ENJOY THE SAFETY

Enhancing Public Space Safety for women through Nighttime Economy

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ABSTRACT

This study explores the intersection of urban safety, gender, and the nighttime economy by combining women's subjective perceptions with objective spatial and statistical data. It seeks to define what constitutes a "safe public space" and to identify areas in Amsterdam that are either perceived or demonstrated to be unsafe during nighttime hours.

As a background, the research examines the role of formal institutions such as the Amsterdam municipality and NGOs in addressing urban safety concerns. It highlights a significant limitation in current approaches: while existing strategies tend to prioritize the security of private venues such as nightclubs and bars, they often neglect the safety of outdoor public spaces—where many incidents and perceived threats actually take place.

This oversight is particularly critical given that women are disproportionately affected by safety concerns in public spaces at night, both in terms of actual incidents and heightened perceptions of risk. According to the European Union Agency for Fundamental Rights (2014), 55% of women in the EU avoid certain places or situations for fear of being assaulted, especially after dark. Such gendered disparities highlight the need for safety strategies that go beyond crime statistics to also include emotional and psychological dimensions of urban space.

This study approaches the topic of urban safety from two lens: the female perspective lens and the temporal lens of nighttime. Methodologically, the study adopts a multi-method approach including spatial data analysis, surveys, interviews, and literature reviews. Special focus is placed on incorporating female perspectives through street interviews. Based on the insights generated, the research proposes a design intervention using pattern language methodology within the Bijlmermeer district.

The intervention aims to assess the area's potential for attracting nighttime economic investment and to develop inclusive spatial strategies that enhance safety through urban programming. The proposed framework not only offers a desirable future vision for Bijlmermeer, but also provides a replicable model for other neighborhoods in Amsterdam. By advocating for closer collaboration between economic stakeholders and human-centered safety interventions, this study aims to foster a more diverse and inclusive nighttime economy—one that promotes not only safer public spaces but also gender equality and the long-term social sustainability of urban communities.

Keywords:

Public Space Safety, Nighttime Economy, Gender Equality, Spatial Disparities, Social Sustainability, Women's Perceptions, Spatial Data Analysis, Design Intervention, Bijlmermeer, Pattern Language, Perceived Safety.

MOTIVATION

Two years ago, I wrote in my motivation letter for applying to TUDelft faculty of Architecture that I would like to concentrate on urban safety in my graduation and future research. Every year, there are many incidents of violence and sexual crimes against women on the streets in China. Big cities sometimes have more safety issues than small, peaceful villages. I live in a big city in the north of China, and due to safety issues I was told by my parents not to go out alone at night until I was 20 years old, let alone to go to a bar street by myself. But even when I'm accompanied by others, I've still had some not-so-great experiences, such as being harassed and attacked by drunk people. Some of these happened in Europe. It made me realize that this is something that probably exists in many cultural contexts, and that many, many vulnerable people are facing this uneasy feeling. Even though I still enjoy the nightlife, I often feel nervous on my way to and from neighborhoods where alcohol is sold. I think I can deeply understand the feeling that young girls want to go out at night and dress up, but inside they may not be able to fully relax and enjoy all this entertainment. I can better understand the harassment that more than half of the women in this world have experienced. This is why I hope to devote my graduation project to researching the safety of vulnerable people at night in the city.

TERMINOLOGY

Nighttime Economy activities(NEA): Economic activities that take place during the night, including businesses like bars, nightclubs, restaurants, and other establishments that operate after dark. The project explores how these activities interact with urban safety and perceptions of safety.

Perceived Safety: How safe individuals feel in a particular space, influenced by a combination of personal experiences, cultural factors, and environmental conditions.

Objective Safety: Measured based on crime rates and other quantifiable factors, providing an evidence-based assessment of safety in public spaces.

Pattern Language: A methodology for urban design that emphasizes the identification of patterns in space and human activities to inform planning decisions. The project uses pattern language to develop design interventions for improving safety in Bijlmermeer.

Eyes on the Street: A concept introduced by Jane Jacobs, emphasizing the importance of natural surveillance in public spaces for promoting safety. It suggests that the presence of people in public spaces can deter crime.

Crime Prevention Through Environmental Design (CPTED): This is a theory and practice that focuses on using the physical environment to reduce opportunities for crime. Natural surveillance is one of the key principles of CPTED, encouraging designs that maximize visibility and reduce places where criminal activity can go unnoticed. (Jacobs, 1961)

Natural Surveillance: Natural surveillance refers to the ability of people to observe and monitor public spaces passively, without the need for active surveillance systems like CCTV cameras. It is often created by the design of public spaces that encourage public visibility and interaction, such as well-lit streets, open areas, and spaces with clear sightlines. The presence of people in these spaces, whether residents, pedestrians, or visitors, is a key component of natural surveillance. (Jacobs, 1961)

Spurious Correlation: A misleading relationship between two variables that may appear to be related but are actually influenced by a third, unconsidered variable. The project explores how controlling for covariates can help identify genuine relationships in data analysis.

Correlation: Correlation refers to a statistical relationship between two variables, indicating that when one variable changes, the other tends to change as well, but it does not imply that one causes the other. For example, a correlation between the number of nighttime economic activities and perceived safety could show that they change together, but this does not mean that the increase in nighttime activities causes a decrease or increase in safety perceptions.

Causation: Causation suggests that changes in one variable directly cause changes in another. For example, an increase in safety measures (such as better lighting or more street surveillance) may directly improve perceptions of safety, making it a causal relationship.

Multivariable Regression: A statistical technique used to examine the relationship between one dependent variable and multiple independent variables (predictors). It helps to account for the influence of multiple factors simultaneously to assess their individual effects on the dependent variable.

Dependent Variable (Response Variable): The variable being predicted or explained in the analysis. In your case, this could be perceptions of safety, crime rates, or another safety-related metric.

Independent Variables (Predictors): The variables that are believed to influence or predict the dependent variable. In your study, independent variables could include factors such as nighttime economic activities, lighting, or street surveillance.

Covariates: These are variables that are included in the analysis to control for potential confounding factors. Covariates help to isolate the effect of the independent variables on the dependent variable. Examples could include socioeconomic status, age, or the presence of law enforcement.

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1. INTRODUCTION

1.1 BACKGROUND AND CONTEXT

1.1.1 Nighttime economy

What is the Nighttime Economy?

The nighttime economy thrives from 6 p.m. to 6 a.m., encompassing various activities such as entertainment, arts, and dining, drawing in residents, office workers, and tourists after dark. This sector not only serves as a source of entertainment but also acts as a key driver of urban economies by creating employment opportunities, supporting local businesses, and generating billions of dollars in revenue. In addition to direct revenue, the nighttime economy stimulates growth in sectors such as transportation, retail, and tourism, which are crucial to the economic health of cities.

Broader Impact of the Nighttime Economy on Cities

A thriving nighttime economy not only boosts business development but also shapes the identity of a city. Vibrant nightlife attracts more people into shared spaces, enhancing public safety, and boosting tourism—an invaluable source of urban income. A strong nighttime economy is increasingly becoming a key factor in attracting young professionals, entrepreneurs, and creatives to urban centers. Globally, over 60 cities have appointed a "night mayor" or created dedicated departments to manage and improve their nighttime ecosystems

Clustering and Spatial Disparities in the Nighttime Economy

While the nighttime economy contributes significantly to the metropolitan economy and creates numerous job opportunities, it is also influenced by the autonomous development of cities, driven by the forces of capitalism and the free market. This results in the clustering of nighttime commercial activities in certain areas. According to Wang et al. (2024), such clustering creates concrete spatial disparities and conflicts, leading to an imbalance in the distribution of activities. Overly centralized economic activities create a more severe segregation at night compared to daytime. In some areas, commercial landscapes are overly bustling, while in others, spaces remain silent. Furthermore, leisure zones within the nighttime economy, while driving local economic growth and providing positive social experiences, are often hotspots for urban violence (Philpot, 2024).

Figure1.1.1 Night Light Map
Source: https://earthobservatory.nasa.go

1.1.2 Gender and Public space safety

Figure 1.1.2 Nighttime activities
Source: https://misstourist.com/category/europe/netherlands/

Figure 1.1.3 Empty street
Source: AP Photo/Jerome Delay, 2015

THE DEATH
AND LIFE
OF GREAT
AMERICAN
CITIES

JANE JACOBS

Under the autonomous development of cities, driven by the laws of capitalism and free-market dynamics, nighttime commercial activities often tend to cluster in specific areas. This phenomenon has been widely discussed in urban studies, where it is argued that cities develop through uneven economic forces, leading to the concentration of certain activities (Harvey, 2001). This clustering results in the creation of vibrant commercial districts(Figure 1.1.2), while other areas may remain underdeveloped or lack economic activity(Figure 1.1.3). Such spatial imbalances, between bustling nighttime activity hubs and underutilized, "blank" areas, can significantly influence the social dynamics and safety perceptions of neighborhoods.

As noted by Jacobs (1961)(Figure 3.2.1), the concept of "Eyes on the Street" is essential in understanding urban safety. Jacobs emphasized that natural surveillance—the presence of people in public spaces—is one of the most effective methods for enhancing safety. She argued that vibrant, active streets, where residents, workers, and passersby can observe what is happening around them, contribute to safer urban environments. She states in her book(Figure 1.1.4):

"The best way to make a neighborhood safe is to have a lot of people around, paying attention to what is going on." (Jacobs, 1961).

The clustering of nighttime activities, especially in high-density commercial areas, can be understood through this lens. Areas with more activities and higher foot traffic tend to have better surveillance, thus enhancing safety. On the contrary, areas lacking such activity may not only be perceived as unsafe but can also present actual safety concerns due to the lack of natural surveillance.
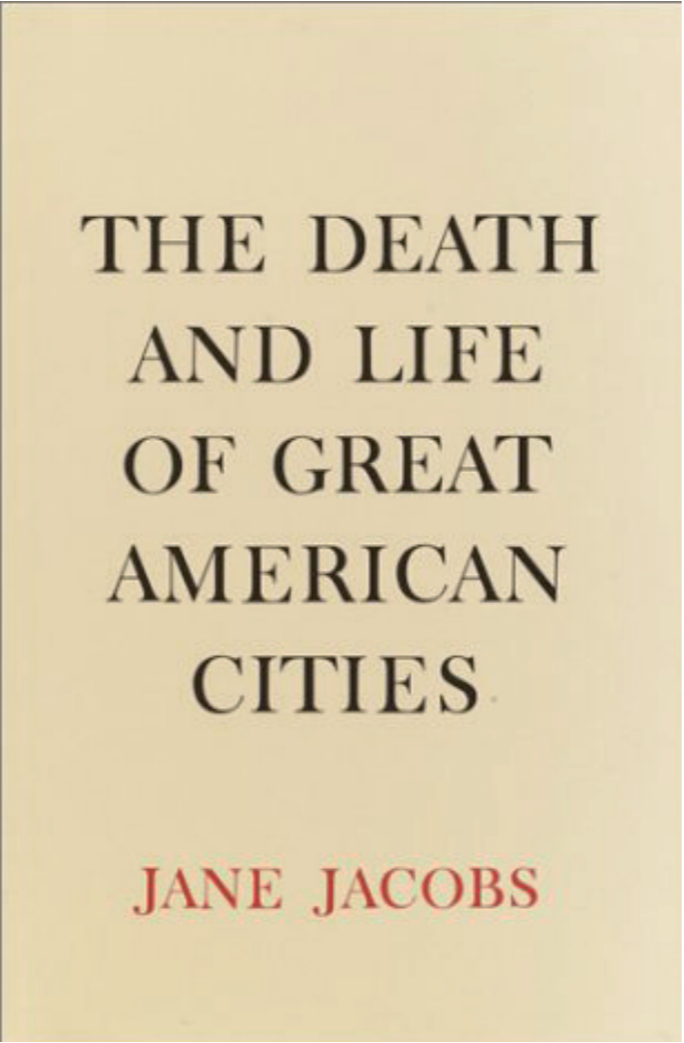
Figure 1.1.4 Cover of The Death and Life of Great American Cities
Source: https://en.wikipedia.org/wiki/Jane_Jacobs#

Figure 3.2.1Jacobs as chair of a Greenwich Village civic group at a 1961 press conference
Source: https://en.wikipedia.org/wiki/Jane_Jacobs#

Data from Orange World (2022) reveals that three out of four women have experienced sexual harassment, with half of these incidents occurring on the street. Similarly, academic literature highlights that a significant portion of crimes, including sexual harassment and other serious offenses, often take place at night. This data points to an urgent need to address nighttime safety, particularly in public spaces. One key concept in urban safety is "eyes on the street", as proposed by Jane Jacobs (1993), which emphasizes the role of natural surveillance in making public spaces safer. Jacobs argued that active streets, where people are present and engaged in various activities, can effectively deter crime. Less populated spaces, on the other hand, are perceived as negative places at night and become hotspots for crime. As a result, the lack of human presence at night can generate insecurity, particularly for vulnerable groups, such as women. This idea is supported by the growing body of literature indicating that unsafe public spaces contribute to the high rates of sexual crimes, such as sexual harassment, and can act as a deterrent for women's mobility and social engagement (Jacobs, 1993).

Objective data, such as crime rates, can reveal the extent of the safety issue, but subjective feelings of safety also play a crucial role. According to the latest data from Orange World (2022), 75% of women in the Netherlands have experienced sexual harassment, with 51% of these incidents occurring in public spaces such as streets(Figure 1.1.6 Data). Furthermore, sexual violence offenses are showing a slight upward trend in the country (Statista, 2022), indicating that this issue continues to persist. The causes of crime are multifaceted, and this information led the question about whether nighttime economic activities and the concept of "eyes on the street" could serve as a potential approach to enhance safety in public spaces. Active, well-lit areas with visible activities could increase natural surveillance and thus reduce the likelihood of criminal behavior, especially for women in urban environments.
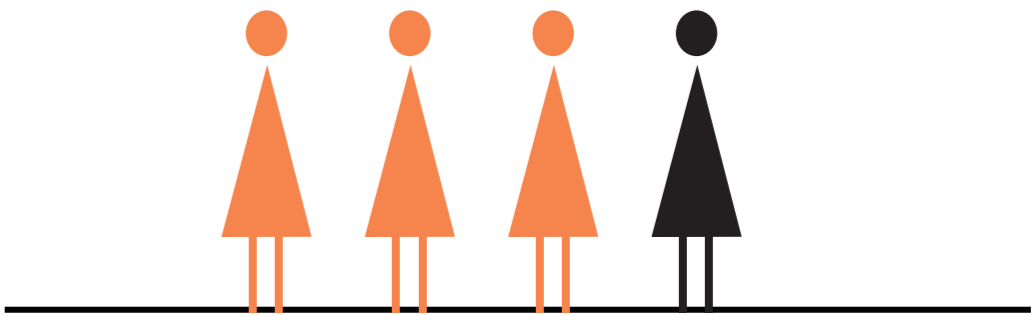
**75% of women in the Netherlands
have experienced sexual harassment**
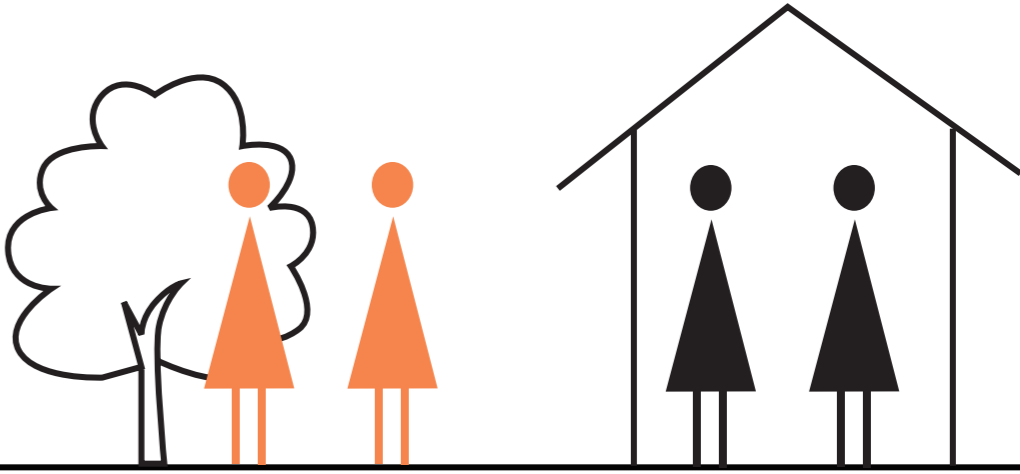
**51% of sex harrasment occurred in
public spaces such as streets**

1.1.3 social context and perception

Given these issues, there are numerous organizations concerned with nighttime economy and safety(Figure 1.1.7). By understanding the ongoing transformations and initiatives, this study aims to identify the positioning of this project within the broader efforts and initiatives currently taking place. This will help to better clarify the project's specific focus and its contribution to ongoing developments in urban safety and the nighttime economy.

First, formal organization could be institutions. Mulnicipality of Amsterdam explores the social, cultural and economic significance of the night-time economy, emphasizing a more pluralistic development strategy. (Gemeente Amsterdam, 2021) NGOs, on the other hand, focus on social and political activism, giving voice to specific vulnerable groups such as women. (Orange World,2022)There is already some collaboration between the two: the Amsterdam City Council signed a statement of intent on safe streets in 2019. Every two years, a safety monitoring program is developed to address sexual harassment in public spaces. They have launched a campaign called "You are not alone". (Gemeente Amsterdam, 2021)

However, this collaboration is still insufficient, and Amsterdam's nighttime vision of strategies to increase safety focuses primarily on private security and access control in nightclubs and bars. There is little discussion of outdoor public spaces.

The documents emphasizes measures such as increasing indoor security; however, the safety of public spaces has been largely neglected. Given the earlier data, where more than half of sexual-related crimes occur on the streets, this project aims to place greater focus on the safety of public spaces, such as streets and squares, to address this significant gap. By doing so, the project seeks to contribute to creating safer, more secure environments in public areas that are often overlooked in existing safety strategies.
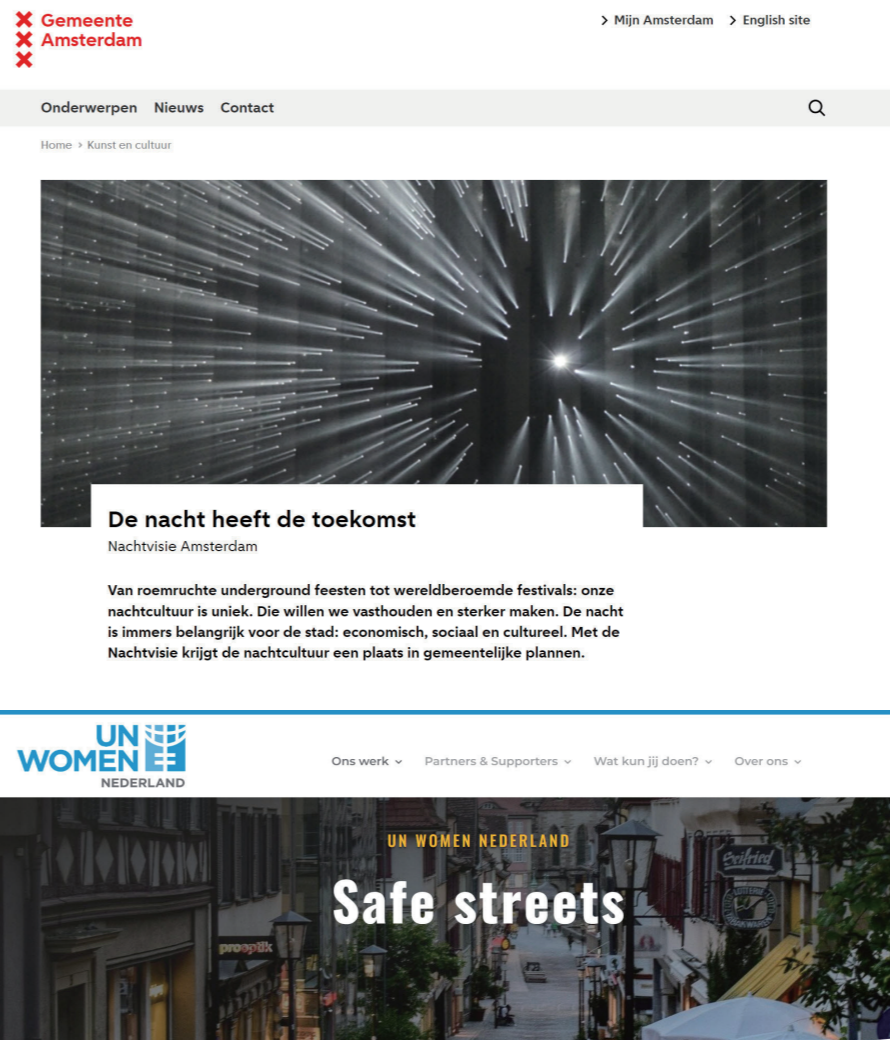
Figure 1.1.7
Source： 1.https://www.amsterdam.nl/kunst-cultuur/nacht-toekomst/
2.https://www.unwomen.nl/onze-campagnes/safe-streets/
3.https://www.orangetheworld.nl/
4.Nancy Blaker and Joost Poort, "De Waarde van de Kleine Uurtjes."
5.Uitvoeringsagenda Nachtcultuur 2023-2026.
6.Gemeente Amsterdam, "Toekomst van de Nacht: Nachtcultuur in Amsterdam."

1.4.Background and problem-What is happening now?

