the lateral quality across inside and outside realms is noticeable and manifested through the feature of *transparency* and *permeability*. According to the results analysis (Chapter 7), it clearly demonstrated that street edge segments with such lateral characteristics are conducive to social engagement. It is important to note, however, that transparency and permeability cannot exist in every segment of street edge (Simpson, 2018). Through this, it needs to consider how these qualities can effectively stimulate street inhabitant engagement who regularly populate it. This is because street edge segments were regarded as the place suitable for adding certain level of transparency and permeability.

Having discussed the significance of permeability and transparency, it is evident that such lateral qualities are intrinsically related to diverse affordances that influence segment establishment and engagement. The study has delved into the affordances pertaining to material, spatial and social qualities (Chapter 3, Theme 2. 2). It has detailed how these qualities are capable of creating an engaging segment, with their combined effect leading to greater engagement. Such affordance exploration provides a chance to alleviate the abrupt division across inside and outside realms. An example of this can be observed in two segments that were differently engaged by street inhabitants (Figure 193). In the case of left segment (Temporary toy stall), it shows

great extent of permeability to attract people engaging. This also resonated with segment's distinctiveness, manifested through high-level and low-level affordances, to promote socialising along the edge space. Conversely, the right segment (Optical store) lacks corresponding qualities, resulting in limited social opportunities. Consequently, this restricted sensual complexity of the segment, as it fails to allow sounds (music) or smells (perfume) to disseminate.



Figure 193 Engagement with(out) lateral qualities

Temporary toy stall (left) and Optical store (right)

Drawing from the previous example, it becomes evident that a segment with complex affordances exerts a considerable impact upon the extent to which segment is socially engaged. This example heightens, from the perspective of real-world and everyday environment, how segment affordances synergise to foster wider social vitality and cohesion. Crucially, it exemplifies how the establishment of territorial affordances within segments facilitates the interplay between inside and outside realms (Simpson, 2018). Such insights thus need to be considered, especially when endeavoring to alleviate the harsh separation across two adjacent realms along street edges. And the lateral qualities hold the potential to create numerous opportunities for street edge segments to become more engaging and appealing.

Apart from the qualities of laterality and affordances, street and its edge should consider as interweaved entities instead of isolated individuality (Glaser et al., 2012; Kickert, 2016; Thwaites et al., 2020). In terms of this relationship, segments are capable of connecting the adjacent realms manifesting them as a multi-dimensional *place*, with dynamic flexibility in locality to emphasise the significance of *thereness* and *hereness* (Cullen, 1971; Thwaites et al., 2013). In Chinese urban design, however, street edge segment is regularly neglected or regarded as a part of a building, which inhibit the potential interaction between inside and outside (Figure 194). Through this, it manifests how this distinctive socio-spatial realm is vital for people engaging with it, ultimately stimulating public life and social participation (Simpson, 2018).



Figure 194 Abrupt division of street edge (Source: Visual China Group, 2020)

7.3.4 Engaging street edge segments manifested through the promotion of territorialisation and personalisation

As detailed earlier, the research highlights the significance of ground floor segments. It emphasises the establishment of distinct affordances within it, aiming to render it identifiable, whilst serving and projecting its function. Significant for this, throughout the study, is the way that territorialisation and personalisation are related to segment affordances, providing opportunity to create an engaging street edge with more complex experiences. In response to this is segment owners are capable of recreating space through small-scale interventions to promote social engagement. Such considerations hold implications for countering the decline of edge segments, especially in Chinese urban villages.

An adaptable and flexible street edge, particularly its territorial segments, has greater capability to accommodate and apply varying affordances in-line with physical and spatial adjustment (Thwaites et al., 2020), providing more complex social experience and engagement (Gehl, 2010; Karssenberg et al., 2016; Simpson et al., 2022). In light of this, a segment that can be easily territorialised and personalised has the potential for a complex socio-spatial expression, going beyond its function role. This not only provides opportunity to reassess segments from being solely commercially oriented, but creates a more appealing edge for pedestrian interaction. Such thinking has resonated with Mehta's opinion (2013) –

... when people personalize their territories, they clarify individual and group territories, make the environment more attractive and complex, and set the stage for interaction.

Mehta, 2013, p. 61

As detailed earlier (Chapter 2, Theme 3. 2), vacant or declined ground floor segments were the least engaged factors of street edges (Figure 195). Although some of street edges investigated might have been very engaging, closed and blank segments are regularly related to street function, economic recession, and most importantly everyday engagement. In terms of such issues, it is worth considering how such vacant segments can be reactivated in a way that stimulates street inhabitant engagement. This also provides opportunity to recreate these edge spaces by introducing new affordances to manifest its territorialisation and personalisation. Through this, these vacant segments nested in street edge should be considered as potential chances instead of negative images (Simpson, 2018). Such insight has echoed the idea forwarded by Chiesi (2015), who maintained that –

Our capacity to individuate opportunities in spaces becomes key, rather than some objective qualities that predetermine its function(s).



Figure 195 Closed and vacant segments

Such opportunities reveal the capability of street edge segments that can be potentially territorialised and personalised, which is the core assertion throughout the overall research. This, in turn, opens the door to the creation of engaging street edge segments, demonstrating pedestrian experience can be shaped by a variety of affordances. Crucially, this also evidences that how small-scale interventions are conducive to promoting bottom-up decision-making practices, either pop-up or long-term impact. Consequently, this has the potential to reinvigorate the vibrancy of street edges, shifting the focus from building form or function per se. Within the current study, although some segments were closed off, they were still occupied in different ways to show its adaptability, or *looseness*. This meant that vacant edge spaces are not useless or disengaging; instead, they can be reused through occupation, whilst manifesting the changes within a forever-developing built environment. In this way, edges can thus become an inextricably intertwined socio-spatial place with their own personality to encourage greater collective engagement (Dovey, 2010; Thwaites et al., 2020).