1.4.2.Individual and social discourse

The public's informal voice, as a form of social discourse, can also be viewed as an institution in itself. Narratives such as "girls should not go out at night" or "don't be in the wrong place at the wrong time" are prevalent across various cultural contexts(Figure 1.1.8). Public spaces, particularly at night, are more commonly occupied by men, while women tend to travel in groups or avoid venturing out altogether. This division raises the question: can the individual voice, especially the subjective experiences and feelings of women, be considered another form of narrative in urban planning?

Subjective feelings are often considered secondary to objective data, but they hold significant value and can provide valuable insights for urban design and planning. In contemporary society, the voices of individual women are beginning to gain more attention. However, these perspectives have yet to be fully integrated or actively practiced in the development of spatial planning and urban design. This highlights the need for urban planning to embrace a more inclusive approach that acknowledges and incorporates both subjective and objective factors in the design of public spaces.

Figure 1.1.8 Individual and social discourse
Source: 1.UN,HerCity
2.FASICA"Amsterdam Mental Mapping Project"
3.FASICA"Amsterdam Mental Mapping Project"
4.Quora, 2024 ; 2.Reddit, 2024

1.2 CASE AREA

1.2.1 Why Amsterdam was Chosen for This Study

Potential

Amsterdam has long been recognized for its dynamic and thriving nightlife, ranging from its underground scene to internationally acclaimed nightclubs and festivals. This vibrant nocturnal culture has fostered collaboration and the development of new artistic expressions. The city has acknowledged the need to cultivate and preserve this lively nightlife while ensuring that it remains inclusive, safe, and enjoyable for everyone involved. To achieve these objectives, Amsterdam implemented its Night Vision policy, which aims to create the ideal conditions for a flourishing night culture.

The Challenge

Nighttime plays a crucial role for the city, contributing significantly to its economic, social, and cultural landscapes. Ensuring safety in this context is a key priority, whether in public spaces or entertainment venues. The city's night culture needs to be accessible and appealing to both residents and visitors. However, challenges such as urban expansion and the scarcity of available space for events and venues have put increasing pressure on the maintenance of this vibrant nightlife.

Economically, Amsterdam's nightlife industry is a vital contributor to the local economy. With approximately 500 establishments dedicated to nighttime activities, the sector generates around 5,000 jobs. The city's rich cultural offerings attract 1.5 million visitors annually, with these tourists injecting approximately €1.25 billion into the economy through festivals, clubs, and other nightlife activities. In 2021, Amsterdam became the first Dutch city to formalize its vision for night culture, which was later codified in the Night Vision Implementation Agenda. This plan outlines 15 measures focused on space and regulations, sector representation, and financial support, with a total budget of €1 million allocated for 2023-2026. Additionally, another €1.2 million has been set aside to support the development of young talent in the nightlife industry.(World Cities Culture Report , 2022

)Problem

Despite the city's thriving nightlife, Amsterdam faces significant challenges in terms of public safety. In 2024, Amsterdam was reported as the city with the highest crime rates in the Netherlands (Figure 1.2.1). This issue, particularly the perception and reality of safety during nighttime, highlights the need for comprehensive strategies to balance the vibrancy of the nightlife economy with the pressing need for security, inclusivity, and public well-being.

The aim of this study is to address these challenges by analyzing the relationship between nighttime economic activities and public safety, focusing on the complex dynamics at play in a city that is both a cultural hub and facing substantial urban security issues.

fewer than 30 (per thousand residents)
30 to 45 (per thousand residents)
45 to 60 (per thousand residents)
60 to 75 (per thousand residents)
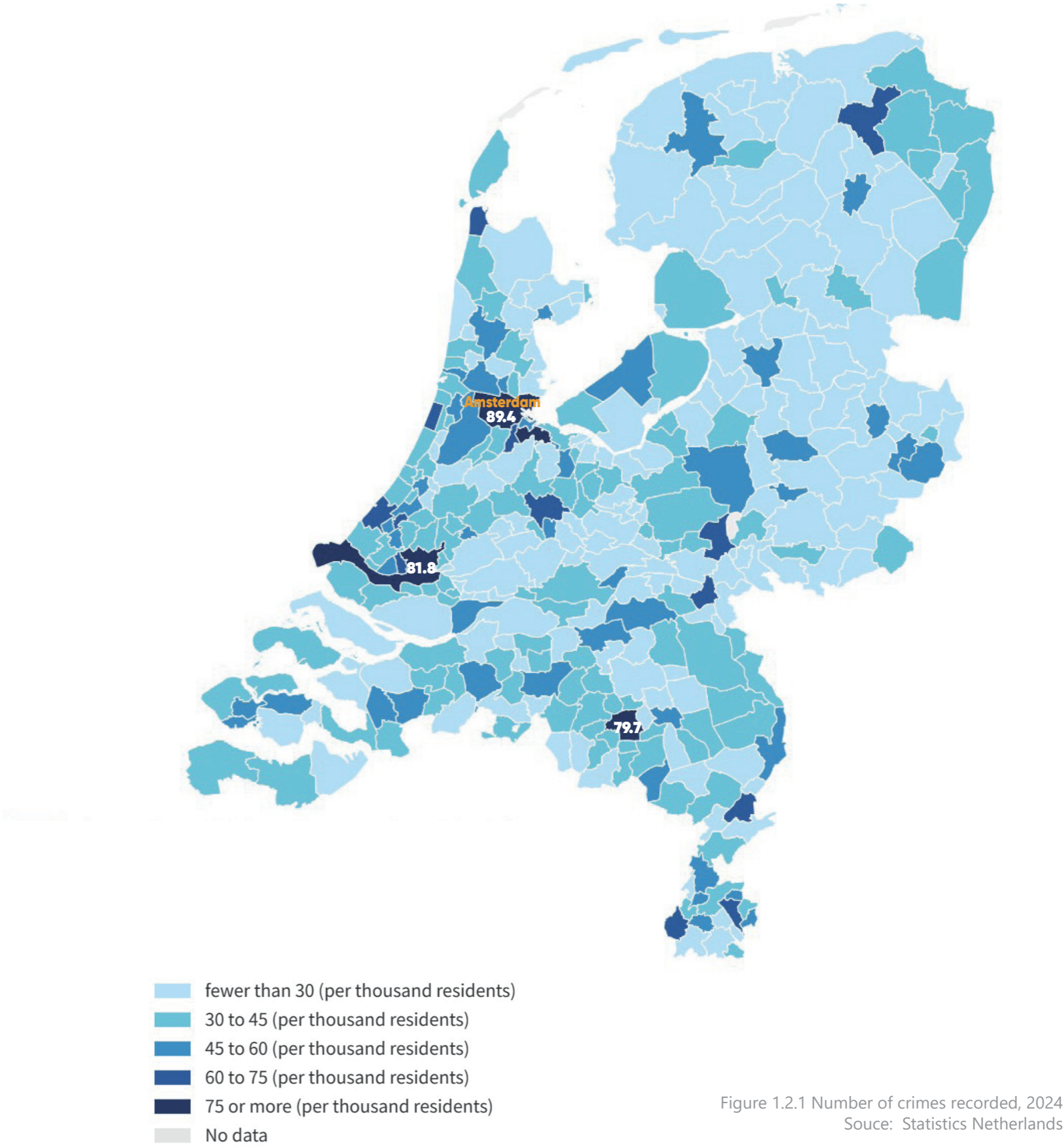75 or more (per thousand residents)
No data

Figure 1.2.1 Number of crimes recorded, 2024
Souce: Statistics Netherlands

1.2.2 the unbalance situation in Amsterdam

Under the autonomous development of the city, influenced by the laws of capitalism and free market development, nighttime commercial activities tend to be clustered.

As illustrated in the Figure 1.2.2, this research began with preliminary online mapping to explore the spatial dynamics of the nighttime economy and perceived safety in Amsterdam. By comparing the concentration of restaurants, which serves as a proxy for nighttime economic activities, with a map of perceived nighttime safety, two notable trends emerge.

Firstly, areas with lower perceived safety are predominantly located in peripheral neighborhoods, while the concentration of nighttime economic activities, such as restaurants, is primarily concentrated in the city center. This spatial distribution highlights a significant imbalance, suggesting that the clustering tendencies of businesses, fueled by capitalist dynamics, lead to an unequal distribution of nightlife industries across the city.

Secondly, the comparison reveals indications of spatial injustice in urban safety. Certain neighborhoods exhibit substantially lower safety perceptions and higher crime rates than others, suggesting a disparity in how safety is experienced across different areas of the city. These findings underscore the need for targeted interventions that address both economic development and public safety in underserved regions.

This analysis sets the stage for further investigation into the complex relationship between urban design, economic activities, and safety perceptions, and provides valuable insights for future urban planning strategies.
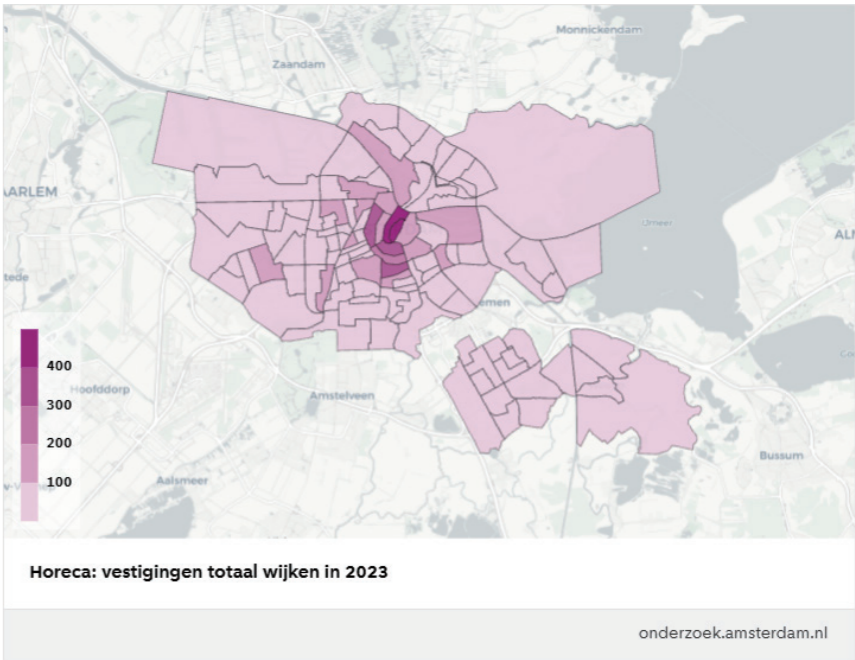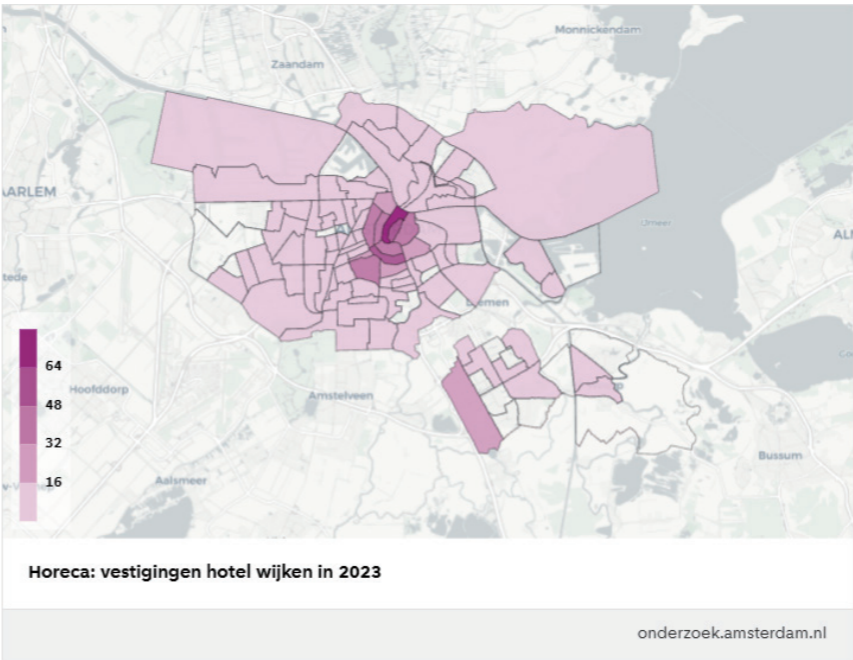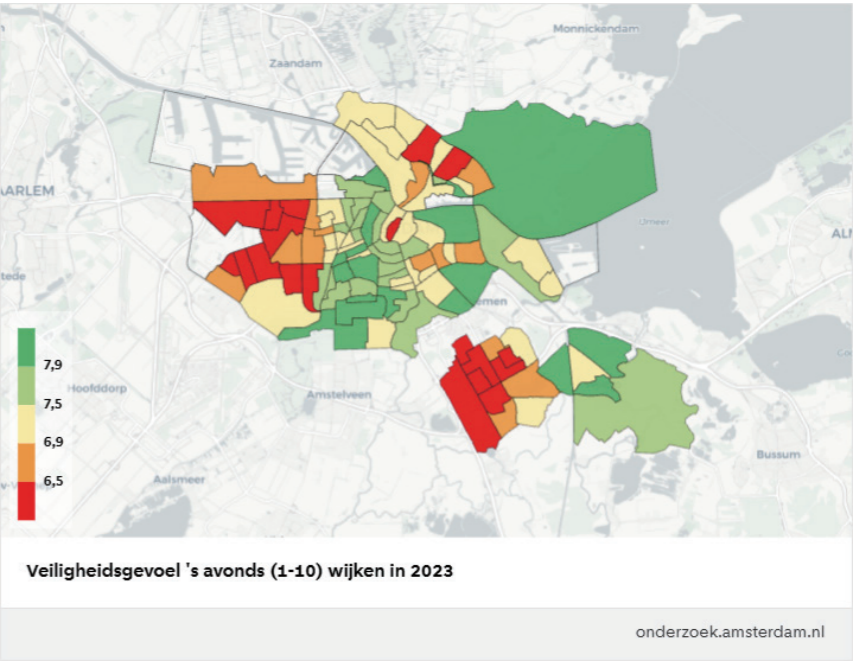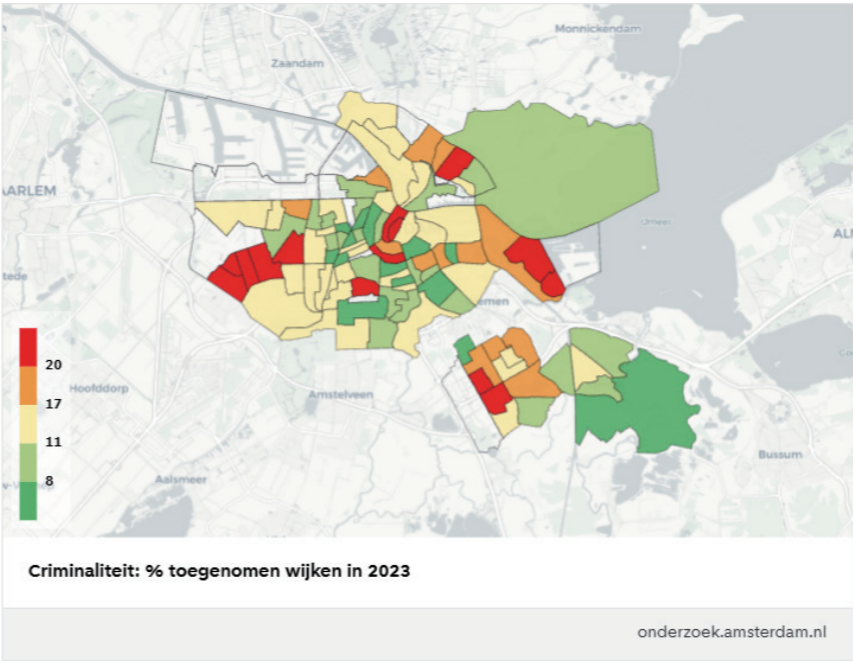

Figure 1.2.2 Map from Gemeente Amsterdam,2024
Data Source: Gemeente Amsterdam,2024

1.2.3 Why Bijlmermeer

In this project, the objective is to identify an area that exhibits both safety concerns and the potential for developing nighttime economic activities. That's why Bijlmermeer is selected as a pilot project location().

Problem: As depicted in the figure, areas marked in darker orange exhibit higher crime rates, indicating a higher level of perceived and actual insecurity. These regions represent zones of concern in terms of public safety, which is an essential factor to consider when analyzing urban security dynamics.

Potential: In relation to business owners, property values serve as an economic indicator reflecting the commercial vitality and potential of an area (Harvey, 2001). As shown in the map, low-priced areas in Amsterdam often overlap with safety concerns. Areas with lower property values, due to their reduced costs, may become attractive to investors, particularly when appropriate policies are implemented. Increased investment in nighttime economic activities can lead to the creation of natural surveillance, a concept that refers to the passive monitoring of public spaces by residents and passersby, which can enhance neighborhood safety (Jacobs, 1961). This form of surveillance may play a significant role in improving the security of the area. Consequently, the economic revitalization, driven by business investment, has the potential to foster an environment that not only stimulates local commerce but also contributes to improving safety in certain regions.

Figure 1.2.3 Map of problem and potentials
Data Source: Gemeente Amsterdam,2024

geojson_lnglat — WONINGW/
- 3130 – 4695
- 4695 – 6260
- 6260 – 7043
- 7043 – 7825
- 7825 – 11738

wijk_madebyziyun
- 54 – 85.4
- 85.4 – 91.8
- 91.8 – 106.2
- 106.2 – 122.2
- 122.2 – 172

1.2.4 Bijlmermeer's situation

Post-WW2 (1940s-1950s)

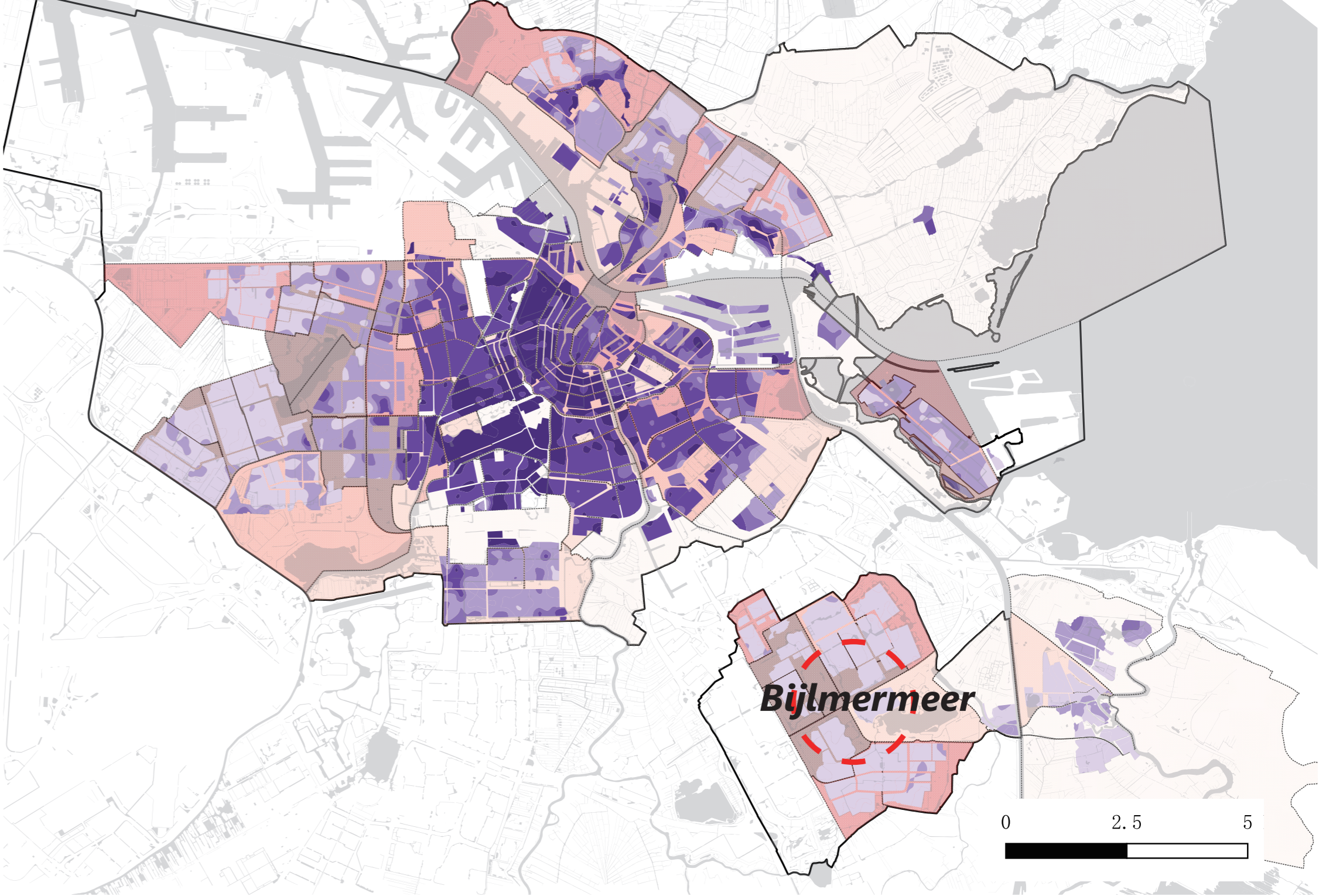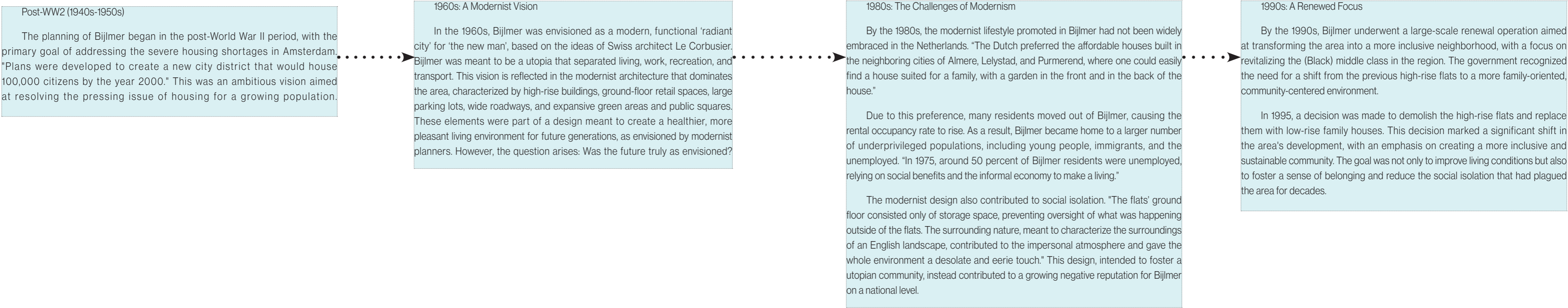The planning of Bijlmer began in the post-World War II period, with the primary goal of addressing the severe housing shortages in Amsterdam. "Plans were developed to create a new city district that would house 100,000 citizens by the year 2000." This was an ambitious vision aimed at resolving the pressing issue of housing for a growing population.

1960s: A Modernist Vision

In the 1960s, Bijlmer was envisioned as a modern, functional 'radiant city' for 'the new man', based on the ideas of Swiss architect Le Corbusier. Bijlmer was meant to be a utopia that separated living, work, recreation, and transport. This vision is reflected in the modernist architecture that dominates the area, characterized by high-rise buildings, ground-floor retail spaces, large parking lots, wide roadways, and expansive green areas and public squares. These elements were part of a design meant to create a healthier, more pleasant living environment for future generations, as envisioned by modernist planners. However, the question arises: Was the future truly as envisioned?

1980s: The Challenges of Modernism

By the 1980s, the modernist lifestyle promoted in Bijlmer had not been widely embraced in the Netherlands. "The Dutch preferred the affordable houses built in the neighboring cities of Almere, Lelystad, and Purmerend, where one could easily find a house suited for a family, with a garden in the front and in the back of the house."

Due to this preference, many residents moved out of Bijlmer, causing the rental occupancy rate to rise. As a result, Bijlmer became home to a larger number of underprivileged populations, including young people, immigrants, and the unemployed. "In 1975, around 50 percent of Bijlmer residents were unemployed, relying on social benefits and the informal economy to make a living."

The modernist design also contributed to social isolation. "The flats' ground floor consisted only of storage space, preventing oversight of what was happening outside of the flats. The surrounding nature, meant to characterize the surroundings of an English landscape, contributed to the impersonal atmosphere and gave the whole environment a desolate and eerie touch." This design, intended to foster a utopian community, instead contributed to a growing negative reputation for Bijlmer on a national level.

1990s: A Renewed Focus

By the 1990s, Bijlmer underwent a large-scale renewal operation aimed at transforming the area into a more inclusive neighborhood, with a focus on revitalizing the (Black) middle class in the region. The government recognized the need for a shift from the previous high-rise flats to a more family-oriented, community-centered environment.

In 1995, a decision was made to demolish the high-rise flats and replace them with low-rise family houses. This decision marked a significant shift in the area's development, with an emphasis on creating a more inclusive and sustainable community. The goal was not only to improve living conditions but also to foster a sense of belonging and reduce the social isolation that had plagued the area for decades.

Bijlmer's evolution from a modernist vision of a utopian city to its challenges in the 1980s and subsequent renewal efforts in the 1990s reflects the complexities of urban planning. The initial ambition of providing affordable housing and creating a functional, modern city district was hindered by social and architectural issues. As Bijlmer's demographic shifted, so too did its architectural and urban planning strategies, with an eventual focus on creating a more inclusive, family-oriented neighborhood. This transformation underscores the importance of not only physical design but also the social and cultural needs of the community when planning urban spaces.

Bijlmer's safety issues are also intricately linked to its architectural form and planning style. The modernist approach, with its emphasis on high-rise buildings and large open spaces, created areas that were difficult to monitor, fostering a sense of insecurity. The lack of natural surveillance, which refers to the passive observation of spaces by residents and passersby, contributed to the perception of unsafe public spaces (Jacobs, 1961). Furthermore, the spatial design, which prioritized separation of functions and spaces, led to an environment that lacked the community integration needed for collective security. As such, the architectural choices made during Bijlmer's development played a role in shaping its safety challenges, which later urban renewal efforts sought to address by promoting a more human-scale, community-oriented approach to urban design.

1.2.5 Stakeholder analysis and position of the project

This study is grounded in the multi-scalar stakeholder analysis model proposed by Malik and Tariq (2021), aiming to identify a clear and appropriate position for this project. Additionally, it draws on the Pentahelix framework, which maps stakeholders across five types: the public sector, knowledge institutions, businesses, civil society, and capital.

As illustrated in Figure 1.2.5, this project analyzes Amsterdam's nighttime stakeholders based on the 2021 Space for Night Culture policy document. By categorizing stakeholders across three different scales, the study distinguishes the following:

Macro scale: referring to society as a whole, encompassing political, economic, and social dimensions.

Meso scale: referring to parts of society, such as groups and organizations.

Micro scale: referring to individual actions and behaviors.

This project, being a student graduation project that integrates research and design, is positioned primarily at the micro scale. It aims to provide localized, actionable insights for a specific area. Moreover, as observed in the stakeholder mapping, there is a notable gap in the 'knowledge' sector at the micro scale.

This project attempts to address this gap by contributing to the knowledge domain at the micro level—particularly by offering knowledge and insights to small-scale institutions and individuals. For example, it seeks to examine what types of nighttime activities generate specific types of impacts. By doing so, the project aims to reduce perceptual barriers between different social groups (e.g., along gender lines), and between different types of stakeholders. Ultimately, this knowledge-sharing effort is intended to promote more inclusive participation in urban planning processes, where all stakeholders can engage on more equal and informed grounds.
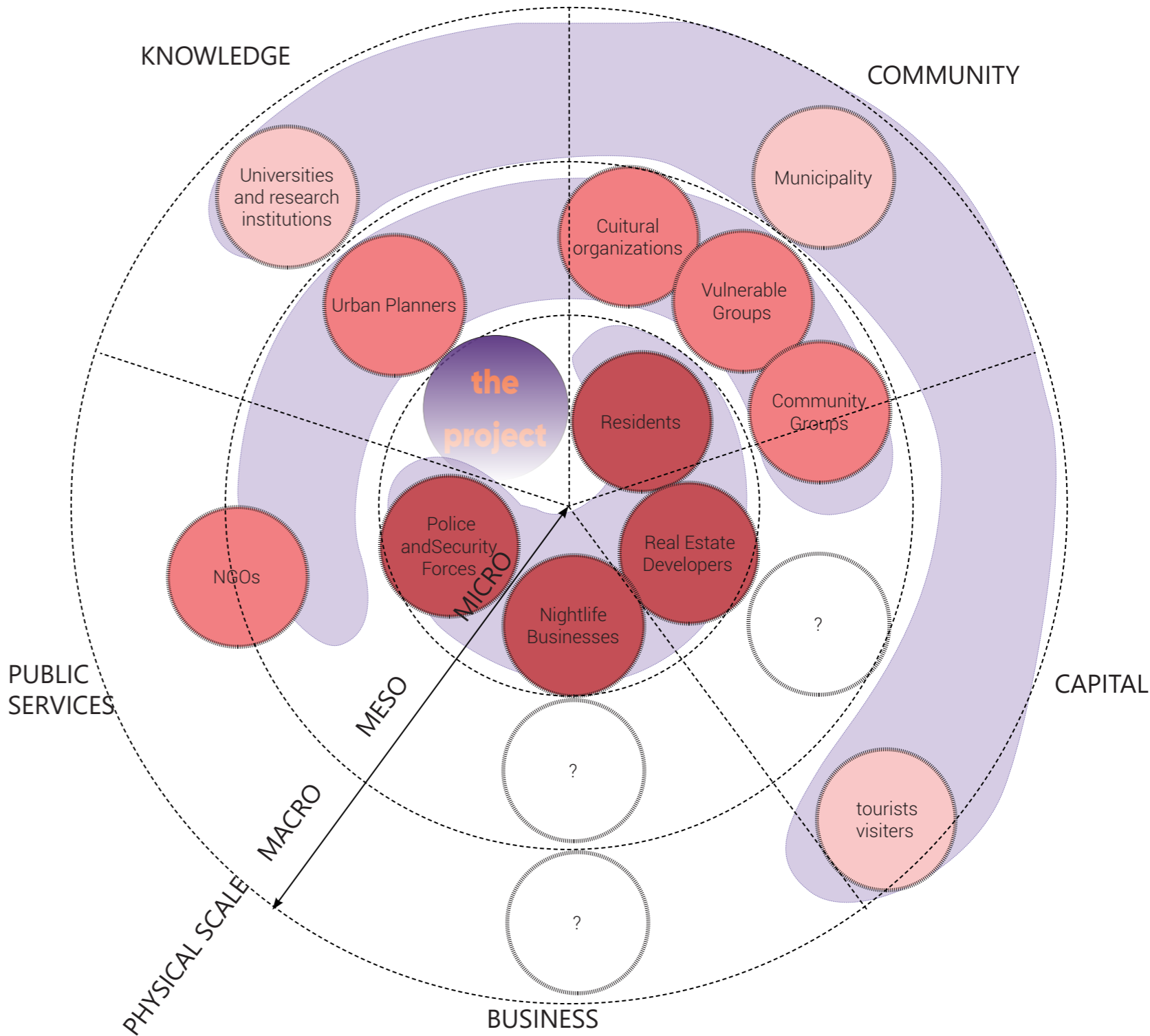

Figure 1.2.5 stakeholder analysis

1.3 PROBLEMATIZATION

1.3.1 Problem statement

Problem statement

The nighttime economy brings significant economic benefits to metropolitan cities by generating high profits and creating numerous jobs. However, the autonomous development of urban spaces, driven by capitalist principles and free-market dynamics, has led to spatial disparities. Nighttime commercial activities tend to cluster in specific areas, resulting in an imbalanced urban landscape. This spatial concentration creates bustling commercial hubs in some neighborhoods while leaving others silent and underpopulated, exacerbating segregation at night compared to daytime.

Jane Jacobs' concept of "eyes on the street" suggests that active, populated spaces foster safety, while less populated areas become "negative spaces" prone to criminal activities. Such unsafe spaces at night, especially those that lack social surveillance, often lead to increased risks for women, including sexual harassment and violence. Objective crime data reveals a rising trend in sexual offenses, with a significant portion of women reporting experiences of harassment in public spaces over the last year. However, safety is not solely measured by crime statistics; women's subjective perceptions of safety also play a crucial role in shaping their engagement with public spaces.

Given the increase in sexual harassment and the uneven distribution of safety across different neighborhoods, this issue raises critical questions about how the activity brought about by the nighttime economy and the presence of "eyes on the street" can enhance safety. Addressing this problem is essential for promoting safer, more inclusive public spaces that encourage gender equality and sustainable urban development.
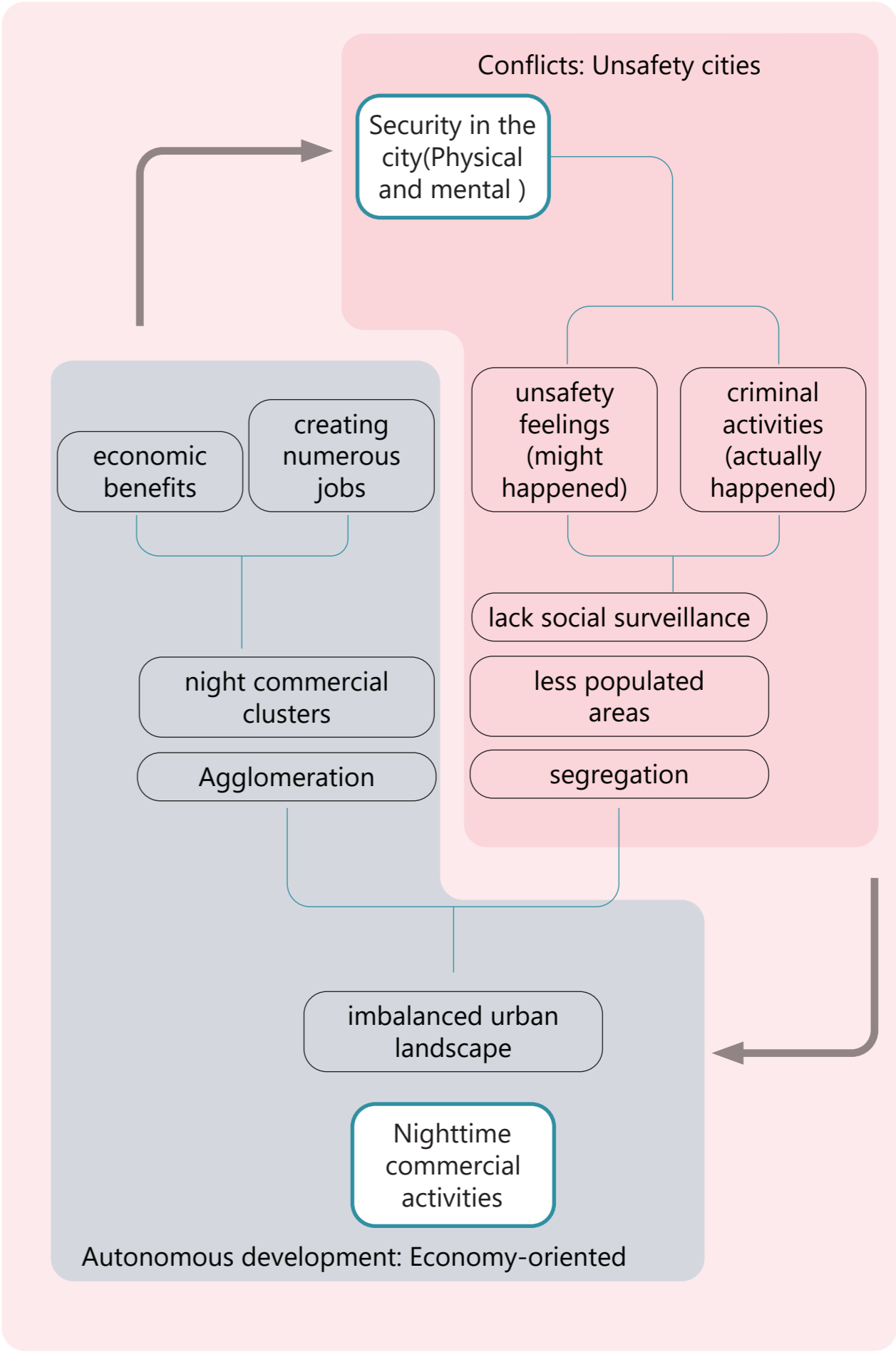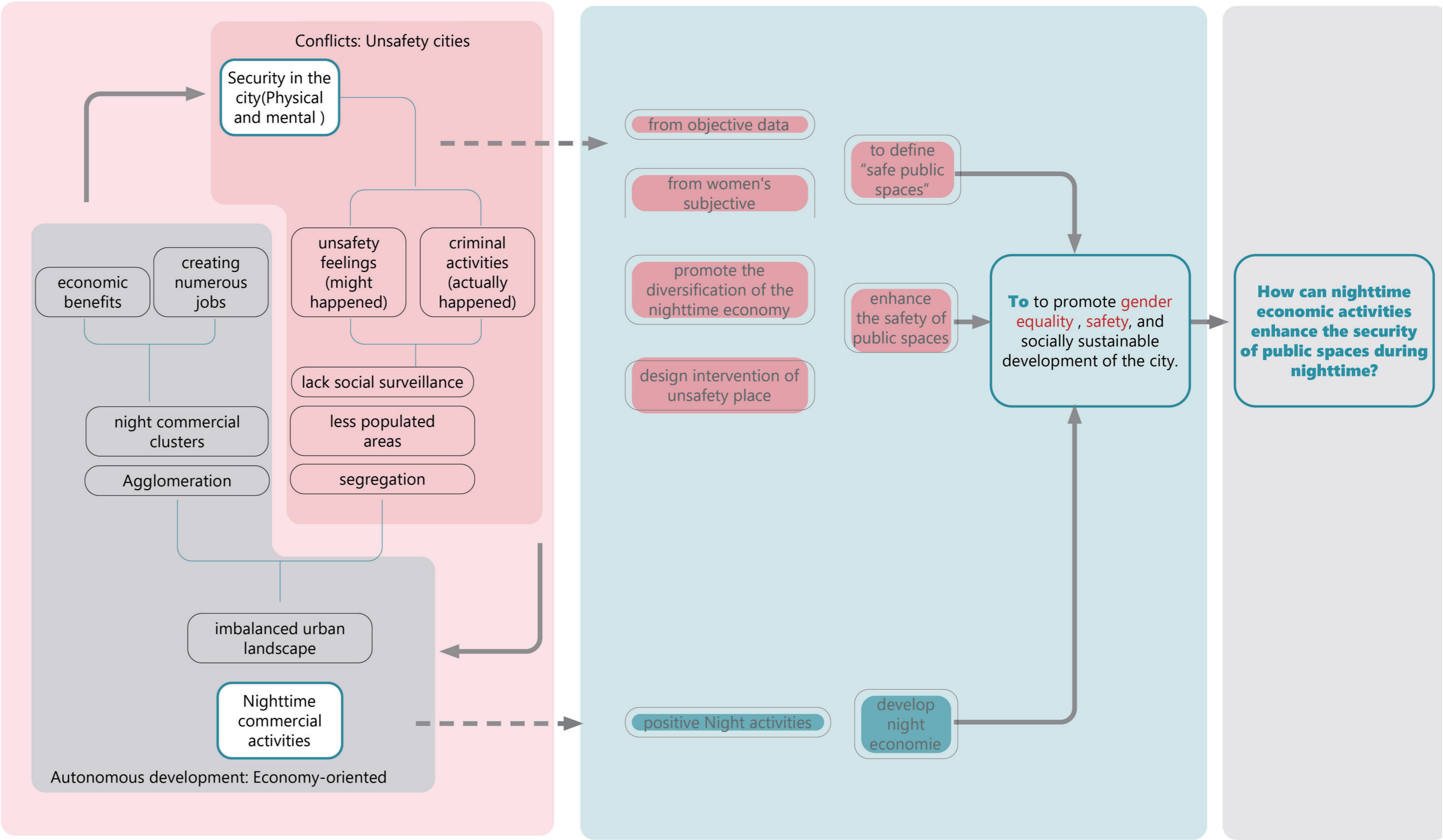
2 RESEARCH FOUNDATION

2.1 Research aim

8 DECENT WORK AND ECONOMIC GROWTH

5 GENDER EQUALITY

This research aims to define "safe public spaces" from both women's subjective perspectives and objective data, and to identify areas that are perceived or proven to be unsafe. By examining the relationship between nighttime activities and the safety of public spaces using a combination of methods, the study seeks to promote a more diversified nighttime economy and the development of various venues to enhance the security of public spaces. The ultimate goal is to foster gender equality and the socially sustainable development of communities, aligning with the UN Sustainable Development Goals, specifically Goal 5 (Gender Equality) and Goal 8 (Decent Work and Economic Growth).

From this, the research question can be formulated as: How can nighttime economic activities enhance the security of public spaces during nighttime?

Conflicts: Unsafety cities

Security in the city(Physical and mental)

economic benefits

creating numerous jobs

unsafety feelings (might happened)

criminal activities (actually happened)

night commercial clusters

lack social surveillance

Agglomeration

less populated areas

segregation

imbalanced urban landscape

Nighttime commercial activities

Autonomous development: Economy-oriented

from objective data

from women's subjective

to define "safe public spaces"

promote the diversification of the nighttime economy

enhance the safety of public spaces

To to promote gender equality , safety, and socially sustainable development of the city.

design intervention of unsafety place

positive Night activities

develop night economie

How can nighttime economic activities enhance the security of public spaces during nighttime?

2.2Research Questions

Main Question: How can nighttime economic activities enhance the security of public spaces during nighttime?

This question explores how activities like cultural events, dining, or entertainment influence public space safety, especially at night, providing insights into strategies to improve safety and foster inclusive environments.

Sub Questions:

What:

a) What types of nighttime economic activities contribute to public safety? This sub-question identifies which nighttime activities foster natural surveillance and contribute to safety. By examining industries like restaurants or bars, the study will highlight how they encourage social interaction and reduce insecurity.Why is this question important?Identifying these activities informs urban planning, helping prioritize venues in areas at risk of being unsafe to improve safety.

b) What specific factors (e.g., lighting) help transform public spaces into safer environments at night?This question focuses on environmental factors such as lighting, visibility, and accessibility, which impact how safe a space feels at night. Why is this question important? It helps urban planners improve infrastructure in public spaces to reduce crime and increase safety.