7.4 The limitation of methodology and current investigation

7.4.1 Methodological limitation in relation to measuring socio-spatial attributes

of street edges

The overall aim for evaluating socio-spatial attributes was to develop an operational guidance and measurement toolkit for street edge qualities of contemporary urban design discourse. The material, spatial and social dimensions have been successfully quantified by Thwaites *et al.* (2020) through examining street edges in Sharrow Vale Road in Sheffield, UK. In this assessment, they scored street edge segments in terms of corresponding six qualities (Figure 196). After the evaluation, the data result was presented through streamgraph to visually demonstrate which segment shows higher quality and which ranked comparatively lower. To a large extent, this method, which attested to its validity and reliability, was also employed into current research.

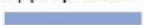
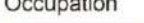
Segment Dimension	Segment Attributes	Indicator Themes <i>Evaluation Scale: weak (1) to strong (5)</i>
Material	Distinctiveness 	Is the segment distinctive against its immediate surroundings? (eg. level of enclosure; material imageability; functionality; sensory prominence)
	Temporality 	Does the segment have capacity for periodic change and adaptability? (eg. material and/or spatial adaptability - diurnal, weekly etc; change in social function or purpose; capacity for flexibility and ambiguity)
Spatial	Openness 	Does the segment appear open, accessible and engaging? (eg. connectivity to other realms; visually and/or physically accessible, i.e. permeable/transparent; gradient from private-public realms)
	Articulation 	Does the segment have material and spatial complexity? (eg. overlapping of adjacent realms, capacity for social retreat or availability; gradient from public-private realms)
Social	Appropriation 	Does the segment express clear social function and purpose? (eg. distinct territorial expression; socially interactive; capacity for flexibility and ambiguity)
	Occupation 	Can or do people occupy the segment? (eg. potential to sit, stop linger; capacity to engage social activity; distinct territorial expression)

Figure 196 Evaluation of Socio-spatial dimensions of street edge segments (Source: Thwaites et al., 2020)

Within the current study, a blend of qualitative evaluation and quantitative analysis was employed to scrutinise and validate data results. The significance of quantitative way

integrated into the data model, utilising statistical analysis (SPSS) to ensure objectivity. As for qualitative assessment, however, it was merely undertaken by lead researcher and other three urban experts of SsUU who forwarded this conceptual framework along with corresponding street edge socio-spatial qualities. While this *expert panel* evaluation (Ewing and Clemente, 2013) aimed for objectivity, it inherently carries a degree of subjectivity. Within the current study, obviously, there is certain limitation in subjective scoring in relation to socio-spatial evaluation. According to the calculation, it reveals that, between lead researcher and other three scorers, 90% of scores were within standard deviation of 5 (30 in total), and 10% of scores were above standard deviation of 6 (30 in total), see Appendix I. Demographics of the scorers was not documented, but further research could take this into account to better understand if certain demographics influences the scoring process. Thus, for the future research, the explicit criteria and descriptors can be established to conduct socio-spatial evaluation. This provides a chance to accurately score segment characteristics based upon clear standard of importance. For an extreme instance, there exist a huge gap between different reviewers, someone may rate *distinctiveness* as a 5, but the other one might give it a 1. Besides, it fails to take street inhabitant's evaluation into account. The major reason is that it is quite challenging for laymen to understand highly academic and professional terminology. Such concerns raised regarding subjectivity are more or less concern with the quantitative analysis. And for the qualitative ratings, it would be beneficial for these two groups to collaborate. Another reason is due to the several lockdowns of Covid-19 in Wuhan, which inhibits the potential opportunity for everyday users to participate it.

7.4.2 Methodological considerations of video recording and data analysis

Beyond gaining new empirical insight into how street inhabitants engage with edges, and how this distinctive realm can be reactivated through bottom-up actions, there has been progress in the current study of how everyday activities are phenomenologically captured and evaluated. This was achieved through the video recording as the major

method of data collection. Apart from this, various visualised techniques were adopted, and explicit analytical processes were developed to demonstrate how socio-spatial qualities influence upon street edge engagement.

Employing video recording provides a way being capable of gaining insights into the essence of people engagement with street edges. It is a method that records the extent to which street inhabitants engage with segments in relation to the socio-spatial attributes. In this way, it offers direct comprehension of what qualities of street edges are conducive to facilitating activity engagement, whilst being prominent (Results 7, Theme 3). It also allowed an understanding of how everyday activities are related to material and spatial interventions. This was accomplished in a way that did not merely dependent upon conventional methods, such as observation or photographing, which often struggle to convey the impact of such socio-spatial elements, or to capture inhabitants' experience accurately. This is important in exploring street environments that are forever-developing and comprise a milieu of multi-dimensional complexities. Thus, video recording stands as a method capable of providing nuanced insights into the nature of pedestrian engagement with edge segments. In addition, prior to conducting fieldwork, author and supervisors had thought about questionnaire and semi-structured interview methods, which are effective methods to understand how street users assess the space they engage with every day. But given the Covid-19 situation, it is challenging to conduct these two methods, thus we decide to primarily employ video recording and onsite observation.

A variety of data visualisation and mapping techniques, within the current research, were developed to demonstrate how socio-spatial qualities influence upon people engagement with street edges. This included the application of behavior mapping (Mehta, 2019) along with other visualised methods, such as Sankey diagrams and Bar charts. These techniques transformed complex data into understandable and readable visual representations, providing detailed insights into the relationship between socio-

spatial natures and activity engagement – an aspect that had not been validated yet. Such approaches prove highly effective in conveying intricate and rich information to design decision-makers, be they experts or everyday users. There is no need for these stakeholders to entirely comprehend statistical knowledge, but can understand what practices they should pay greater attention through such visualised analysis and manifestation, which facilitate wider social participation.

The production of data visualisations subsequently provided practical insights into nuances of people interaction with street edges. This approach, firmly rooted in a human-centric, and socio-spatial qualities emphasised, allowed for a theory-based framework to emerge from the ideas explored. These profound insights could not have been achieved without the employment of video recording along with associated analytical approaches.

7.4.3 Investigation consideration to influence future research

It is important to acknowledge that empirical insights gained and detailed ideas developed during the current study cannot entirely address all street edge issues. Such practical issues are closely interweaved with socio-economic transformation and urban development (Smith, 2014; Yang and van Oostrum 2020). The overarching aim here is to develop an understanding of how pedestrian experience can be promoted through street edge establishment. In other words, how ‘translate’ socio-spatial perception into design languages that impact social engagement, particularly from the perspective of bottom-up practices. This helps understand there exist certain limitations that could be further explored, whilst improving the approaches employed for future research.

The current research predominantly focuses upon everyday activities in relation socio-spatial attributes to establish an understanding of street edges along with segments. Video recording was the primary tool employed, capturing direct and first-hand insights into street edge experience, particularly in the context of everyday activities. However,

it is crucial to acknowledge that video recording comes with its limitations, as it captures actions rather than the underlying cognitive processes, which result in a potential disconnection between physical actions and perception. Future studies thus might attempt to use such method with broader sensory approach application, akin to studies by Aspinall *et al.* (2015) and Mavros *et al.* (2016) who employed EEG Sensor to explore activity behavior. Through this, it could yield a more comprehensive multi-sensory understanding of socio-spatial qualities combined with interview and questionnaire methods, building upon the insights acquired in the current investigation.

The current study primarily focused upon street edge in Chinese urban villages, Wuhan. While this research has provided in-depth insights into socio-spatial qualities influencing varying activity tasks, it needs to admit that the limitation of data information was collected from a single city. Further research is warranted to ascertain the extent to which the findings from this study can be generalisable and feasible within broader contexts, such as other cities or western environment. Besides, due to the widespread of Covid-19, the design decision-making actions and policy should shift the focus away from large-scale renovation or demolition. Rather, it could place greater emphasis upon everyday engagement and social experience through small-scale interventions in such unique urban form. Through the combination of top-down policies and bottom-up practices, it provides opportunities to better promote lived experiences in street edges in Chinese urban villages.

The edges studied here were also characteristic of function-mixed urban village streets, strengthening the socio-spatial consideration of varying street edge typologies. Thus, it is crucial to broaden examination in a wider urban context and a more diverse range of street typologies. Apart from this, for the future research, it could also compare busy segments with each other and with less active ones to distil *what elements make these segments distinguishable to promote pedestrian experience and engagement, or disengaging to alienate pedestrians. More specifically, criterial of socio-spatial*

evaluation can be established to clarify the score scale.

The insights developed were established from the perspective of pedestrian engaging with edges, particularly in relation to socio-spatial attributes and everyday activities. During the investigation, however, the study did not take specific groups into account, such as gender, age, and occupation etc. And it is also important to understand the intentions of shop owners, beyond making more sales. Further research therefore could specifically explore how these varying groups engage with street edges and segments. For instance, people who frequently inhabit street edges, and who territorially recreate such complex realms, particularly ground-floor segments across inside and outside, could provide in-depth insights into edge experience and socio-spatial considerations.

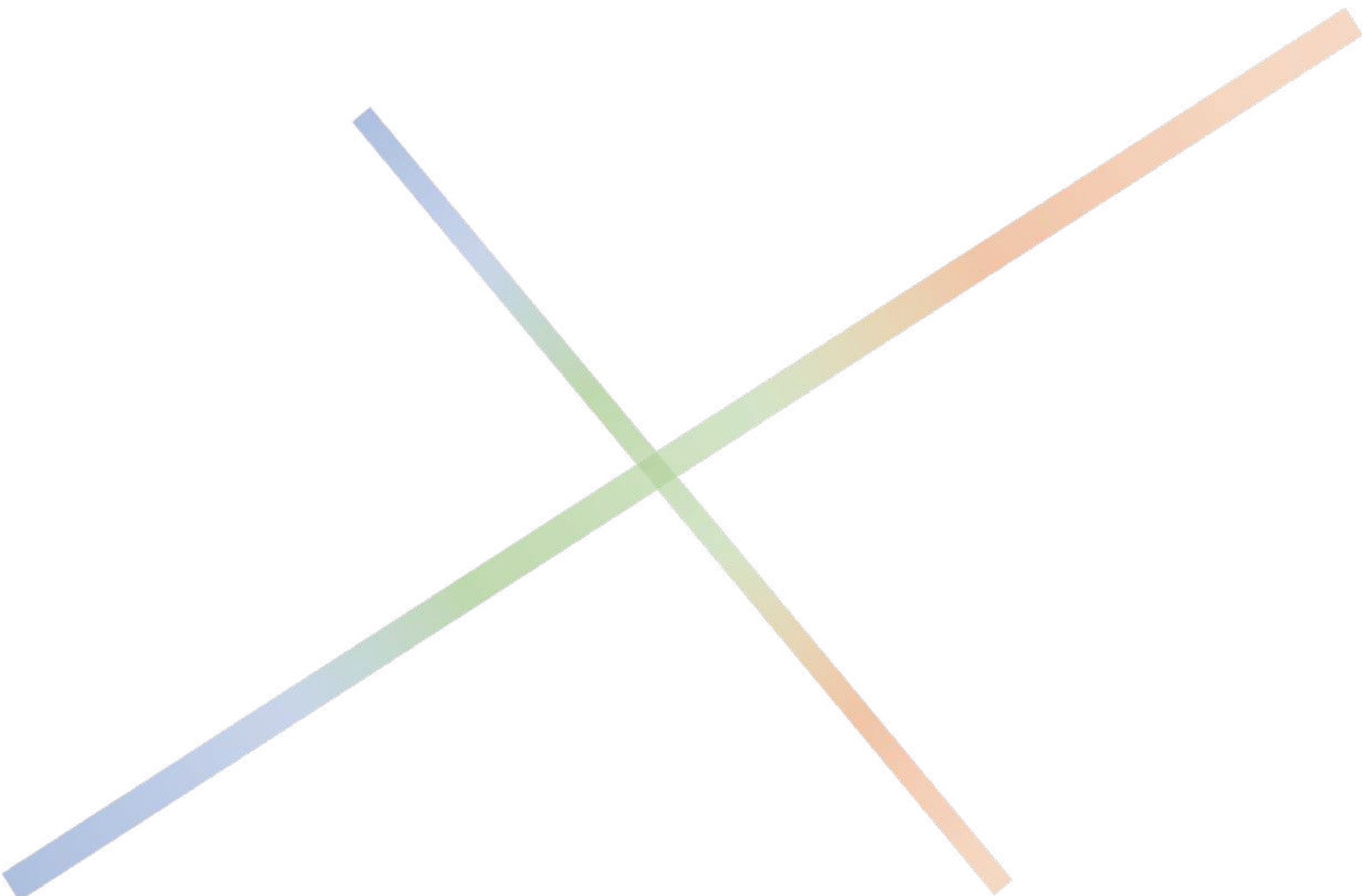
In general, there exists ample room for further investigation to expand upon the robust groundwork laid by the current study, and thus the potential ideas could be:

1. Theoretical knowledge of urban design discourse and its role as pragmatic guidance of the built environment – The current study has started to establish an understanding of street edge as socio-spatial manifestation to impact differing activity engagement. It serves as a catalyst for practical design decision-making actions, thus paving the road for exploring in-depth grounded theories towards pragmatic design pattern language.
2. Further investigation into the relationship between socio-spatial qualities of street edges and differing sociability – The current research has initiated an exploration into the impact of socio-spatial attributes on street inhabitant engagement with the edge. Through this, further research could expand upon this by taking Mehta's (2013) work into account, which is a typology of social behaviors (*passive, fleeting, and enduring sociability*). It seeks to establish a more comprehensive

understanding of sociability behaviors in relation to socio-spatial expression.

3. The everyday engagement of street edge in relation to its function and diversity –
The current research has explicitly provided insights into everyday engagement, but has not extensively delve into how different street typology and function might have effect upon this interaction. Further exploration of these potential influencing factors is warranted, building upon the insights garnered in the existing study.

Chapter 8



Conclusion

How pedestrian engagement can be promoted through the establishment of street edges and segments

The current research delves deeply into, understanding how socio-spatial attributes of street edges influence everyday pedestrian activities. The insights gained aim to guide the creation of more engaging street edge segments through balancing the relationship between top-down and bottom-up design decision-making actions. In terms of this idea, a central idea that pervades the research is the pivotal role of ground-floor segments in allowing for personalisation and territorialisation. Street edges that are established in such manner not only foster ownership and appropriation, but provide the opportunity to craft inviting street environments. Noticeably, such insights are rooted in the understanding that i) street edge is an intertwined entity with complex socio-spatial assemblage, rather than a singular line, or a part of building (Theme 1); ii) differing activity tasks play a crucial role in shaping everyday engagement in-line with desires and needs (Theme 2); iii) ground floor segments are capable of accommodating various material forms and spatial structures that influence social engagement, which, in turn, emphasised the importance of socio-spatial establishment (Theme 3).

Research Theme 1 – The significance of socio-spatial attributes, especially in relation to personalisation and territorialisation, has been discussed throughout the current research. Such manifestations have evidenced how a street edge can be engaging or disengaging, through physical affordances within territorial segments. Crucial for this is the make-up of segments, territorially nested in ground-floor interfaces, can be flexibly adapted in response to its function and richness. Expanding on the earlier discussion, segments that are easily changed greatly influence the extent to which street edges are physically engaged with. By breaking down into nuanced segment scale, it shifts the emphasis away from building morphology that is regularly dictated by plot and plinth structures, towards small-scale adjustments to heighten segment's distinctiveness and complexity. Consequently, territoriality that can accommodate

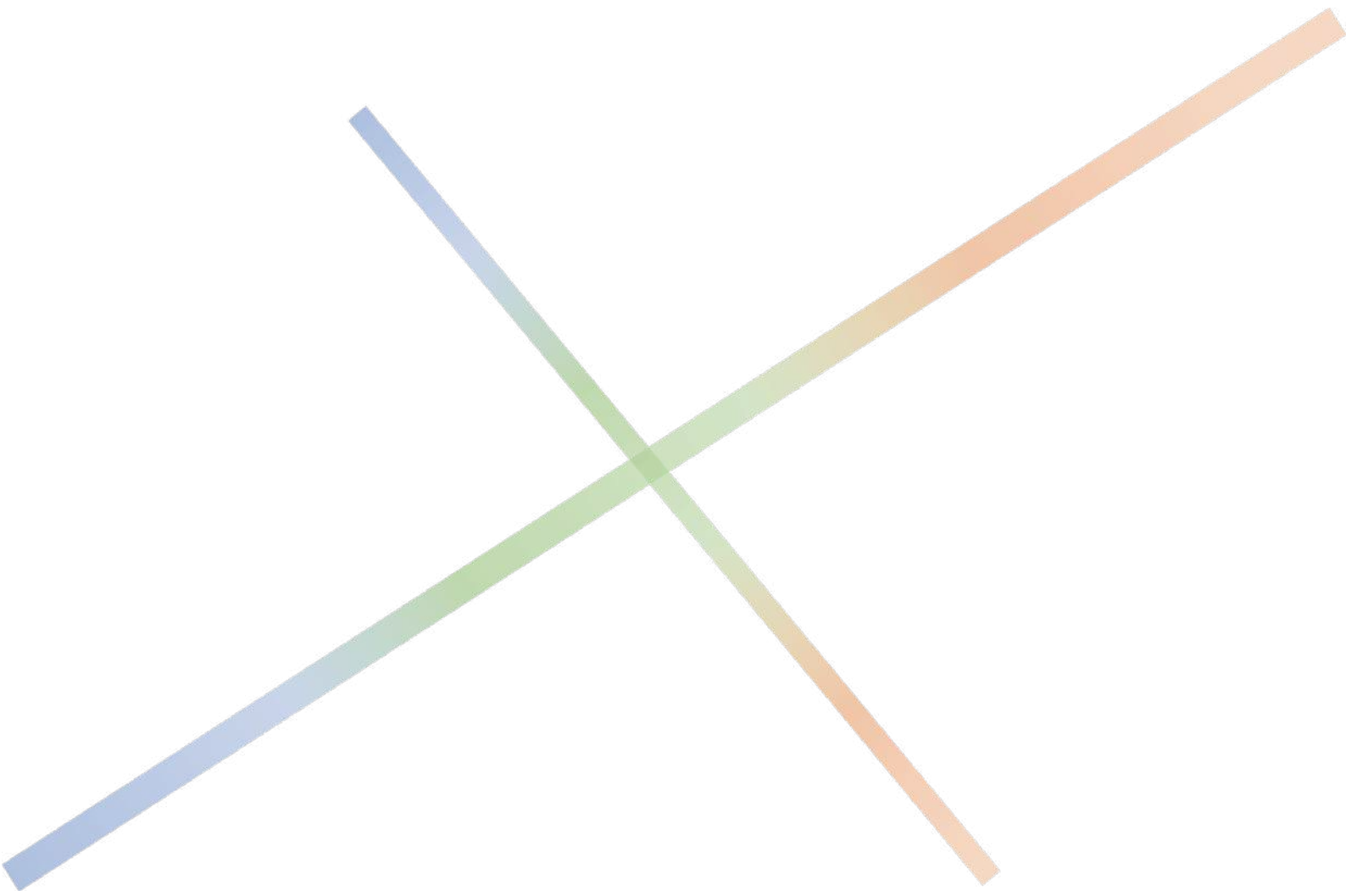
various affordances, either high level or low level, has the potential to create an engaging street edge that contributes to wider social vitality.