Where:

a) Where are nighttime economic activities concentrated, and how do these concentrations affect different neighborhoods in terms of safety?This question examines the spatial distribution of nighttime activities and their correlation with safety levels in various neighborhoods. Why is this question important?It helps identify safe and unsafe areas, guiding policy development to promote equitable safety across the city.

b) Where do negative spaces (areas with little to no activity) exist, and how do they contribute to unsafe conditions? This question identifies areas with little nighttime activity, which can become hotspots for crime due to lack of natural surveillance.Why is this question important?Identifying negative spaces allows planners to intervene, improving safety and encouraging use of underutilized areas.

This research aims to explore how nighttime economic activities can enhance safety in public spaces, creating safer and more vibrant urban environments.

Main Question

Sub Question

How can nighttime economic activities enhance the security of public spaces during nighttime?

What

What types of nighttime economic activities contribute to public safety/lack of safety?

What specific factors help transform public spaces into safer environments at night?

Where

Where are the unsafe areas?

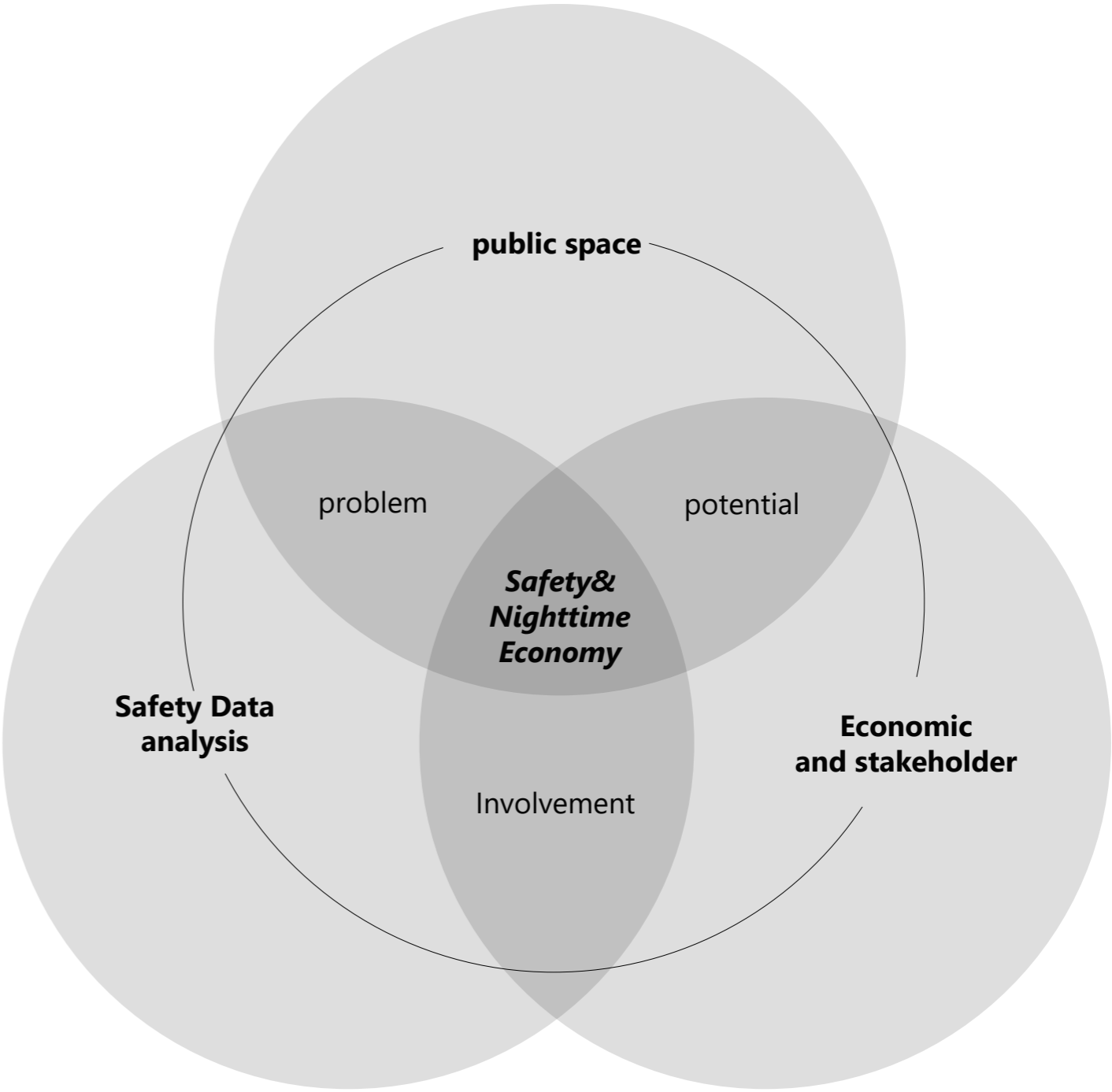Where are nighttime economic activities concentrated
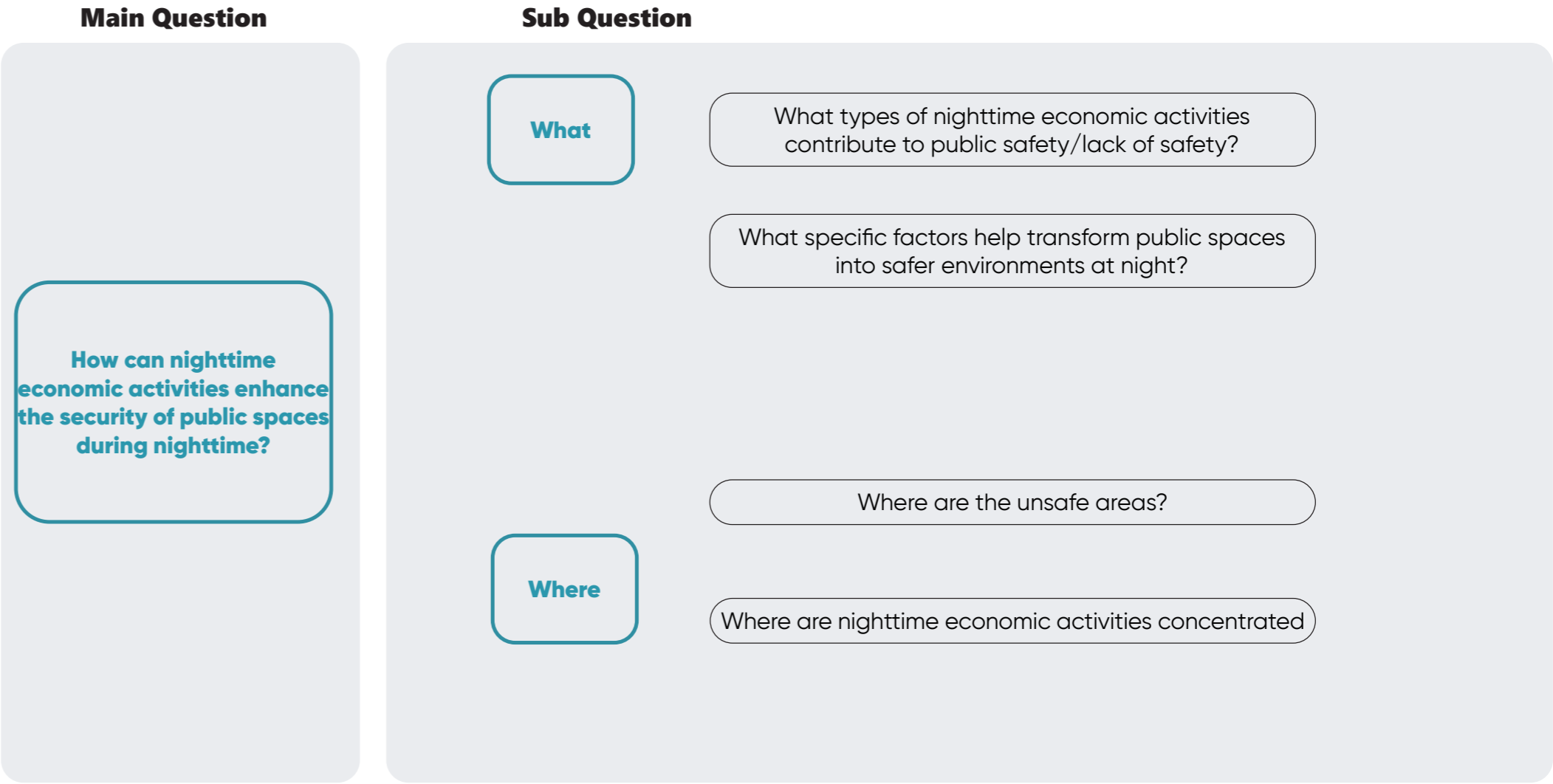
2.3 Theoretical framework

The theoretical framework of this research is constructed around three central pillars, each contributing to the understanding and analysis of urban nighttime safety and the role of nighttime economic activities.Public Space Theory

The first pillar draws from public space theory, a fundamental component in urban studies that investigates how public spaces contribute to community life, safety, and well-being. Key thinkers such as Jane Jacobs, William H. Whyte, and Jan Gehl have extensively discussed the importance of active and well-designed public spaces in promoting safety and social interaction. Jacobs' concept of "eyes on the street" emphasizes the role of natural surveillance in creating safer environments. Whyte's observations on the dynamics of public spaces underscore how design influences social behavior, while Gehl's work on urban design advocates for human-centric spaces that foster both safety and engagement. Additionally, insights from environmental psychology on perceived safety provide valuable understanding of how individuals' psychological responses to their environment influence their sense of security in public spaces.Safety Data Analysis

The second pillar focuses on safety data analysis, which includes both quantitative methods and theoretical approaches for understanding urban safety. This involves using statistical tools and spatial analysis techniques to map and identify safety issues within urban environments. Through data-driven insights, this research examines how various factors—such as the density of nighttime economic activities and crime rates—interact to affect perceptions of safety in public spaces. The use of GIS-based mapping and regression analysis allows for a more nuanced understanding of the spatial distribution of safety and its relationship to urban activities. These methodologies provide a rigorous framework for analyzing the correlations between urban design, public space utilization, and safety outcomes.Economics and Stakeholder Theory

The third pillar integrates economics and stakeholder theory, exploring how economic forces shape urban spaces and the interests of different actors involved in urban development. This framework examines the factors that encourage investment in public spaces, particularly in the context of the nighttime economy. By understanding the motivations of nighttime business operators, local governments, residents, and other stakeholders, this research explores how their competing interests influence the development and safety of urban areas at night. Stakeholder theory provides insights into how diverse actors negotiate, prioritize, and shape the urban nighttime environment, and how these dynamics can either enhance or hinder safety and economic growth.Together, these three theoretical perspectives—public space theory, safety data analysis, and economics and stakeholder theory—form the foundation of this research.

public space

problem   potential

*Safety&
Nighttime
Economy*

**Safety Data
analysis**

**Economic
and stakeholder**

Involvement

2.4 Methodology framework

1.Quantitative Data Analysis:

Through quantitative research and regression analysis(by R), the impact of various nighttime economic activities on neighborhood safety is assessed. Activities that demonstrate a positive correlation with increased safety are distilled into actionable design patterns.

2.Literature Review

The exploration of public space theories highlights the critical role of design interventions in enhancing the quality of small-scale urban spaces. A recurring theme in the literature is the concept of natural surveillance, as popularized by Jane Jacobs' notion of "eyes on the street." Jacobs emphasized that vibrant, active streets with engaged participants naturally deter crime and foster a sense of security.Scholars have further elaborated on how interactive public spaces can promote inclusivity and community interaction. High-quality public spaces are those that encourage diverse social behaviors, offer accessibility for various demographic groups, and facilitate spontaneous interactions. Research also points to the significance of integrating elements such as lighting, seating arrangements, and spatial connectivity to ensure a welcoming and safe environment.

3.Mapping

Mapping can highlight safety levels in different wijken (neighborhoods) by overlaying safety indices and crime data.This approach helps identify correlations between economic activities and safety conditions, guiding targeted urban interventions. Mapping simplifies complex data, making it easier for stakeholders and planners to understand and address urban safety challenges effectively.

4.site survey

The site survey involves observing and documenting the current conditions of the site, conducting interviews, and distributing questionnaires. This process aims to understand people's perceptions of safety in nighttime public spaces.

5.Intervention:Pattern Language:

Using pattern language as the core methodology, these patterns provide a structured framework for integrating functional and spatial elements into urban planning. The identified patterns are then applied to areas with safety risks, reshaping land use and functionality to support a safer nighttime environment.

Analysis

FILTER

Interventions

ARRANGEMENT

Spatial planning

Mapping

Spatial Mapping

Literature Review

Case Studies

Literature Review

Data analysis

Space syntax

Crime Data Analysis

Site surveys

Field Observations

Surveys and Interviews

design Interventions

Pattern language

design Interventions

Spatial planning

Site surveys

Mapping

Literature Review

public space theory

problem

potential

design Interventions

Safety Data analysis

Mapping

Data analysis

Literature Review

Economic and stakeholder

Data analysis

Mapping

Involvement

Together, these methods ensure a holistic approach, combining evidence-based strategies with human-centered design principles to enhance nighttime safety and urban quality of life.
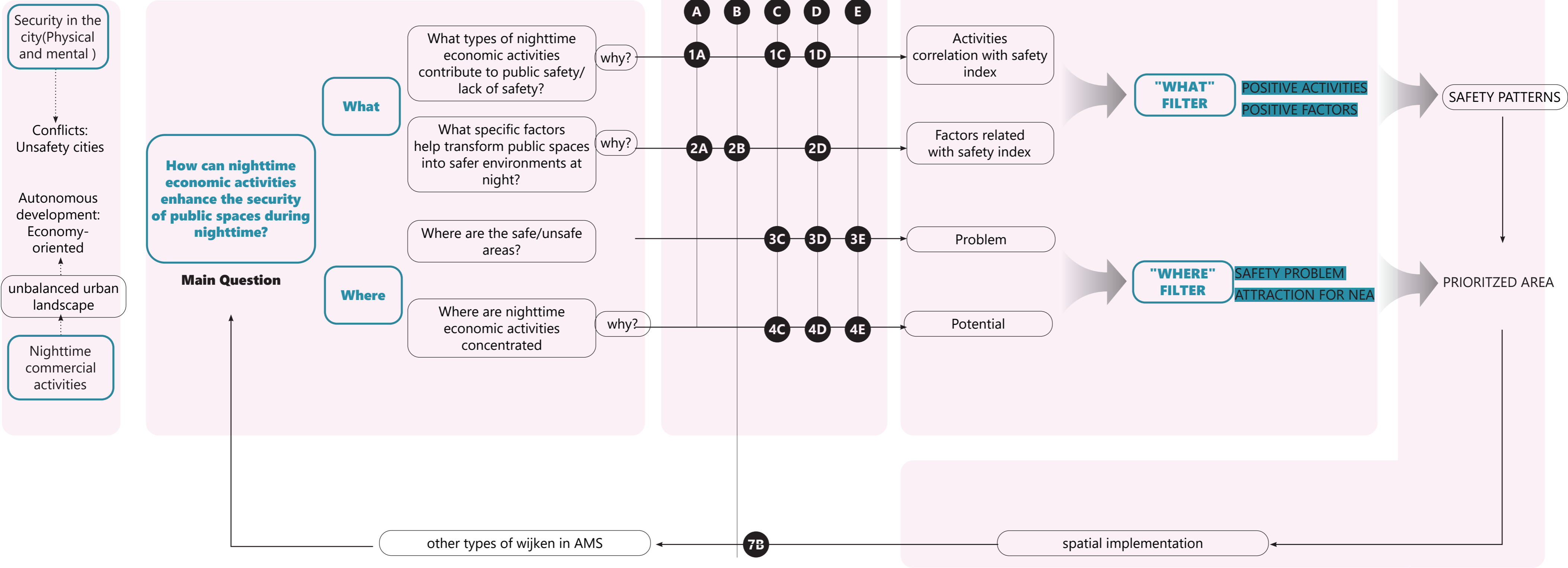
3. RESEARCH AND INTERVENTIONS

3.1 LITERATURE REVIEW

This literature review examines the intersection of nighttime economic activities (NEA) and urban safety, focusing on how these activities impact public space security. Drawing from seminal works in urban sociology and planning, such as Jane Jacobs' Eyes on the Street (1961), the review highlights the importance of natural surveillance and discusses how activities like cafes, restaurants, and bars can enhance safety by increasing public presence. Additionally, the review emphasizes the role of architectural design, lighting, accessibility, and social dynamics in shaping perceptions of safety. Furthermore, it addresses the spatial disparities in safety, where areas driven by economic clustering experience higher levels of activity and safety, while others remain isolated and unsafe. By synthesizing these concepts, the review provides a foundational understanding of how nighttime economic activities can contribute to safer urban environments, fostering both social interaction and security.

Expected Outcome: This literature review provides a broad understanding of existing theories and concepts related to nighttime economic activities and public space safety. While offering general insights, it also sets the stage for further research by identifying key areas for exploration.

3.1.1 Factors that influence public space safety

Natural Surveillance and the "Eyes on the Street" Concept

The concept of "Eyes on the Street," introduced by Jane Jacobs in The Death and Life of Great American Cities (1961), underscores the significance of natural surveillance in enhancing safety in urban spaces. Jacobs argued that the presence of people in public spaces actively observing their surroundings reduces opportunities for criminal activity, thus contributing to a safer environment. The "eyes" refer to pedestrians, residents, business owners, and others who regularly interact with public spaces. However, the effectiveness of these "eyes" is contingent upon the type of activity and time of day. For instance, nighttime economic activities such as cafes, bars, and cultural venues often maintain a steady presence of people, increasing vigilance and enhancing security. However, not all nighttime activities contribute positively to safety, as the type of activity and its social dynamics are crucial in determining their effectiveness in fostering security (Linning & Eck, 2021).

Factors Affecting Public Space Safety---Lighting

Lighting is a critical factor in ensuring the safety of public spaces at night. Well-lit areas significantly reduce the fear of crime by increasing visibility, thus deterring potential offenders. Inadequate lighting, on the other hand, creates dark corners and blind spots where criminal activities can occur undetected. Research indicates that well-lit streets are perceived as safer and more welcoming, encouraging greater foot traffic, especially after dark (Gemeente Amsterdam, 2021).

Accessibility

Accessibility is vital for public space safety. Well-connected areas that are easily accessible by foot, bicycle, or public transport encourage greater use and foster dynamic, observable spaces. In contrast, areas that are isolated or difficult to access often have lower levels of natural surveillance and may feel unsafe (Hou, 2021).

LACK OF NATURA SURVILLIANCE

LACK OF LIGHTING

LOW ACCESSIBILITY

NEAs AND LIVELY STREET

ARCHITECTURAL FORM
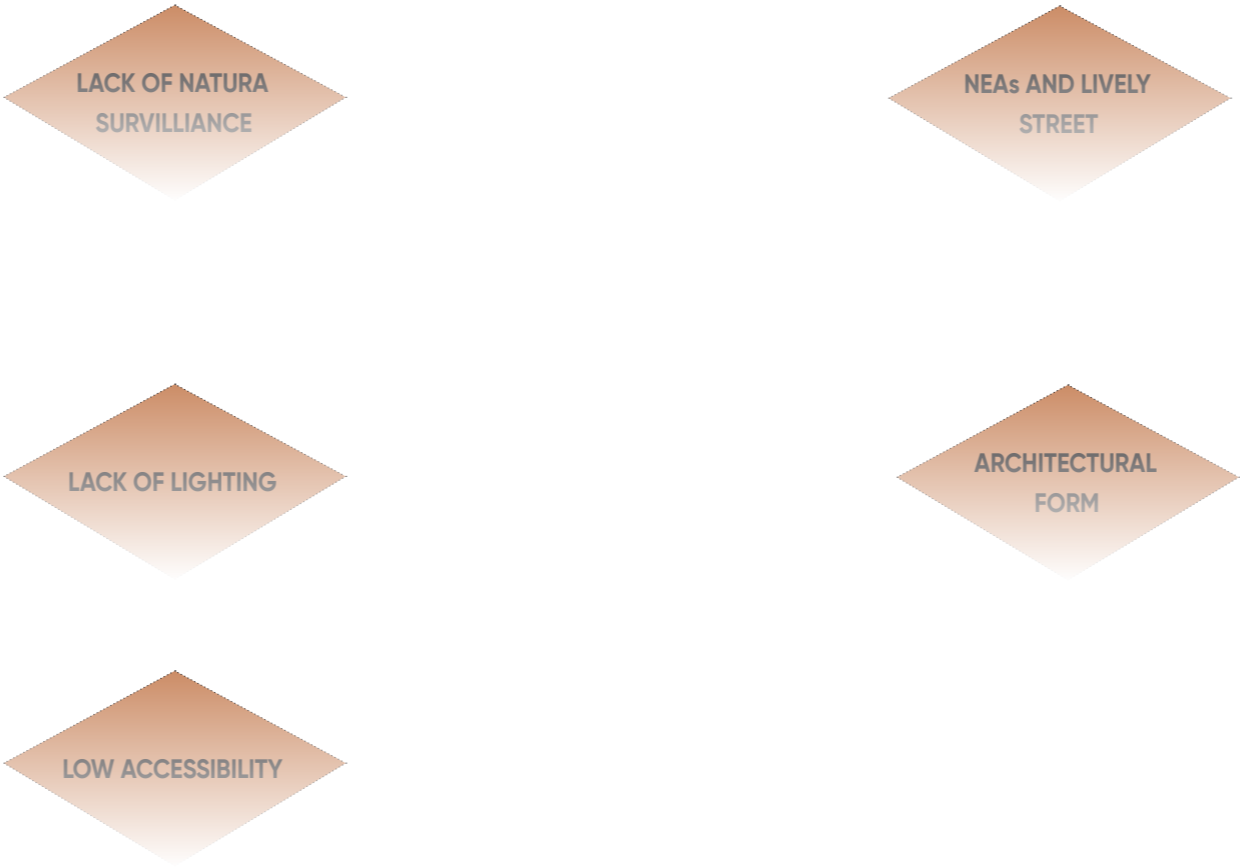
Nighttime Economic Activities (NEAs) and Vibrant Streets

Nighttime economic activities (NEAs), including restaurants, clubs, cinemas, and cultural venues, play a crucial role in creating vibrant, active streets. These activities not only contribute to the city's economy but also improve safety by increasing the number of people in public spaces during the night. Areas with a high concentration of NEAs tend to be more active and bustling, which aids in deterring criminal behavior through increased natural surveillance. NEAs are thus integral components of urban design that promote safer environments (Koren, 2024). Additionally, the integration of these activities into the urban fabric fosters social interactions, which are vital for building safer urban spaces. However, it is important to note that not all activities contribute positively to safety. For instance, alcohol-serving establishments can sometimes lead to an increased sense of insecurity, as they may attract aggressive behaviors or create environments perceived as unsafe (Gehl, 2010; Whyte, 1980).

Form Of Buildings And Public Space

The design and architectural form of buildings also play a significant role in the safety of public spaces. Gehl et al. (2013) argue that the physical design of urban spaces should promote visibility and encourage interaction, which can prevent criminal activity. For example, building facades that open onto streets—featuring active ground-floor uses such as cafes or shops—create dynamic, observable spaces that enhance natural surveillance. On the contrary, blank walls or facades that do not engage with the street create isolated spaces that can foster insecurity and criminal activity. The concept of "eyes on the street" can be compromised when the architectural design restricts visibility and engagement, thereby reducing natural surveillance and contributing to a sense of unease in the area (Gehl et al., 2013).

Conclusion

This literature review underscores the importance of spatial configuration, architectural form, natural surveillance, lighting, and accessibility in creating safer public spaces during the nighttime. By incorporating nighttime economic activities and ensuring their accessibility within the framework of the 15-minute city, urban planners can enhance safety and security in cities. Furthermore, factors such as clear signage, well-lit environments, and areas of stay play critical roles in improving the safety of public spaces. These elements, combined with vibrant NEAs, can transform urban areas into safer environments, especially at night.

3.1.2 Spatial Determinants of Nighttime Economy Development

Proximity To Cultural And Commercial Hubs

Among the key spatial determinants that shape the geography of investment in the nighttime economy, proximity to cultural and commercial hubs and accessibility to public transportation emerge as two of the most consistently identified factors in both theoretical and empirical literature.

Proximity to existing cultural landmarks, entertainment venues, and commercial centers has been shown to significantly influence the location decisions of investors in nightlife-related infrastructure. Liu et al. (2023), in their geographical study of urban nightlife landscapes in Guangzhou, demonstrate that the spatial clustering of nightlife venues often corresponds to established cultural and commercial nodes. Their analysis categorizes nightlife districts into distinct types—such as creative, nostalgic, and leisure-oriented—each of which forms around different kinds of cultural-commercial attractors. This spatial concentration not only leverages existing foot traffic but also reinforces a place's symbolic identity and market viability. Similarly, van Liempt and colleagues (2024), examining Amsterdam's nightlife landscape, emphasize how club promoters strategically align venue selection with intra-urban dispersal patterns. They argue that being adjacent to culturally resonant areas or zones with historical reputations for nightlife enhances both the visibility and social legitimacy of nighttime venues. In this sense, cultural-commercial proximity functions not only as an economic logic but also as a symbolic-geographical one.

Public Transportation Accessibility

Public transportation accessibility has increasingly become a core criterion for nighttime economy investments. As nighttime mobility depends on the availability of safe and affordable transport options, especially during late hours, areas with extended transit coverage attract more patrons and, by extension, investors. Plyushteva and Boussauw (2020), in their gender-sensitive analysis of Sofia's night bus network, highlight how the mere presence of public transit after dark enables a more inclusive form of nightlife participation. Their findings show that accessible transport is not only a practical enabler but also a spatial equalizer, expanding the user base of nighttime venues beyond high-income or centrally located populations.

Recent transport policy literature further supports this relationship. A 2025 study on nighttime commuting and land use patterns suggests that job density and public transit proximity are positively correlated with late-hour transit use, underscoring the attractiveness of transit-served zones for investors targeting nighttime activities. These findings align with broader "15-minute city" planning frameworks, which emphasize mixed-use development and modal accessibility as key to fostering multifunctional and resilient urban spaces—including those active at night.

Conclusion

Overall, the reviewed literature reveals a mutually reinforcing dynamic: areas with rich cultural and commercial offerings supported by robust transit systems tend to attract higher levels of investment in the nighttime economy. Investors prefer locations where existing place identity, concentrated pedestrian flows, and mobility infrastructure coalesce to reduce risk and maximize visibility and access. In such environments, nighttime investment is not only economically sound but spatially integrated into the broader urban ecosystem.

3.1.3 A balance between nighttime economy and safety
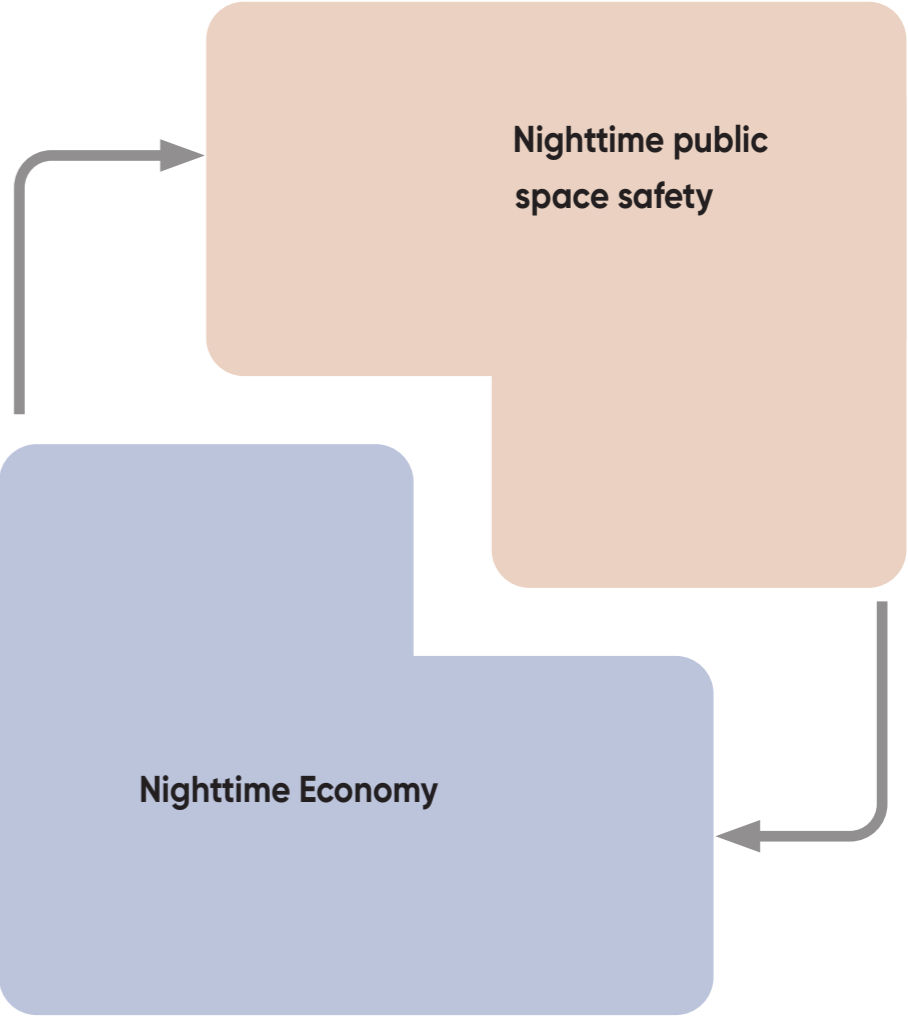
This project aims to find a balance between nighttime economy and safety, thereby developing interventions that both attract investment in the nighttime economy and enhance public safety. The research seeks to identify areas with both potential for the development of nighttime economic activities and existing safety concerns. The goal is to understand how to coordinate the various factors mentioned in the literature review within these areas, ensuring that the development of the nighttime economy can simultaneously promote safety and contribute to a more vibrant urban environment. By analyzing these factors, the study aims to propose effective strategies for integrating economic growth with enhanced security in urban spaces.

3.2 DATA ANALYSIS

DATA ANALYSIS Methodology in Urbanism

In urban analysis, data analysis plays a crucial role in understanding and solving complex issues by providing a systematic, empirical approach to the study of urban spaces. In this paper, regression analysis was employed to explore the relationship between perceived safety and various urban factors. For example, Carpentieri et al. (2024) used spatial regression analysis to study perceptions of safety for women in urban areas, specifically in the city of Naples. Their research highlights how data analysis can identify spatial patterns and correlations between safety perceptions and urban characteristics, offering valuable insights for urban design and policy interventions

As urbanism often involves diverse and multifaceted challenges, data analysis helps to test and validate theoretical concepts in specific urban contexts. For instance, Jane Jacobs' theory of "eyes on the street" suggests that visible street activity can provide natural surveillance, enhancing public safety (Jacobs, 1961). However, whether all activities contribute to safety is still an open question, and data analysis provides a way to empirically assess these assumptions in particular urban environments.

Why This Project Conducts DATA ANALYSIS

In this project, data analysis is employed to verify and assess the relevance of broader theoretical concepts in the context of Amsterdam's urban environment. While theories and frameworks derived from other cities (such as Jane Jacobs' work, rooted in Western urban contexts) may provide useful guidelines, they need to be tested and adapted to local realities. For example, the same activities occurring in Shanghai may be perceived as safe, while in Amsterdam, the perception of safety may differ significantly. People's safety perceptions are influenced by various factors such as cultural background, past experiences, and local urban context. Data analysis helps to process these contextual nuances, enabling a more localized and specific understanding of urban safety issues. By using data from Amsterdam, this project aims to generate original insights into the relationship between nighttime economic activities and public safety in this particular city.

Expected Outcomes

Correlation between Amsterdam's Nighttime Economic Activities (NEA) and Safety Index: This part of the research will use regression analysis to identify potential correlations between different types of NEAs and safety indices in Amsterdam. By examining this relationship, the study aims to understand how certain nighttime economic activities are associated with positive or negative perceptions of safety. The findings will help pinpoint which NEAs positively influence safety perceptions and should be prioritized in urban design and interventions.

Cluster Analysis of Amsterdam's Neighborhoods (Wijken) Based on Safety Index: Using cluster analysis, this project will categorize Amsterdam's neighborhoods based on their safety index. The goal is to identify neighborhoods facing similar safety concerns to those in Bijlmermeer. These neighborhoods, exhibiting comparable issues, may benefit from similar interventions. However, any interventions proposed will need to be localized, with modifications tailored to the specific needs of each area.

3.2.1 DATA ANALYSIS +Site survey

3.2.1.1 Dependent Variable Selection: Safety Index

Figure 3.2.1 Safety index classification 2014
Made by Author
Source:Safety index classification 2021Verantwoording Veiligheidsindexen 2021

For Dependent Variable Selection, This study uses data from the Gemeente Amsterdam based on the Verantwoording Veiligheidsindexen 2021 data system. According to this system, the safety index is subdivided into three categories: Crime Index, Nuisance Index, and Insecurity Perception Index (Figure 3.2.1) (Verantwoording Veiligheidsindexen, 2021). Gemeente Amsterdam has a rich and comprehensive database, providing substantial support for this study. However, this also means that the data relevant to the research needs to be carefully selected according to the research aim and research questions, followed by analysis. As this study focuses on the relationship between nighttime economy and safety, particularly the sense of safety for vulnerable groups, it attempts to combine objective crime data with subjective safety perceptions. Therefore, this study selects "High Impact Criminal-related (HIC)" and "victimization: sexual assault" to address the objective aspects of safety, referring to the actual incidents of victimization or crime that have occurred. Additionally, "nuisance: crime" is included to reflect the public's perception of safety. Further explanations will follow below.

High Impact Criminal-related (HIC)

The reason for selecting High Impact Crime (HIC) instead of High Volume Crime (HVC) is as follows: "In the registered crime index, a distinction is made between High Impact Crime (HIC) and High Volume Crime (HVC). This classification is based on the varying levels of impact that a crime can have on a victim. A crime that affects the victim personally, such as violent assault, is considered a High Impact crime. More common offenses, such as car theft, typically have a lesser personal impact on the victim and fall under the category of High Volume crime." (Verantwoording Veiligheidsindexen, 2021). Therefore, High Impact Crime (HIC) is more closely related to people's sense of safety, especially for vulnerable groups, such as women.

Victimization: Sexual Assault

While the main focus of this study is to explore the impact of nighttime economic activities on safety, this study takes a female perspective on the issue. Therefore, this study will not only discuss general safety but also specifically address the safety experiences of women, as reflected in the questionnaire survey section . As stated in the Verantwoording Veiligheidsindexen, 2021: "Essentially, registered crime counts only the crimes that are officially known to law enforcement, while victimization focuses on the personal experience and perception of crime, even if it was never reported to the authorities." Thus, data based on personal experience can better reveal safety issues related to sexual assault.

Sense of Safety in the Evening

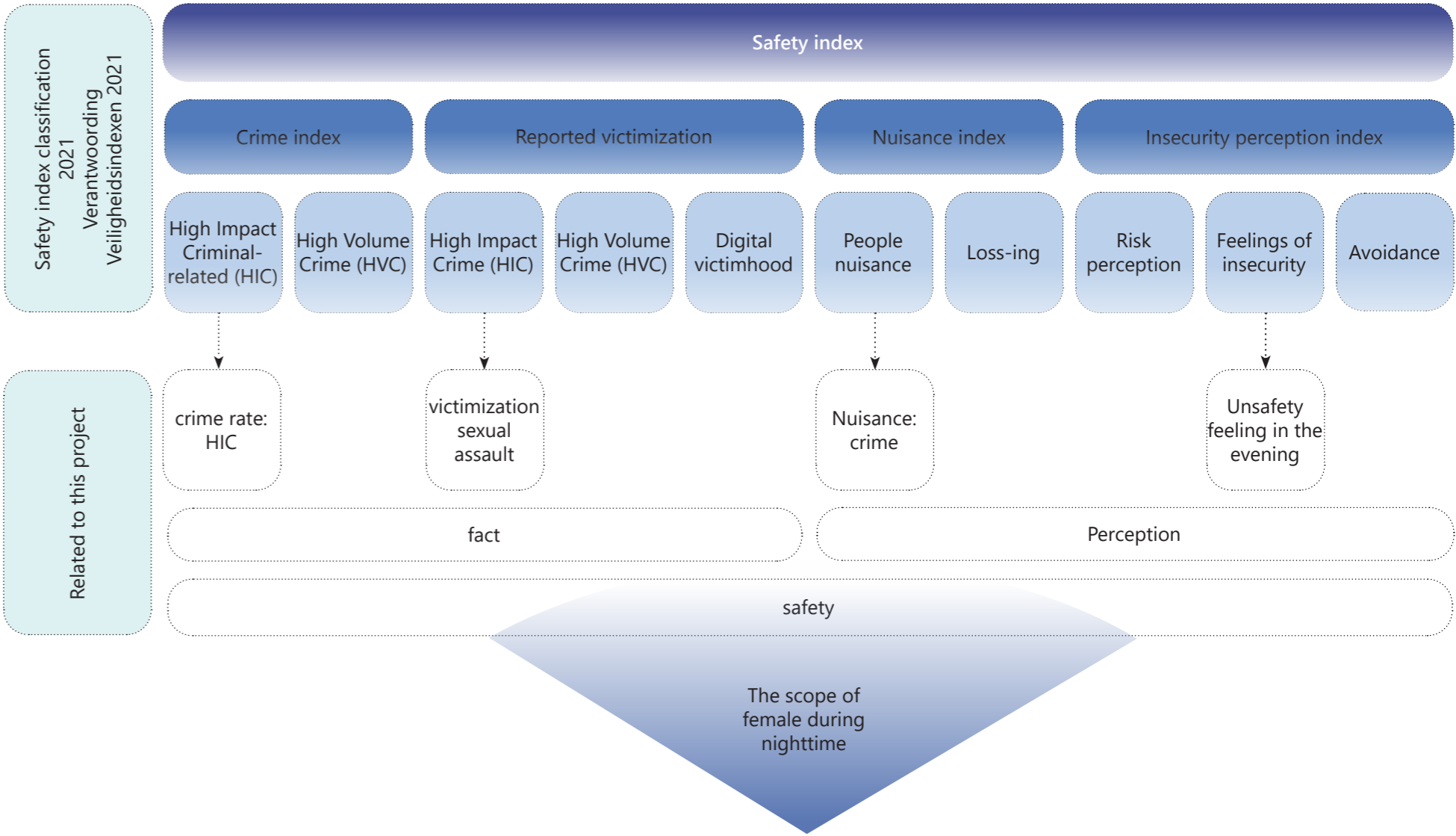As this study mainly discusses the nighttime economy and activities, the selected independent variable is

data on industries that are still operating after 18:00. Fortunately, Amsterdam has data on the sense of safety in the evening, which is highly relevant to the main research question of this study.

Nuisance: Crime

This study also considers "nuisance: crime," a subjective factor, to analyze how crime perceptions in the context of the nighttime economy influence residents' and the public's sense of safety. By combining crime data with public perceptions, this approach provides a more comprehensive understanding of how nighttime economic activities impact people's sense of safety.

The combination of these data will provide valuable insights into the relationship between the nighttime economy and safety, while also reflecting the actual impact on vulnerable groups.

3.2.1.2 Independent Variable Selection: nighttime economic activities

This section of the study aims to discuss and attempt to answer the question: What types of nighttime economic activities contribute to public safety or lack of safety?

Therefore, nighttime economic activities were chosen as the independent variable, and data from OpenStreetMap (OSM) Points of Interest (POI) was utilized. Since POI data covers a wide range of industries, the study also conducted site surveys and used Google Maps as supplementary tools for observation. By visiting areas such as Leidseplein, De Wallen, and Bijlmermeer in Amsterdam, we identified industries that remain operational after 18:00. The selected nighttime economic activities are shown in Figure *.

It is important to note that the site surveys, while helpful, may not be entirely rigorous. The observations were made through a combination of direct visits and visual inspection, which could be influenced by the time of day, personal biases, or the availability of information at the time of the survey. Therefore, while the findings provide valuable insights, they may not capture all the nuances or be fully representative of every nighttime economic activity in the city.

This diagram presents the structure of data used to define the scope of nighttime economic activities, derived from Points of Interest (POI) data from OpenStreetMap (OSM) and site observations. The diagram categorizes different types of nighttime economic activities into various groups:

Catering business: Includes establishments such as restaurants, cafes, pubs, bars, and fast food places, which are a significant part of the nighttime economy.

Nighttime Entertainment: Covers a variety of entertainment venues, such as strip clubs, nightclubs, coffeeshops, casinos, and cinemas, which are integral to the evening economy.

Daily Routine: This category includes businesses that might also operate at night, such as massage parlors, supermarkets, laundry services, and gyms/fitness training centers.
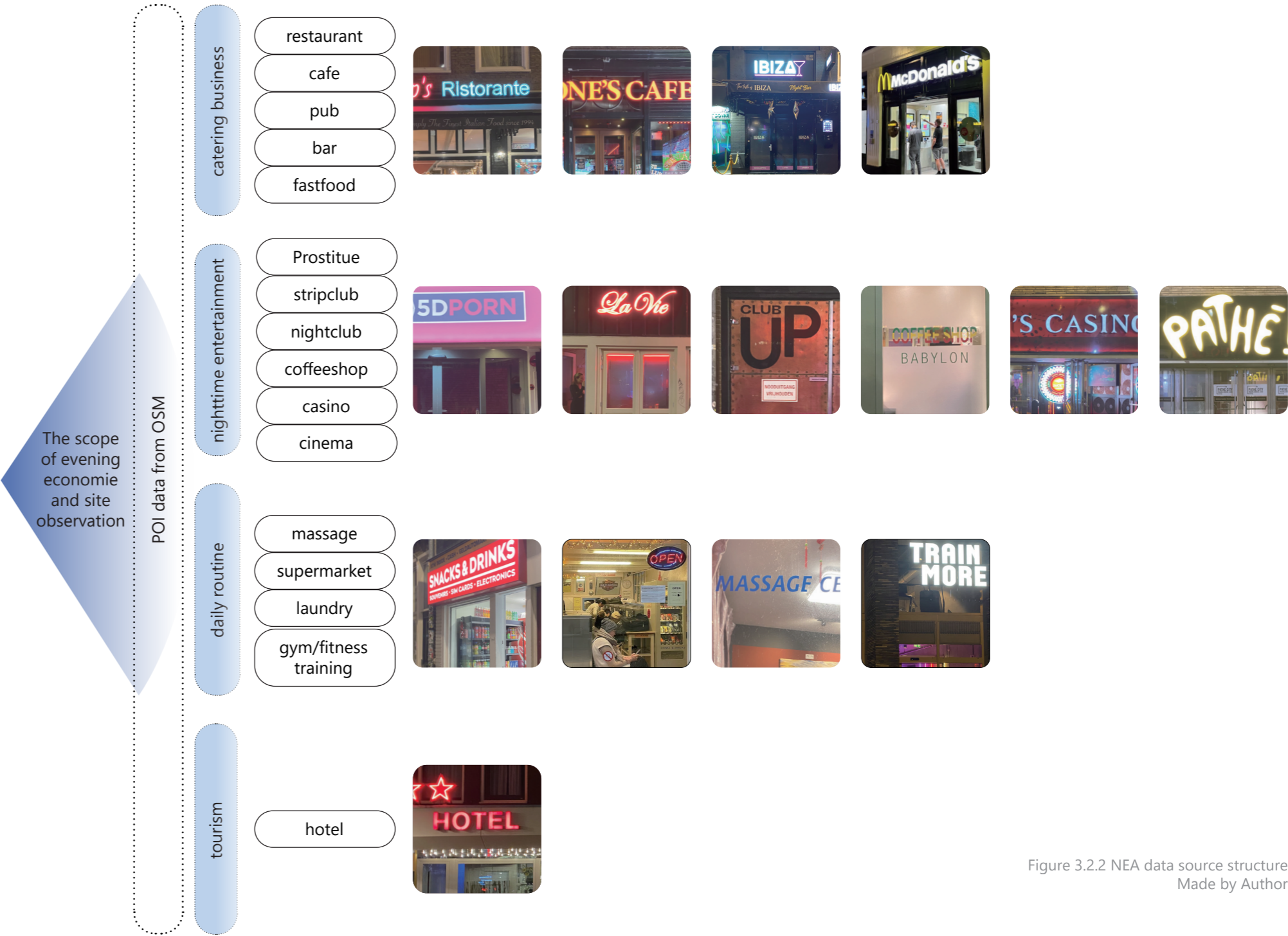
Figure 3.2.2 NEA data source structure
Made by Author

Tourism: Focuses on tourism-related activities, with hotels being a primary example of nighttime services for visitors.