Research Theme 2 – The current research found that differing activities play a pivotal role in shaping street edge engagement. These socially-driven insights demonstrate the way in which user activities can be projected through material forms and spatial organisations. Some everyday activities stimulate visual engagement to promote interconnectivity between interior and exterior, or also known as *here-ness* and *there-ness*; and some facilitate physical accessibility spanning two adjacent realms. Through this, such material and spatial elements greatly influence the extent to which street inhabitants engage with street edges. Within such consideration, it can be argued that the importance of activity tasks cannot be fully appreciated without a grasp of material and spatial arrangements. This comprehensive understanding sheds light on how people engage, what they aim to accomplish, and where they position themselves. As a result, an engaging street is manifested through everyday activities in line with desires and needs.

Research Theme 3 – The current investigation empirically highlighted how pedestrian engagement is intricately interacted by socio-spatial qualities of street edge, especially at ground floor segment scale. The findings obtained evidence that street edges should not be perceived as a singular line, but as an integration of social, spatial and material complexities closely linked with people's behaviors. This also reveal that stakeholders, by the segment owners or street inhabitants, wield the influence to shape socio-spatial characteristics in ways that either attract or deter pedestrian attention. Building upon this, such processes primarily emphasise bottom-up initiatives, in relation to ownership and territorialisation, to foster engagement with adaptable edge spaces, countering the predominance of top-down tactics, particularly in Chinese urban villages.

In general, such ideas developed within the current research have been validated

through data collection employing video recording and pertinent analysis techniques. This methodology thus has yielded new insights into street edge engagement, particularly in understanding the relationship between socio-spatial qualities and everyday activity tasks – a facet that has been challenging to capture and articulate in the previous works. These insights contribute to theoretical knowledge and practical guidance, providing opportunities to address the prevailing issues detailed in current urban design (Chapter 2). This also facilitates an in-depth exploration of street edges along with segments, with the aim of crafting socially responsive street environment for pedestrians actively engaging in everyday life. The current research presented here, particularly in Chinese urban village context, introduces innovative perspectives based on substantial evidence, striving to enhance street vitality and wider social cohesion for the betterment of human well-being.



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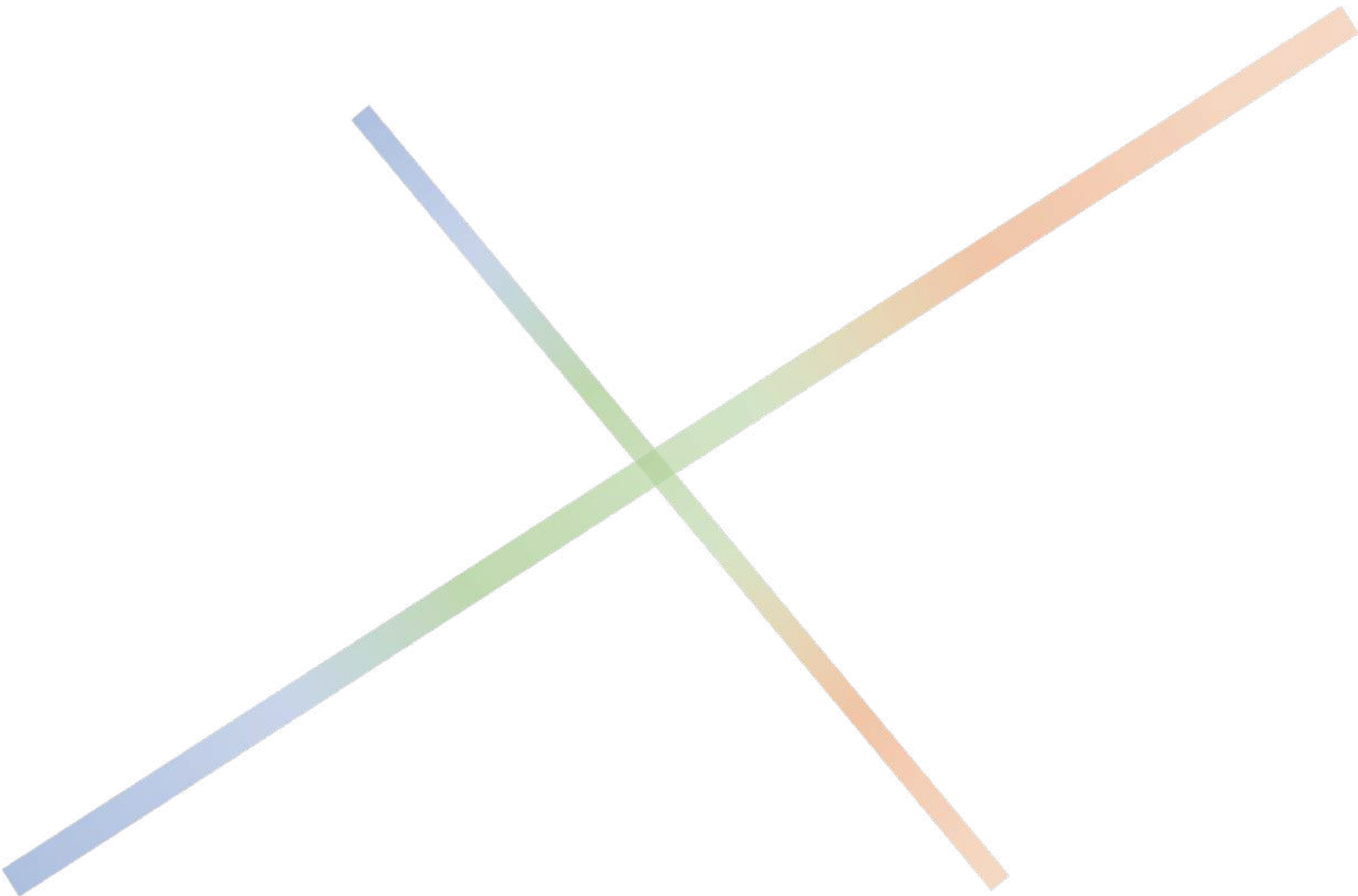
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Glossary