This structure, utilizing POI data from OSM and supplemented by site observations, helps categorize the different types of businesses and services that contribute to the nighttime economy. These categories help in analyzing how different industries operate and contribute to public safety or insecurity, based on their nature and operations during nighttime hours.

Data Year Selection

Following these principles:1. Use the most recent data whenever possible.. 2. Use data from the same year or adjacent years. This study selected statistical data from 2022 and 2023. Due to some uncertainties in the 2023 data, the study replaced it(Income and Socioeconomic Status data) with the 2022 data.

Using Multiple Regression Analysis try to Avoid Spurious Correlation

This study aims to explore the relationship between nighttime economic activities and safety. To avoid spurious correlation, covariates were introduced. The inclusion of covariates is particularly crucial in observational studies, as spurious correlations often arise when confounding variables affect the relationship between independent and dependent variables. By including relevant covariates in the regression model, we can control for these confounding factors, allowing for a more accurate estimation of the true relationship between the independent and dependent variables (Pearl, 2009; Sterne & Davey Smith, 2001). As Siegel (2016) pointed out, "Correlation is not causation." For example, a widely spread theory suggests that there is a relationship between economic data and the safety of a neighborhood. Wealthier areas may also have more dining establishments. But is nighttime economy (such as restaurants) really the cause of safety?

Introduction of Covariates

Introducing covariates helps reduce spurious correlations. The safety of a region is often related to the economic conditions of that area, and the nighttime economic activities (such as the number of restaurants) in that region are usually also related to the economic conditions. Therefore, this study introduces covariates including the Gini coefficient, income, and socioeconomic status (SES) to more accurately analyze the relationship between nighttime economic activities and safety. The theoretical foundation and literature supporting these variables will be explained in detail below.

Gini Coefficient

According to the definition from the Onderzoek en Statistiek website, "The Gini coefficient is a measure for income inequality, varying between 0 (everyone has the same income) and 1 (one household has all the income, and the others have none)" (Dashboard kerncijfers | Website Onderzoek en Statistiek, n.d.). Research shows that inequality has a significant impact on safety (Glaeser et al., 2008).

Income

A study conducted in Maastricht, the Netherlands, found that low-income groups have a lower perception of safety, especially among women and the elderly. They reported higher levels of fear of crime, particularly at night."Among those reporting a low-income status, 34% feel unsafe during the day, and 67% feel unsafe at night" (Van Oers et al., 2010, p. 45).

Socioeconomic Status (SES)

Some European studies have explained that there is a link between socioeconomic background (SES) and involvement in crime, suggesting that lower SES groups are more likely to engage in criminal behavior (Burgos Ochoa et al., 2023; Swedish National Council for Crime Prevention, 2023).

Therefore, considering the potential impact of the Gini coefficient, income, and socioeconomic status on safety and crime, this study introduces these variables to more precisely understand the relationship between nighttime economic activities and public safety. By controlling for these covariates, we can eliminate spurious correlations caused by inequality or low income, allowing for a more accurate assessment of the effect of nighttime economic activities on safety.
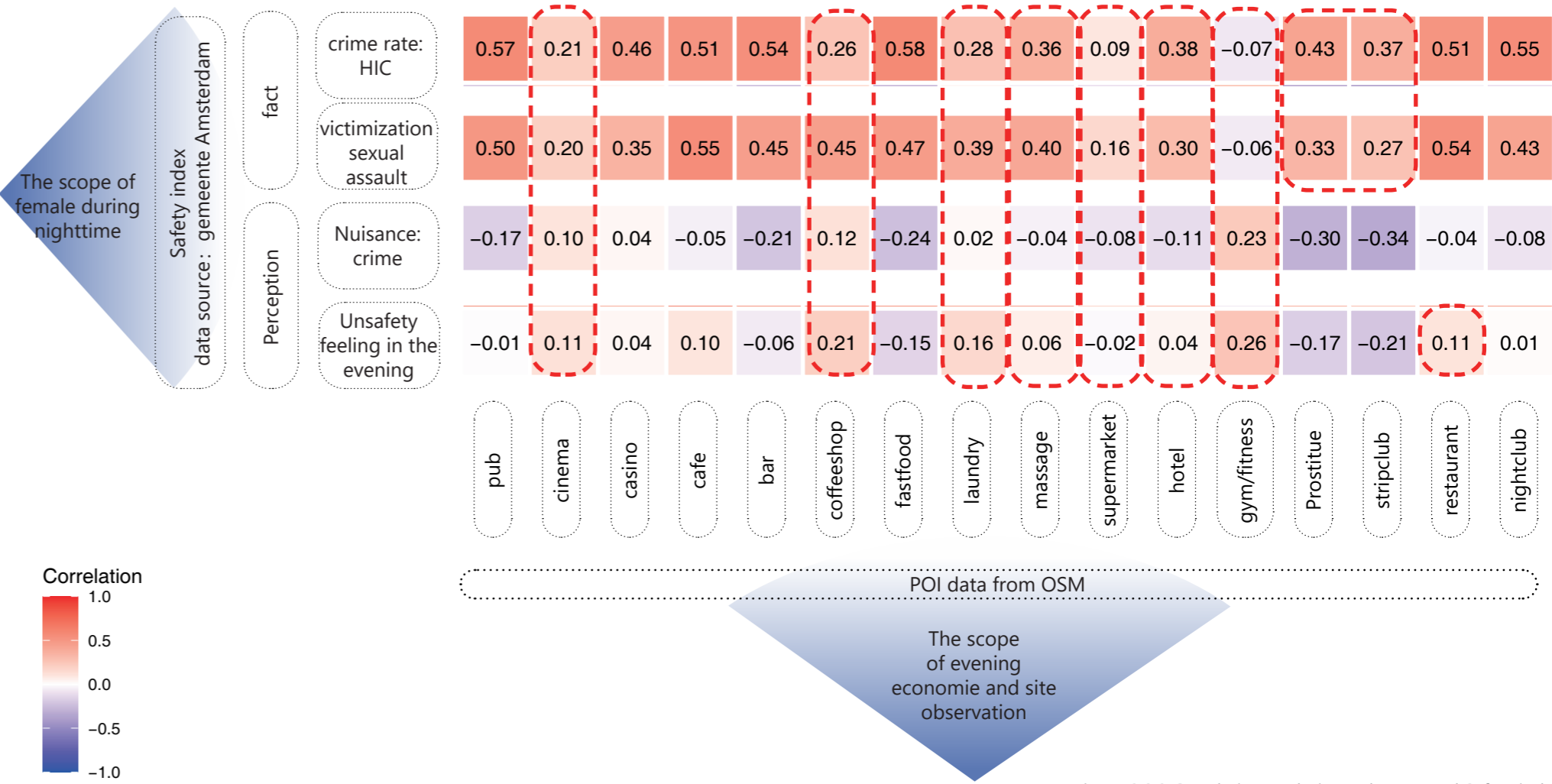
3.2.1.4 Data Correlation result

Figure 3.2.3 Correlation analysis result: NEA and Safety index
Made by Author
Data Source1: onderzoek.amsterdam.nl
Data Source2: Open Street Map

	pub	cinema	casino	cafe	bar	coffeeshop	fastfood	laundry	massage	supermarket	hotel	gym/fitness	Prostitue	stripclub	restaurant	nightclub
crime rate: HIC	0.57	0.21	0.46	0.51	0.54	0.26	0.58	0.28	0.36	0.09	0.38	−0.07	0.43	0.37	0.51	0.55
victimization sexual assault	0.50	0.20	0.35	0.55	0.45	0.45	0.47	0.39	0.40	0.16	0.30	−0.06	0.33	0.27	0.54	0.43
Nuisance: crime	−0.17	0.10	0.04	−0.05	−0.21	0.12	−0.24	0.02	−0.04	−0.08	−0.11	0.23	−0.30	−0.34	−0.04	−0.08
Unsafety feeling in the evening	−0.01	0.11	0.04	0.10	−0.06	0.21	−0.15	0.16	0.06	−0.02	0.04	0.26	−0.17	−0.21	0.11	0.01

Safety index data source: gemeente Amsterdam — fact (crime rate: HIC, victimization sexual assault); Perception (Nuisance: crime, Unsafety feeling in the evening)

The scope of female during nighttime

POI data from OSM

The scope of evening economie and site observation

Correlation
1.0
0.5
0.0
−0.5
−1.0

Correlation Analysis Results

This study used R language to analyze the relationship between the independent variables (the number of Points of Interest (POI) related to nighttime economic activities) and the Safety Index (including "High Impact Criminal-related (HIC)", "Victimization: sexual assault", "Nuisance: crime", and "Unsafety feelings in the evening").

Results Description

As shown in Figure *, the results of the regression analysis indicate that these nighttime economic activities still exhibit a correlation with the safety index after controlling for the effects of the Gini coefficient, income, and SES. Of course, this study could include more data as covariates; however, it was limited by the availability of data and time constraints. If more variables could be included in the future, the results of the regression analysis might be more persuasive (Hesseling & Smeets, 2022).

From the results, we can observe that most nighttime activities show a positive correlation with "High Impact Criminal-related (HIC)" and "Victimization: sexual assault". However, industries that sell alcohol, such as bars, nightclubs, and restaurants, demonstrate a stronger correlation with crime rates. In contrast, supermarkets and gyms show lower correlations, and even negative correlations in some cases.

In the perceived safety data, activities such as restaurants, gyms, and coffeeshops show a positive correlation with people's positive safety perceptions. On the other hand, activities like prostitution, strip clubs, and fast food show a negative correlation with people's sense of safety.

Conclusion

From these findings, we can also observe some phenomena that may reflect certain biases. For example, people may associate prostitution and strip clubs with nuisance or feelings of unsafety. However, compared to restaurants or pubs, the correlation between prostitution and strip clubs with crime rates is not as strong.

At the same time, we can see that fast food establishments, bars, pubs, and nightclubs, whether in terms of actual crime rates or subjective safety perceptions, do not contribute to safety.

Lastly, this study may provide some guidance for future urban design and interventions. Nighttime economic activities under the daily routine category, such as cinemas, laundromats, massage parlors, supermarkets, and gyms/fitness centers, may enhance the safety of a neighborhood. In contrast, restaurants and hotels might contribute to improving people's sense of safety.

3.2.2 Cluster Analysis and Problem Typology

Cluster analysis and problem typology are two distinct yet complementary approaches used in urban research to classify and understand complex spatial and social dynamics. These methods help in identifying patterns, understanding the nature of problems, and informing intervention strategies.

Cluster analysis is a statistical technique used to group similar objects or data points based on specific criteria. In the context of urban planning, it is used to identify areas that share common characteristics, such as safety levels, socioeconomic status, or accessibility. This technique allows for the classification of neighborhoods (or "wijken") into different groups, helping to uncover spatial patterns in urban dynamics. For example, neighborhoods with similar safety indices, crime rates, or levels of nighttime activity can be grouped together to reveal broader trends or correlations (Wang et al., 2024). This helps planners and policymakers target areas with similar issues for tailored interventions.

In this project, cluster analysis was applied to classify neighborhoods in Amsterdam based on their safety profiles, allowing for the identification of areas with both high safety concerns and potential for nighttime economic development. By grouping neighborhoods into clusters, the analysis provides a more nuanced understanding of where interventions might be most effective.

"Safety" is a multifaceted concept. A location with low perceived safety does not necessarily correlate with a high crime rate(Figure 3.2.5). Therefore, this study aims to categorize safety problems across different neighborhoods (wijken) and establish a typology of safety issues. Additionally, the goal is to assess the applicability of the intervention strategies developed in this research to other neighborhoods, both within Amsterdam and potentially in other cities and districts facing similar challenges.

Problem typology is a qualitative approach used to categorize and classify different types of issues based on their characteristics and context. In urban research, this method involves identifying specific problems within a given space, such as high crime rates, lack of natural surveillance, or poor public space design. By defining and categorizing these problems, researchers can assess the types of interventions required to address them effectively. For instance, a typology might distinguish between areas that suffer from poor lighting, low foot traffic, or inadequate public amenities—each of which would require a different approach to improve safety and quality of life.

registered crime

percived safety in evening

safety nuisance

sextual crime
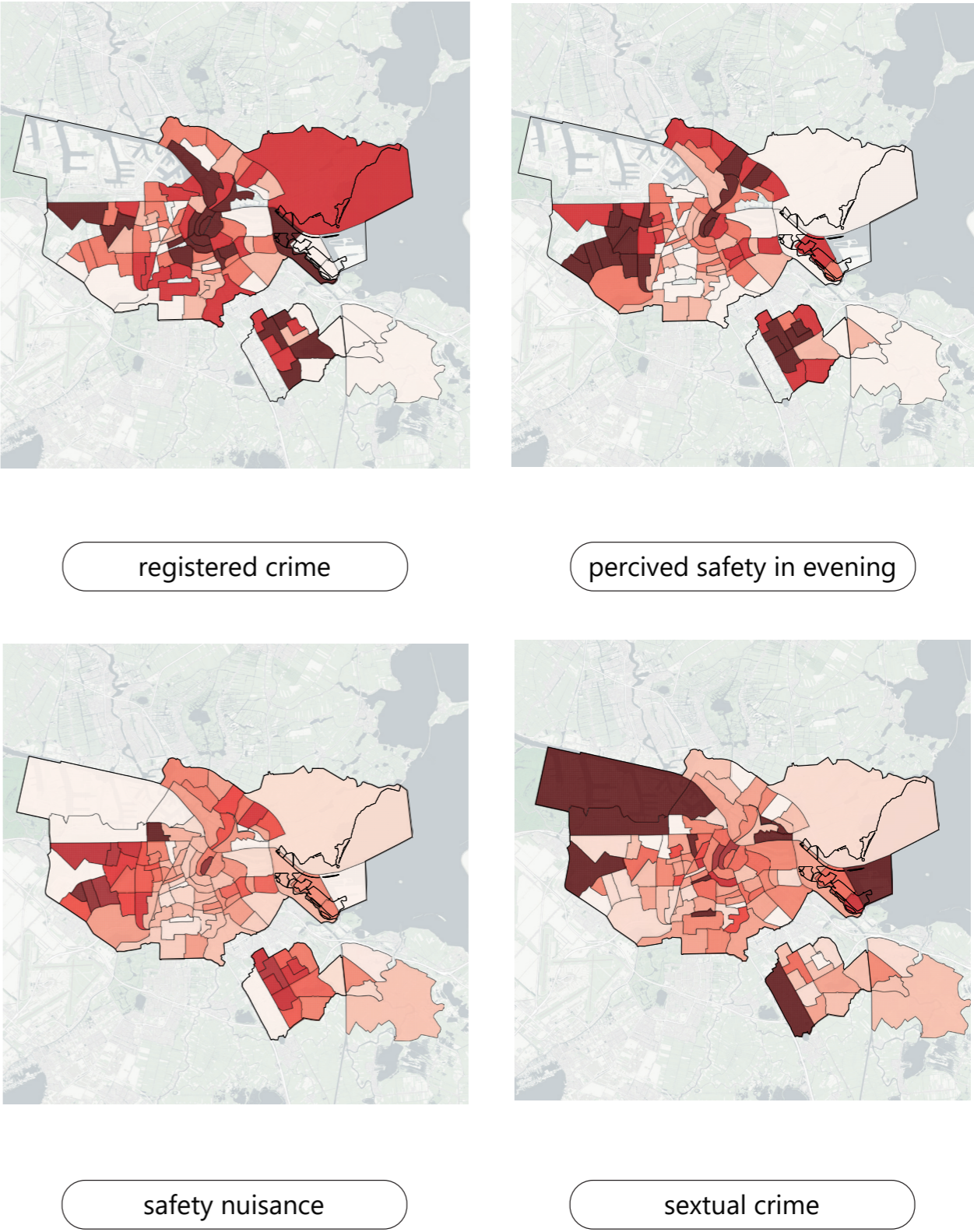
Figure 3.2.5 Spatialized safety index Amsterdam
Made by Author
Data Source: onderzoek.amsterdam.nl
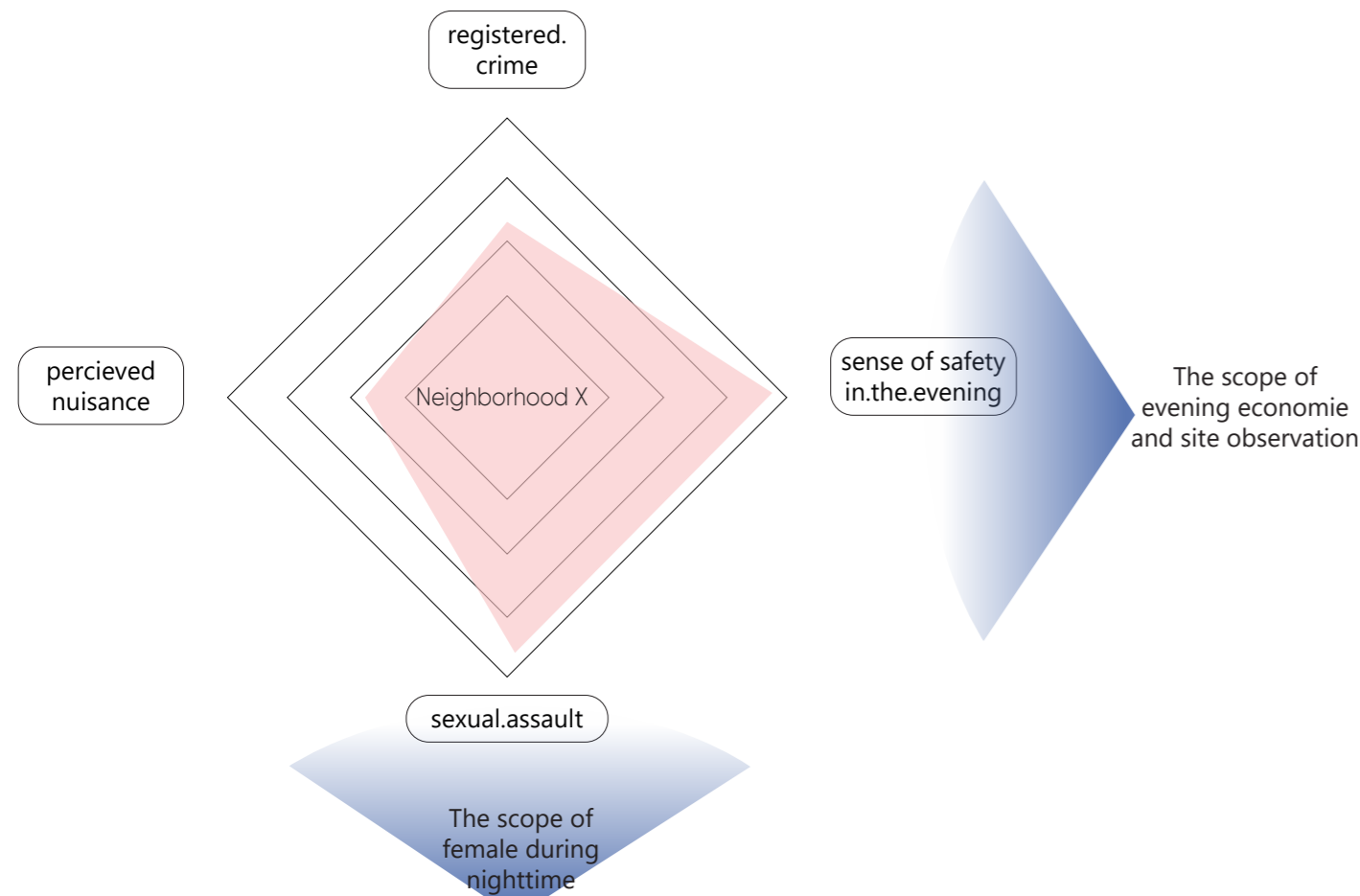
Figure 3.2.6 Template of the radar diagram : safety problem typology
Made by Author

As discussed in Chapter 3.2.1, the safety assessment of neighborhoods in this project is based on four dimensions: crime rate, victimization (specifically sexual assault), nuisance crimes, and perceived safety in the evening. Figure 3.2.6 presents a radar chart , which illustrates the safety problems faced by neighborhood X, specifically its higher likelihood of sexual assault incidents and lower perceived safety in the evening. These are the key areas of concern that this research focuses on.