Affordance – Theoretical knowledge concerning how physical and material qualities play a significant role to provide opportunity for social engagement and experience (Gibson, 1979; Mehta and Bosson, 2010; 2021).

Appropriation – It can provide various opportunities for a certain social interaction and engagement through people occupying and making use of space in their regular activities (Franck & Stevens 2007, Thwaites et al., 2013; 2020).

Assemblage – It refers to place as a combination that properties are constantly evolving, highlighting the interplay between socio-spatial dimension and human-environment, rather than things exist or operate alone (people/objects/environment) (Dovey, 2010; Dovey and Wood, 2015).

Being – Linked to place thinking where material and spatial dimensions have been existed in a static state, providing little opportunity for any personalisation and appropriation (Dovey, 2010).

Becoming – Interactive with assemblage thinking which social and spatial practices are considered as something that is within a forever-developing and fluid state, manifested through re(territorialised) practices and processes (Dovey 2010).

Bottom-up decision making – Down-to-earth, usually non-professional, small-scale actions that are primarily undertaken by everyday users (Habraken 1998; Thwaites et al., 2013).

Chinese urban village – The transformation from rural village to urban community due to of the rapid urbanisation, but it still retained their original morphological structure and lifestyle, and also means informal settlement, unhygienic and low-quality living condition (Hao 2012; Hu 2017; Niu 2019).

Decline – Issues with street edge along with segments where social and economic factors influence the variety and vitality of these spaces, whilst being incapable of personalisation and adaptation (Kickert, 2016).

Distinctiveness – Physical and spatial affordances of edge segment to make it identifiable and recognisable, as well as associated with imageability that are manifested through certain features, either high-level or low-level (Lynch, 1960; Ewing and Clemente, 2013; Thwaites et al., 2020).

Extent – Transitional structure of street edge, which is linked to socio-spatial attributes that potentially influence its engagement along its overall length, such as manifestation of all segments along edge ground floor (Cullen, 1971; Thwaites et al., 2013; 2020).

Form (levels of control) – A top-down organising, structurally stable infrastructure that provides opportunity for appropriation and occupation within the built environment (Habraken, 1998; Thwaites et al., 2020).

Hereness – A sense of place, which alleviates directional focus through heightening locational sensation and qualities, the opposite to thereness (Cullen, 1971).

Human-environment – Dynamic and continued change in terms of social, spatial and material practices driven by the relationship between human activities and built environment, which human functioning and spatial and material surroundings cannot be separated (Thwaites & Simkins 2006).

Laterality – A multi-dimensional quality of street edge, which associated with features that impact the engagement transecting across indoor / outdoor realms, such as canopy of a segment smoothly connecting two adjacent realms (Cullen, 1971; Thwaites et al., 2013; 2020).

Locality – A multi-dimensional quality of street edge, which relates to qualities that promote the social engagement and experience by highlighting hereness (Cullen, 1971; Thwaites et al., 2013; 2020).

Looseness – A highly dynamic feature that provides greater level of ambiguity, flexibility and evolution within the built environment. It is a quality of edge extent that accommodates freedom of appropriation and indeterminacy (Franck and Stevens, 2007; Dovey, 2010).

Multi-dimensional – The integrated influence of socio-spatial qualities in relation to lateral and locational emphasis of street edge at an assemblage level (Dovey, 2010; Thwaites et al., 2013).

Place (levels of control) – Process of occupation within the built environment manifested through territorialisation and personalisation of form, establishing the connection between people and environment they visit and inhabit daily (Habraken, 1998; Thwaites et al., 2020).

Placeness – Positively acquire sense of belonging and self-identity in physical settings manifested through social connection of everyday users created (Relph, 1976; Seamon and Sowers, 2008).

Placeless(ness) – Negatively deliver physical settings that barely provide social interaction for people to generate sense of attachment (Relph, 1976; Seamon and Sowers, 2008).

Plinth – The ground floor of different plots embedded within a building that is primarily morphologically defined (Karssenberget al., 2016; Simpson et al., 2022).