Building on this, the project aims to identify neighborhoods with similar safety challenges to those experienced in neighborhood X, and to establish a typology of such problem areas across the city. This typology can provide valuable insights into the specific safety needs and possible intervention points in other neighborhoods facing similar issues. Figure 3.2.7 highlights the results of this process, showcasing neighborhoods with comparable safety concerns. (For the purpose of explanation, this section does not include a list of all 100+ neighborhoods in Amsterdam.)

Based on the clustering approach selected in this study, a K-value of 3 was chosen for the clustering analysis. This allows the categorization of Amsterdam's neighborhoods into three distinct groups based on the safety issues they face. The K-means clustering method, commonly used for its ability to divide data into non-overlapping groups, was selected. This method is particularly useful in identifying patterns within the data, enabling a more nuanced understanding of safety perceptions and crime distribution across the city. By clustering neighborhoods based on these safety factors, we can better understand the spatial distribution of safety concerns and design more targeted interventions for each group.

Through this approach, this study not only identifies critical safety problems but also helps inform strategic interventions that could address these challenges in a way that is applicable to various neighborhoods across Amsterdam and beyond.

Figure 3.2.7 Radar diagrams: Highlighting the key areas of concern (sexual assault and perceived safety in the evening)
Made by Author

After normalization, the safety coefficients for various neighborhoods (wijk) in Amsterdam were subjected to cluster analysis. This analysis resulted in the division of neighborhoods into three distinct categories based on their safety levels. The categories reflect different degrees of safety, helping to highlight areas with higher safety concerns versus those that are relatively safer. The results of the cluster analysis, which categorize neighborhoods based on these safety indices, are presented in **Figure **, providing a visual representation of the spatial distribution of safety across Amsterdam.

By using this method, the study offers a systematic approach to identifying the varying levels of safety across the city. It serves as a foundation for the next steps of the project, which aim to focus on urban interventions that can specifically target the areas identified as unsafe. This analysis is particularly crucial in understanding which neighborhoods require urgent safety enhancements and how resources should be allocated to address these concerns.

Following the cluster analysis, the mapping section visually presents the safe and unsafe areas in Amsterdam, based on the results of the analysis. The safe areas, where the safety factors are higher, are clearly marked, while the unsafe areas are highlighted with lower safety indices. This mapping process helps translate the abstract data analysis into a more accessible visual form, providing a clear understanding of where safety issues are most prevalent. The areas marked as unsafe represent locations that may require more targeted urban interventions, such as improved street lighting, increased police presence, or changes in urban design to enhance public safety.

The mapping results not only offer a spatial view of the safety distribution across the city but also serve as a tool for future urban design and intervention planning. By pinpointing areas that have been identified as unsafe, city planners and policymakers can focus their efforts on these high-risk areas, ensuring that resources are effectively allocated to improve safety where it is most needed.

TYPE 1

TYPE 2

TYPE 3

PILOT PROJECT SITE

0   2.5   5 km
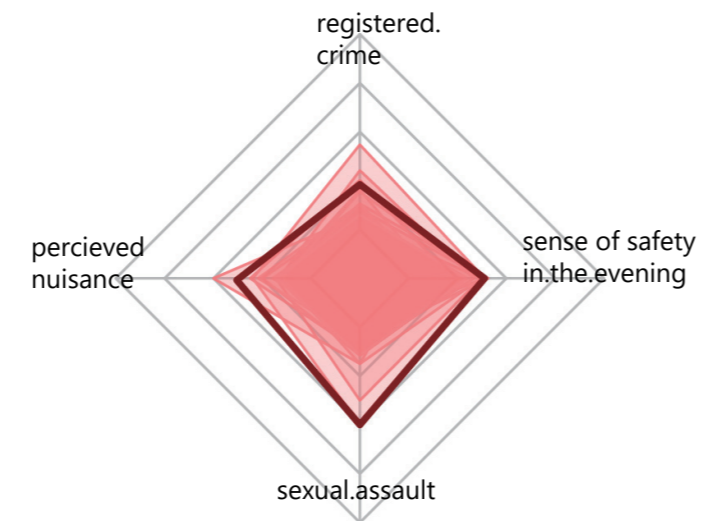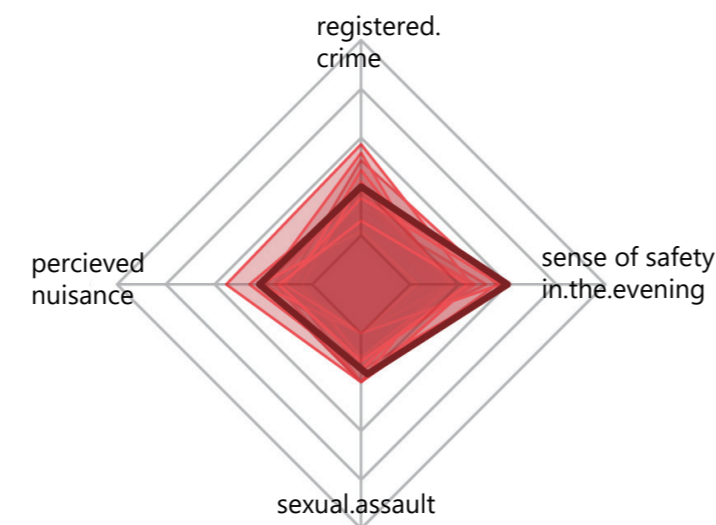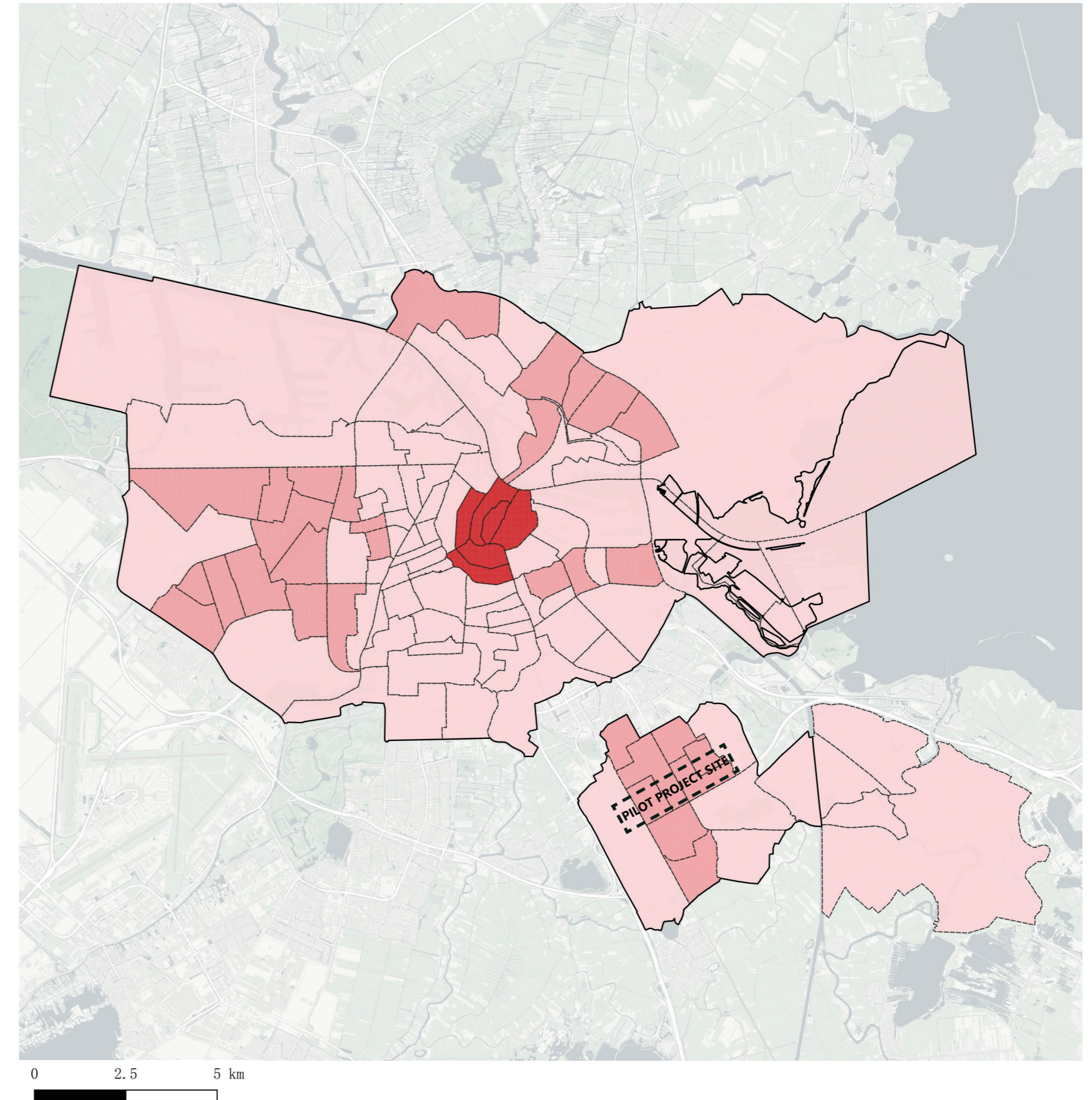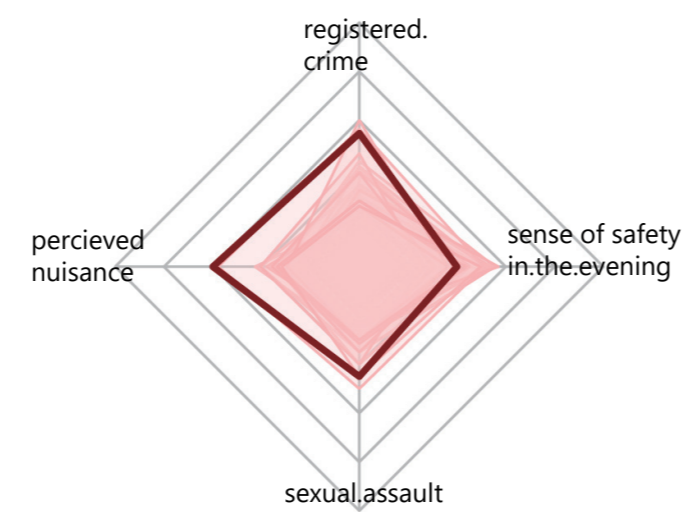
3.3 Site Visit

Site Visit Methodology in Urbanism

In urbanism, the site visit methodology is a critical tool for understanding the dynamics of urban environments, particularly when analyzing the performance of buildings or public spaces. Muratovski (2016) highlights that research into the performance of a building or public space is "the process by which one can understand the world in a verifiable and consistent manner." This means that gathering existing data alone is insufficient for research; it is about deriving new insights and interpretations from this data. Through site visits, researchers can capture real-world information, such as human behaviors, environmental features, and spatial dynamics, that might not be evident from secondary data alone.

The concept of originality in this context refers to examining materials or situations that have not been previously studied, or providing new interpretations of well-known material (Lucas, 2016). Site visits, therefore, allow researchers to contextualize theoretical knowledge with first-hand observations and data, offering a more comprehensive understanding of urban environments. In doing so, it fills in gaps left by traditional data sources, ensuring that the research is grounded in the lived experience of the place being studied.

Why This Project Conducts a Site Visit

For this project, conducting a site visit is crucial to gather localized information that complements the theoretical research and data analysis. As stated earlier, even the most developed theories may not apply universally. The theories based on urban studies in American cities may not be directly applicable to a city like Amsterdam. The existing literature and theoretical frameworks may not fully account for the nuances of Dutch urban environments. Therefore, this project aims to challenge and validate these theories through a site visit to Bijlmermeer, the area under study.

Expected Outcomes

Validation and Critique of Existing Literature and Data Analysis: The site visit will serve as a method of validation for the literature review (Chapter 3.1) and data analysis (Chapter 3.2). It will allow for a critique of existing urban safety theories and models by testing them in the specific context of Amsterdam, particularly Bijlmermeer.

Localized Data on Safety and Nighttime Activities: The site visit will provide localized data, offering a clearer understanding of how safety and nighttime economic activities manifest in Bijlmermeer. This will help in refining our understanding of public space safety and offer practical insights into how urban design and nighttime economic activities can either enhance or hinder safety.

In essence, the site visit will allow this research to bridge the gap between theory and practice, offering both a critical examination of existing frameworks and a better understanding of how they apply to real-world situations. It will help in the creation of an evidence-based design intervention that is both locally relevant and theoretically sound.

The site survey consists of three main components:

Site Observation and Mapping: In this part of the study, the site is observed and documented through various spatial characteristics. This includes an examination of the building facades, outdoor lighting conditions, pedestrian traffic, and other relevant spatial features. The aim is to capture the physical aspects of the environment that may influence safety perceptions and the overall quality of the public space.

Survey: The second part involves conducting a survey at the site to collect quantitative and qualitative data from individuals regarding their perceptions and experiences. The survey aims to capture how people feel about the safety, accessibility, and overall quality of the space. The results of the survey provide valuable insights into public attitudes towards the space and highlight areas that may need improvement in terms of safety and functionality.

Semi-structured Interviews: The third part involves semi-structured interviews (Kvale, 1996) conducted with two local nighttime business operators. These interviews focus on gathering their views on factors that influence the local nighttime economy. By engaging with these stakeholders, the study aims to understand how business practices, urban design, and the broader social environment impact the viability and safety of nighttime activities in the area.

This comprehensive approach allows for a nuanced understanding of the site's dynamics, combining both subjective perceptions (from surveys and interviews) with objective spatial observations, and providing a well-rounded basis for further design or policy recommendations.

3.3.1.2 Site Observation

Figure 3.3.1 Five types of Building Facades
Made by Author
Source: google street map

3.3.1.2 Building Facades as a Pattern Related to Urban Safety

According to Jan Gehl, the design of ground-floor façades plays a pivotal role in shaping the public's sense of safety and engagement within urban environments. Active, articulated façades tend to invite attention, foster interaction, and enhance perceived safety, while blank, passive façades often contribute to feelings of discomfort, neglect, or insecurity (Gehl, 2010).

This study applies Gehl's framework to the Bijlmermeer district, employing on-site observations to evaluate the physical and functional characteristics of ground-floor façades(Figure 3.3.1). To structure the survey, façades were classified into five categories defined in The City at Eye Level (Gehl, 2010, p.241), as shown in table 1 .

Based on these classifications, the façades across various blocks in Bijlmermeer were assessed. The distribution and type of façade were then analyzed in relation to their impact on perceived safety, pedestrian walkability, and street-level vibrancy.

The façade types from A to E represent a gradual decline in both perceived safety and street-level vitality. Based on Jan Gehl's three key indicators of ground-floor quality—door density, unit size and function, and façade characteristics—this study aims to observe and classify the façades surrounding Bijlmerdreef in the Bijlmermeer district according to the A–E typology.

Two rounds of site observations were conducted in March, 2025. These observations not only supported the classification of ground-floor façades but also served as a preliminary step for the upcoming survey design. Specifically, they helped identify locations where respondents were more likely to be approached, and informed the formulation of context-specific questions that reflect the spatial and social dynamics of Bijlmermeer.

The collected façade data were then entered into QGIS and spatially mapped to visualize the distribution and variation of façade types across the area, as shown inFigure 3.3.2 .

- façade typeA
- façade typeB
- façade typeC
- façade typeD
- façade typeE

Figure 3.3.2 Map of Five types of Building Facades
Made by Author

Category	Name	Door Density	Unit Size & Function	Façade Characteristics	Implications for Perceived Safety
A	Active	15–20 doors / 100 m²	Small units, diverse functions	No blind units, strong vertical articulation, rich details, high façade relief	Highly engaging and transparent; enhances sense of safety
B	Friendly	10–14 doors / 100 m²	Relatively small units, some variation in function	Few blind/passive units, some façade relief and many details	Generally positive street experience, supports walkability
C	Mixture	6–10 doors / 100 m²	Mix of small and large units, modest variation	Some blind/passive units, modest relief, fewer details	Moderately engaging, mixed safety perception
D	Boring	2–5 doors / 100 m²	Large, monotonous units, minimal functional variation	Many blind or uninviting facades, few or no details	Feels unwelcoming, reduces informal surveillance
E	Inactive	0–2 doors / 100 m²	Large, functionally uniform units	Blind/passive units, flat/uniform façades, no visual interest	Often perceived as unsafe or dead zones

Table 3.3.1. Five types of Building Facades
Made by Author

3.3.2 Site Survey

Following the site observations and a clearer understanding of the research focus, two rounds of structured interviews were conducted in April 2025. The survey consisted of four main sections, each designed to explore specific aspects of the research:

Basic Information – including demographic data such as gender, age, and occupation.This section was intended to explore whether individuals with different identities (e.g. gender or age groups) exhibit distinct perceptions of safety.

Nighttime Activities – examining participants' habits and frequency of nighttime outings. The purpose of this section was to gain insight into participants' nighttime behavior, and to understand the factors influencing their habits, such as personal routines, perceived risks, or accessibility of destinations.

Perception of Safety – collecting participants' opinions on which types of nighttime economic activities (NEA) are perceived as safe or unsafe. The data collected here will be used to assess the correlation between NEA types and perceived safety, and to compare and cross-validate these findings with the outcomes of the site survey.

Photo-Based Safety Perception – asking respondents to rate a selection of visual scenes from Bijlmer based on how safe or unsafe they appeared.This section served as a practical test of Jan Gehl's theory (as introduced in section 3.1.1), allowing the study to evaluate whether his façade quality principles are applicable to the Bijlmermeer context in Amsterdam.

3.3.2.1 Basic Information

Given the focus of this study, as shown in Figure 3.3.3.a, female respondents were prioritized during the survey process, although input from a small number of male participants was also included for reference.

As for the age and occupation of respondents, no specific target group was pre-selected. Instead, participants were randomly approached. However, since the interviews were conducted during the evening hours, a relatively high proportion of the respondents turned out to be students(Figure 3.3.3.c), who are 18-24 years old(Figure 3.3.3.b), possibly due to their availability and presence in public spaces at night.

However, in sections 3.1.2.3 Perception of Safety and 3.1.2.4 Photo-Based Safety Perception, female respondents generally provided lower safety ratings, indicating a greater sense of insecurity, especially with noticeable variations across different locations.

In contrast, male respondents tended to give consistently high ratings (mostly 4–5 out of 5) and showed minimal variation in their assessments of different environments. As one male participant interviewed near the cinema remarked,

"I personally feel all of these places are safe, but I know not everyone feels the same way."

Additionally, younger female participants expressed greater concern about feeling unsafe, particularly in less crowded or poorly lit areas.
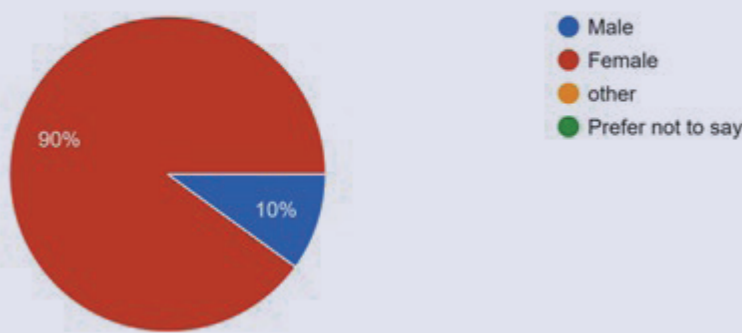

1.1 What is your gender?
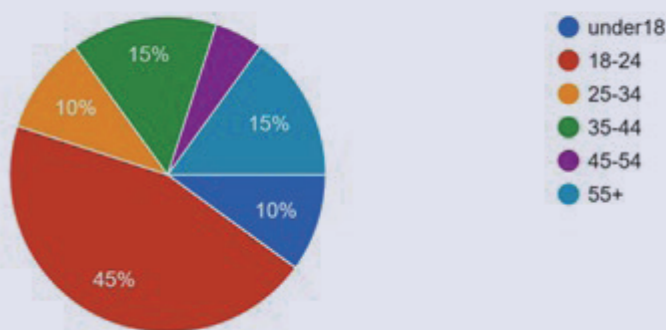
Figure 3.3.3 a

1.2 What is your age?

Figure 3.3.3 b

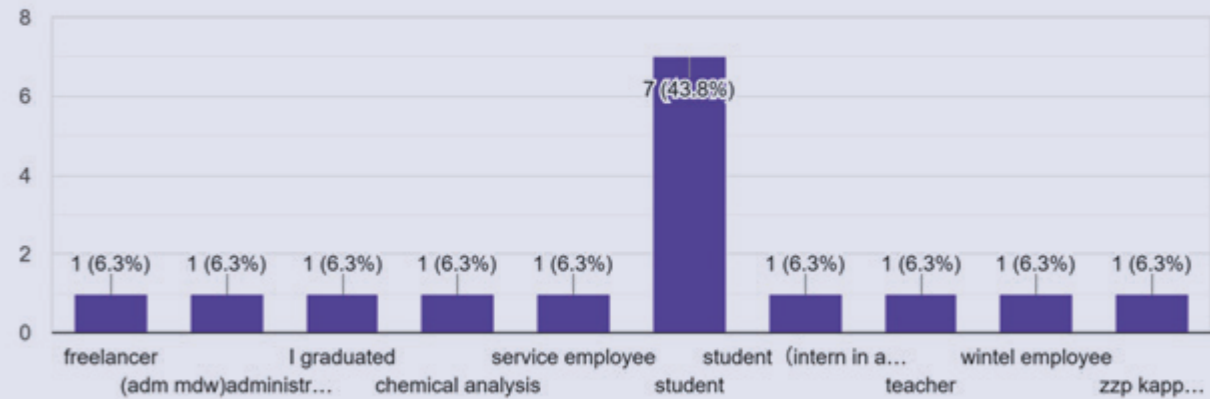1.3 What is your occupation? (e.g. student, retail worker, freelancer, etc.)