Plot – Whole building infrastructure with identical feature and appearance (such as windows), as well as morphological structure (Porta and Romice, 2010; Feliciotti et al., 2016).

Street edge segment – A subdivision of plinth with socio-spatial attributes, manifested through territorial actions, as well as individual and group ownership and personalisation, making the street environment more complex and richer, whilst providing potential opportunity for social interaction (Thwaites et al., 2013, 2020; Simpson et al., 2022).

Socio-spatial – Characteristics of street edge segments that established from the integration of material form, spatial organisation and social vitality to express its experiential complexity (Dovey, 2010; Gehl, 2010; Thwaites et al., 2020).

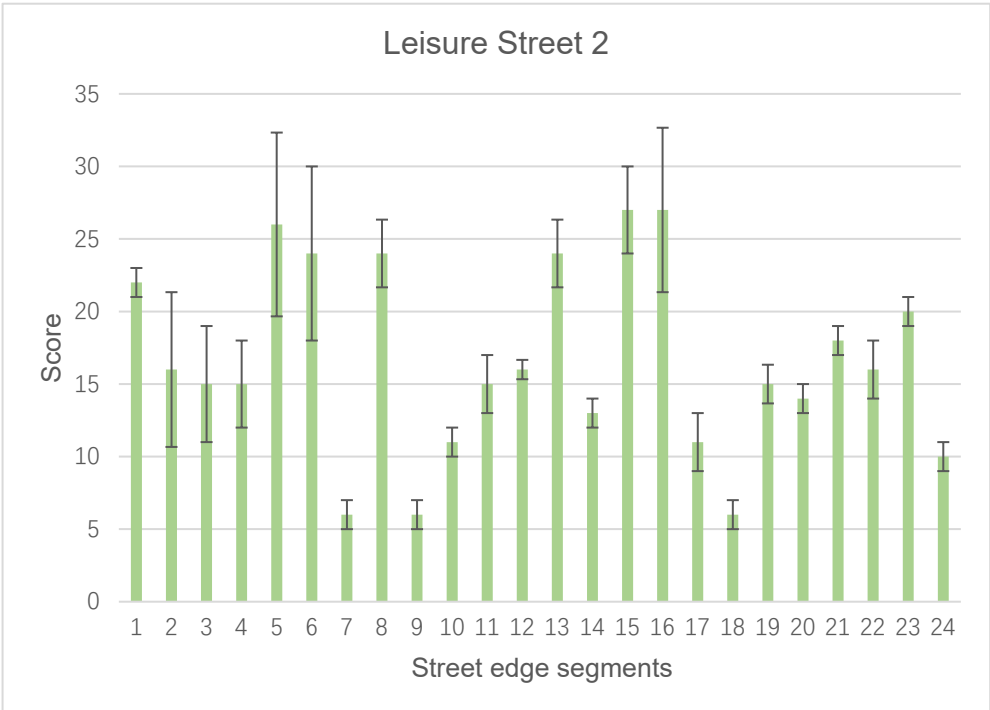
Territorialisation – Actions and behaviors, comprising necessary, optional and social, conducted by people to potentially influence everyday engagement and experience, whilst activating the street edge environment through reproduction / recreation (Gehl, 2010; Thwaites et al., 2013; Mehta, 2019).

Thereness – A sense of whole setting, which emphasises overall directional sensation through restricting locational qualities, the opposite to hereness (Cullen, 1971).

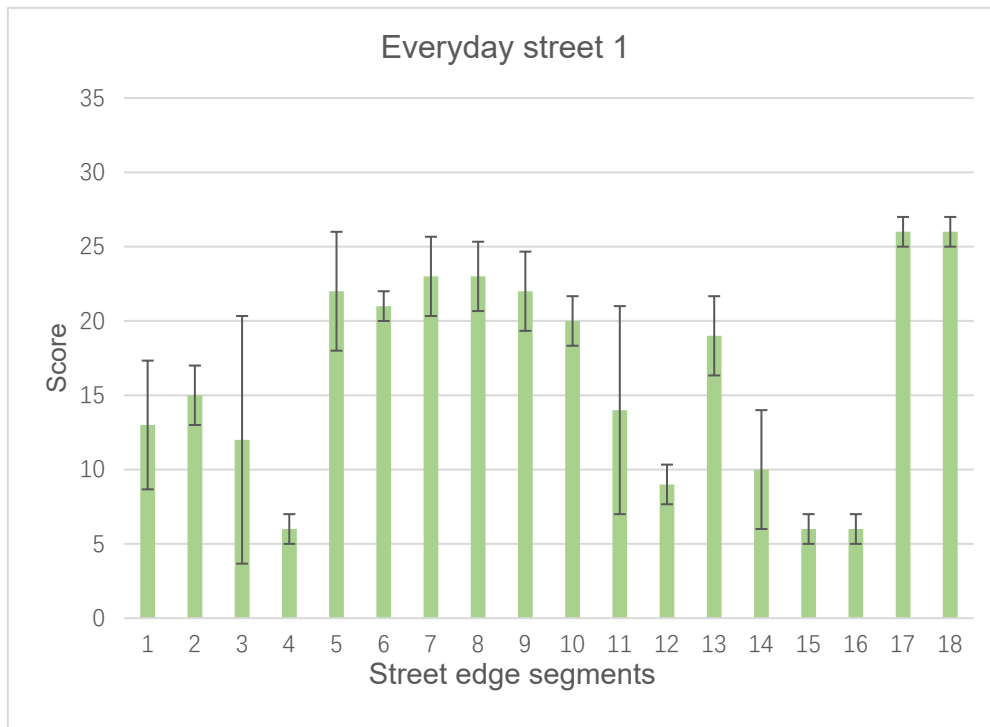
Top-down decision-making – Primarily dominated professionals, usually undertake large-scale infrastructure, tactics and overarching guidance (Habraken, 1998; Thwaites et al., 2013).

Understanding (levels of control) – Social interaction between people and the place they create established through communal interest and collective ownership (Habraken, 1998; Thwaites et al., 2020).

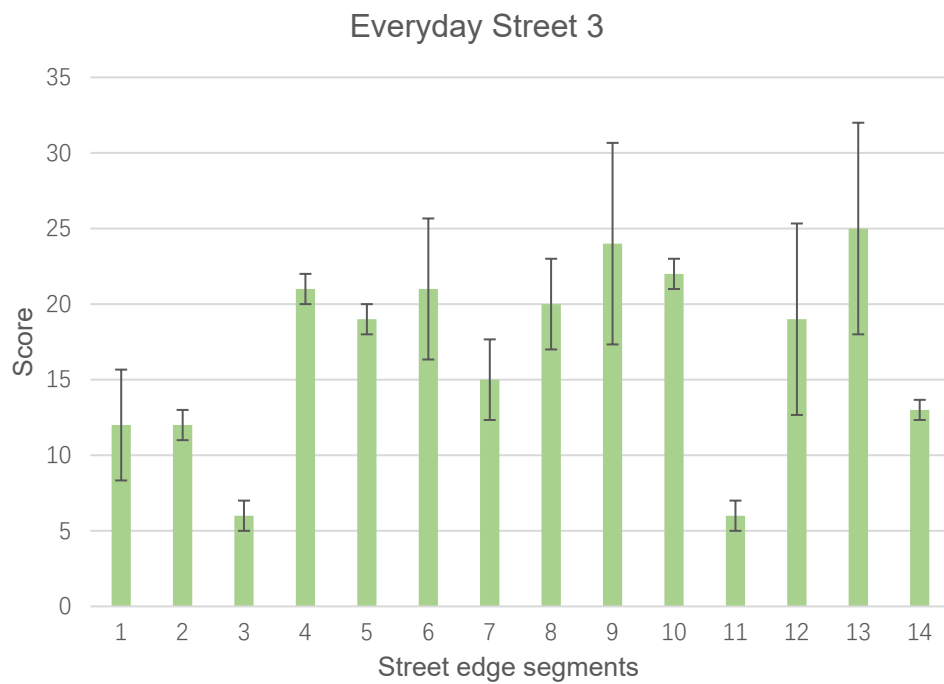
Appendix I



Bar charts show the score of lead researcher, and standard deviation shows the how close scores were to the lead researcher



Bar charts show the score of lead researcher, and standard deviation shows the how close scores were to the lead researcher



Bar charts show the score of lead researcher, and standard deviation shows the how close scores were to the lead researcher

Appendix II

Score 1 assessment

Tan Hualin - Main Street						
Segment	Distinctiveness	Temporality	Appropriation	Occupation	Openness	Articulation
1	5	3	3	4	4	3
2	5	2	2	4	3	4
3	5	5	5	3	4	5
4	5	5	5	5	5	5
5	5	2	4	5	5	5
6	5	4	5	5	5	5
7	4	5	5	5	4	5
8	5	3	3	2	4	4
9	5	3	5	4	4	5
10						
11	5	4	4	2	4	4
12	5	5	5	2	5	4
13	5	5	5	5	5	4
14	3	2	3	5	2	5
15	3	3	3	4	3	5
16	5	3	3	2	3	5
17	4	4	4	5	3	5
18	5	1	2	2	5	5
19	2	3	5	5	4	3
20	2	3	3	3	3	2

Door to upstairs

Prison door

Score 2 assessment

Tan Hualin - Main Street

Segment	Distinctiveness	Temporality	Appropriation	Occupation	Openness	Articulation
1	3/4	2	3	2/4	4	3
2	4	2	3	3	5	3
3	5	3 2/2	4/5	2	4/5	4
4	5	2	4/5	2	5	4
5	4 5	2	3 3	4/5	5	5
6	5	4	5	4	4	5
7	5	3/4	4	5	5	5
8	3	2	3	2	3	3
9	5	4	4 4	4	3	5
10	—	—	—	—	—	—
11	4	2	2	3	4	4
12	3	3	2	3	4	4
13	5	4/5	3	5	4	5
14	2	1	1	5	1	3
15	2	2	2	2	2	2
16	4	2	3	4	3	5
17	5	4	5	5	5	5
18	—	—	—	—	—	—
19	4	2	3	4	3 3	4
20	2	1	2	1	1	2

Door to upstream

Private door

0-5

Socre 3 assessment

Tan Hualin - Main Street						
Segment	Distinctiveness	Temporality	Appropriation	Occupation	Openness	Articulation
1	4	1	3	2	2	1
2	4	4	4	4	4	3
3	5	4	4	4	4	5
4	4	4	4	3	4	5
5	5	2	4	4	5	4
6	4	3	4	4	4	3
7	4	3	2	4	2	3
8	3	3	3	4	3	2
9	4	3	3	4	3	4
10						
11	5	5	4	3	4	4
12	3	4	4	4	5	3
13	4	4	4	4	4	4
14	3	2	1	4	1	2
15	3	2	2	3	2	2
16	4	3	3	5	4	4
17	5	5	4	5	5	4
18						
19	4	5	5	4	3	4
20	3	3	4	2	1	1

Door to upstairs

private door

Score 4 assessment

Tan Hualin - Main Street						
Segment	Distinctiveness	Temporality	Appropriation	Occupation	Openness	Articulation
1	5	4	3	2	4	3
2	5	4	3	2	3	3
3	3	4	4	4	3	4
4	1	3	2	2	3	2
5	5	2 3	2	3	5 4	4
6	5	4	5	4	3	4
7	3	3	3	4	2	3
8	2	3	3	3	4	2
9	5	4	4	5	4	5
10	1	2 1	1	1	1	1
11	5	3	3	4	3	3
12	4	3	2	3	4	3
13	5	4	4	5	4	4
14	4	3	2	3 2	3	2
15	4	3	2	3	2	3
16	5	4	4	5	3	5
17	5	4	5	5	4	5
18	1	1	1	1	1	1
19	3	3	3 3	2	3	2
20	3	3	3	2	3	2

Door to apartments

private door