Figure 3.3.3 c
Basic Information
Made by Author

3.3.2.2 Nighttime Activities

As shown in Figure 3.3.4.a, the majority of respondents rarely or never go out at night. The main reasons given were personal, such as "I'm usually busy or tired," rather than concerns about nighttime safety.(Figure 3.3.4.e)

Moreover, more than half of the respondents indicated a preference for areas other than Bijlmer when engaging in nighttime activities (Figure 3.3.4.d). As shown in Figure 3.3.4.f, the most common destinations included music or performance venues (such as the Arena), cinemas, or friends' homes. A number of participants also mentioned visiting popular nighttime districts nearby, such as Leidseplein in central Amsterdam.

In terms of purpose (Figure 3.3.4.b), most respondents went out for leisure and socializing, while a smaller portion went out for shopping or work. Regarding transportation choices (Figure 3.3.4.c), more participants reported using private cars or public transport than walking or cycling. This may reflect limited accessibility to nighttime economic areas (NEA) via slow mobility modes in Bijlmer, or point to a lack of pedestrian- and cyclist-friendly infrastructure, a hypothesis that will be further examined in the next phase of the study.

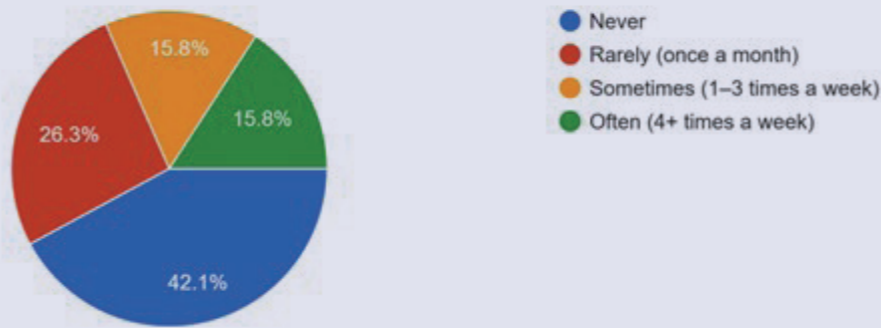2.1 How often do you go out at night (after 20:00) in Bijlmer?

Figure 3.3.4.a

2.1.1 Where do you usually go? (please name one or more locations)

Ziggo Dome, Cinema. Bar, Arena, Friends' House, Leidseplein

Figure 3.3.4.f

2.1.2 Why do you go out at night? (choose all that apply)
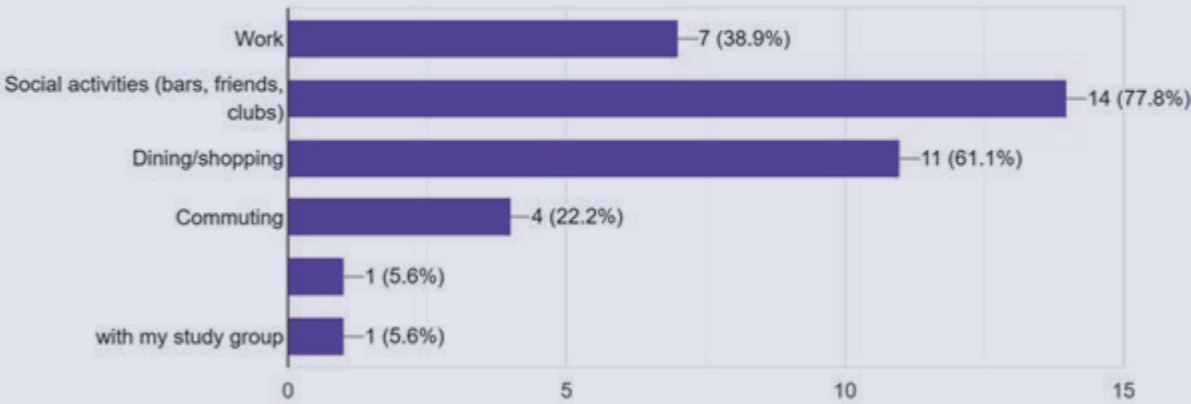

Figure 3.3.4.b

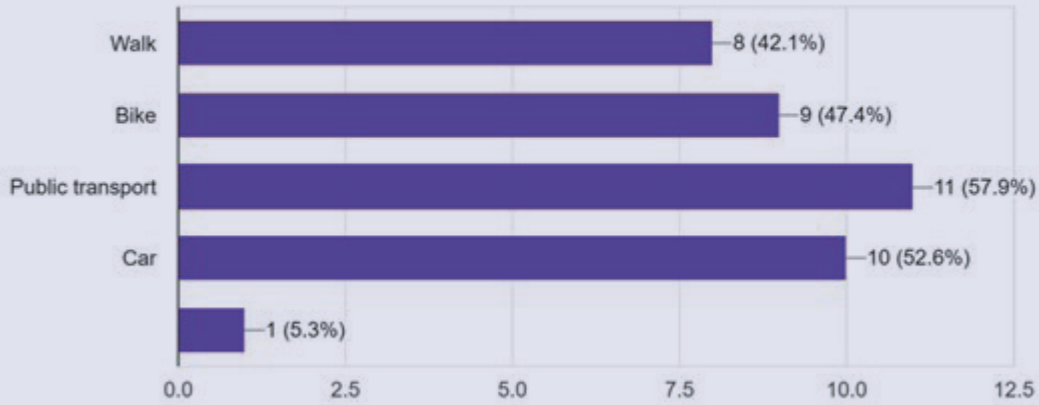2.1.3 How do you usually get there? (choose all that apply)

Figure 3.3.4.c

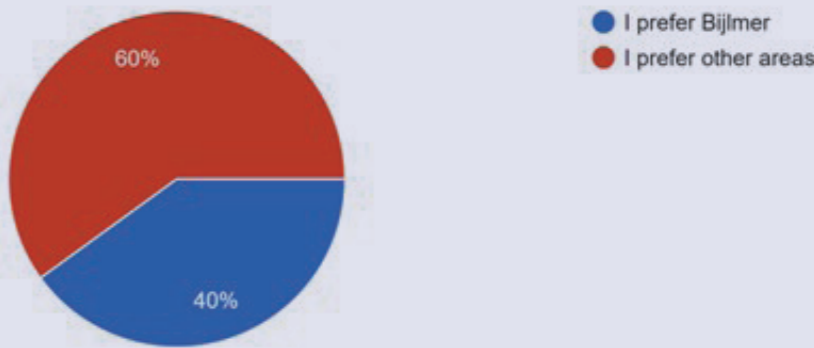2.2 Do you prefer going out in Bijlmer or in other areas of Amsterdam?

Figure 3.3.4.d

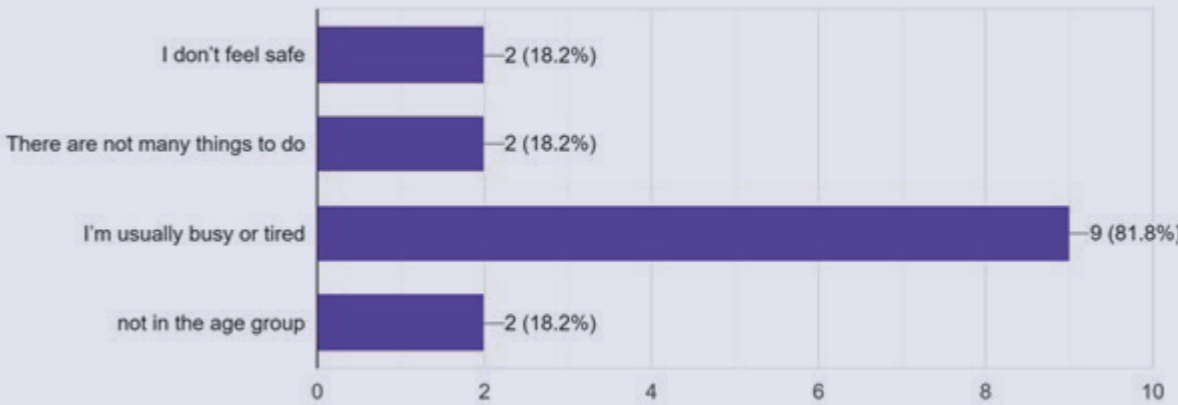2.3 Why don't you go out at night? (choose all that apply)

Figure 3.3.4.e

3.3.2.3 Perception of Safety

As the statistical data for Amsterdam is provided for all genders, this study included the question, "How safe do you feel at the following places at night (after 20:00)?" in the survey. The goal was to gather a portion of women's safety perceptions regarding the nighttime economic activities previously studied. Since this survey was conducted before the data analysis, more variables (activities) were added to the data analysis section related to nighttime economic activities.

The survey included questions about music bars and football bars because the original POI definitions for bars and pubs caused confusion among many respondents. After conducting several interviews, we adjusted the survey wording based on OpenStreetMap's POI definitions. This could have introduced some bias, but compared to the vague original definitions, the survey provided more effective and useful information.

As shown in Figure 3.3.5, part of the survey results are displayed. By inviting 20 respondents to rate their safety feelings regarding various nighttime economic activities on a scale of 1 to 5, and then calculating the average score, we observe that the safety ratings for supermarkets, gyms/fitness centers, cinemas, restaurants, and massage parlors (representing more routine activities) were relatively high, with average scores above 4. On the other hand, activities like coffeeshops, football bars, and nightclubs received lower scores, with averages below 3.5.

The interviews and surveys also asked people why they felt unsafe in certain places. Commonly mentioned keywords included: "emotional people", "different people", "suspicious people", etc. Some respondents also mentioned feeling unfamiliar with the location. Of course, a few respondents stated that they generally consider Amsterdam to be a safe city.

In conclusion, the analysis of this survey serves not only to address the research question but also to provide further reference and guidance for future designs. For instance, supermarkets, gyms/fitness centers, cinemas, restaurants, and massage parlors might contribute to enhancing the safety perception of women in the targeted group. However, coffeeshops, football bars, and nightclubs may require design interventions or better management to improve the safety perception they offer. The survey does not solve all the issues, nor does the data analysis. However, combining both approaches might provide a more objective and comprehensive result.
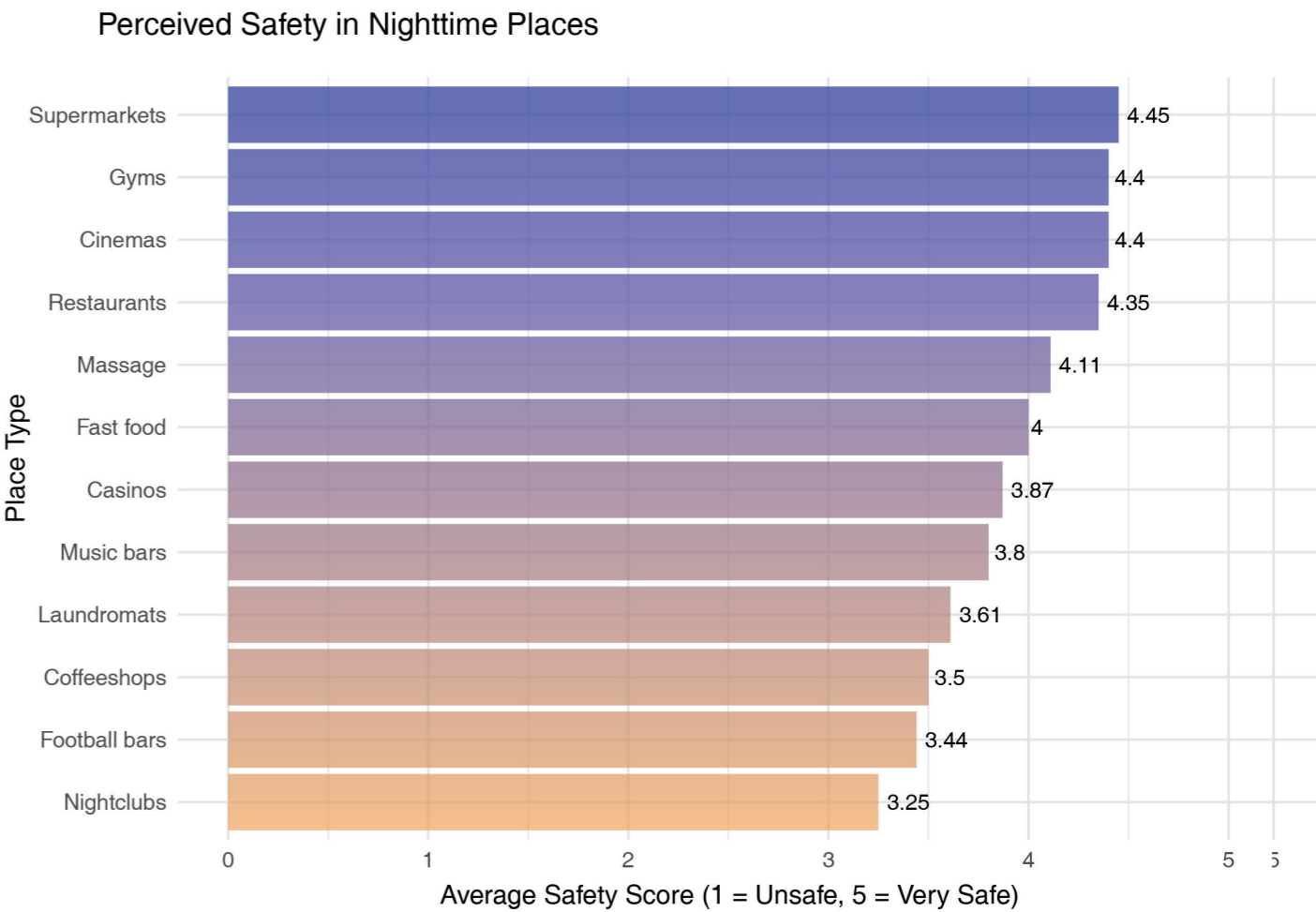

Perceived Safety in Nighttime Places

Place Type	Average Safety Score
Supermarkets	4.45
Gyms	4.4
Cinemas	4.4
Restaurants	4.35
Massage	4.11
Fast food	4
Casinos	3.87
Music bars	3.8
Laundromats	3.61
Coffeeshops	3.5
Football bars	3.44
Nightclubs	3.25

Average Safety Score (1 = Unsafe, 5 = Very Safe)

Figure 3.3.5
Percieption of NEAs
Made by Author

3.2 How safe do you feel at the following places at night (after 20:00)?
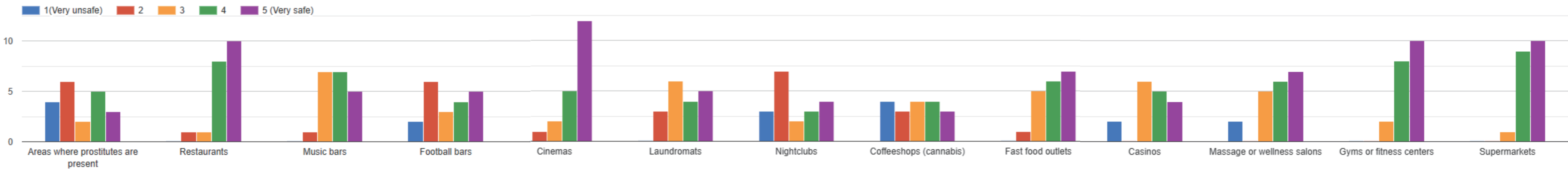
3.3.2.4 Photo-Based Safety Perception

This study aims to understand the factors that influence nighttime safety from a female perspective. To achieve this, a questionnaire survey was conducted. Part of the survey included showing the respondents six photos and asking them to rate their perceived safety based on what they saw in the photos. As the pilot project of this study was located in Bijlmermeer, the photos selected for the survey were of various scenes from Bijlmermeer. However, during the survey, respondents were not informed about the exact location of these photos.

The questionnaire presented 6 photos (labeled A, B, C, D, E and F) to the respondents, as shown in Table 3.3.2 These photos represented the following settings:

During the durvey, six photographs were presented to pedestrians during street interviews near the Bijlmermeer commercial district. These images were part of a survey in which participants were asked to rate their perceived safety at the depicted locations on a scale from 1 to 5. The survey data, which was introduced in the site analysis section of the report, provides insight into how individuals perceive safety in specific urban areas.

The data collected from these street interviews is visualized on Table 3.3.2 which represents the locations of these six photos in the Bijlmermeer district. These photos were strategically selected to represent various types of urban spaces, allowing for a comprehensive analysis of how different physical and social environments influence safety perceptions.

As seen in Table 3.3.2, the results from the survey show that respondents did not significantly differ in their safety ratings for most of the locations, except for Photo A, which generally received higher safety ratings.
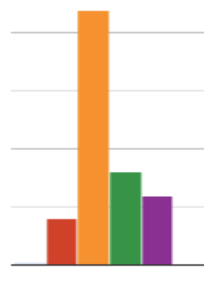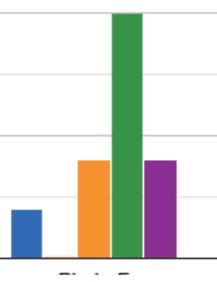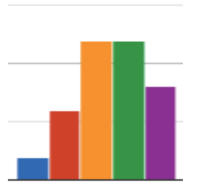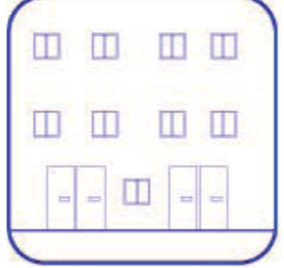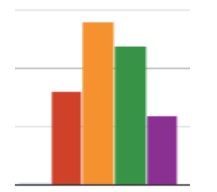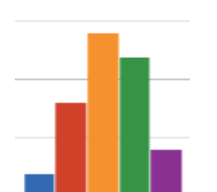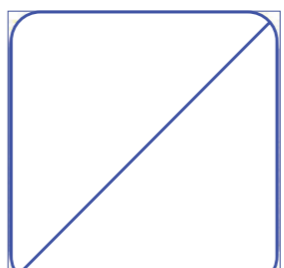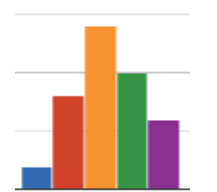

| | 1(Very unsafe) | 2 | 3 | 4 | 5 (Very safe) |

Category	Name	Door Density	Unit Size & Function	Façade Characteristics	Implications for Perceived Safety
A	Active	15–20 doors / 100 m²	Small units, diverse functions	A commercial center (open during the day but closed at night)	
B	Friendly	10–14 doors / 100 m²	Relatively small units, some variation in function	A shop with active business	
C	Mixture	6–10 doors / 100 m²	Mix of small and large units, modest variation	A vacant shop or an empty ground floor	
D	Boring	2–5 doors / 100 m²	Large, monotonous units, minimal functional variation	A low-rise residential area with poor lighting	
E	Inactive	0–2 doors / 100 m²	Large, functionally uniform units	A high-rise residential area	
F	/	/	/	A street scene	

Table 3.3.2.Perception of photos
Made by Author

The results of this survey align with the findings from the earlier literature review and provide additional insights into the factors influencing nighttime safety. These include the significance of environmental design features such as lighting, sidewalks, and the presence of people. The results suggest that well-lit areas, with active commercial spaces and residential buildings, are perceived as safer. In contrast, vacant, poorly lit spaces, or areas lacking human activity tend to make people feel less safe.

Additionally, the findings suggest that spaces with a mixture of residential areas, commercial activities, and good lighting contribute to a sense of security, while areas that are dark, isolated, or vacant lead to a higher perception of danger. This insight can be used to guide future urban planning and nighttime economy design, encouraging the creation of spaces that promote positive social interactions and increased safety, particularly during nighttime.

Conclusion

This questionnaire serves to validate and support the previous literature findings by collecting subjective safety perceptions directly from residents. Moreover, it highlights the importance of incorporating human-scale design and active public spaces in urban planning to foster a safer nighttime environment, particularly for women.

This survey also emphasizes that factors like street activity, visibility, and environmental design directly impact the feeling of safety, supporting the idea that urban spaces designed for natural surveillance can contribute to safer environments during the night.

"Photo A could be a little unsafe because you are surrounded by big roads, and you can't easily escape."

"The street filled with cars made me feel safer."

"Dark spaces, which make me feel unsafe."

"Some residential areas that make me feel safer."

"The lighting in the area is important."

"Photo A could be a little unsafe because you are surrounded by big roads, and you can't easily escape."

"The street filled with cars made me feel safer."

"Dark spaces, which make me feel unsafe."

"Some residential areas that make me feel safer."
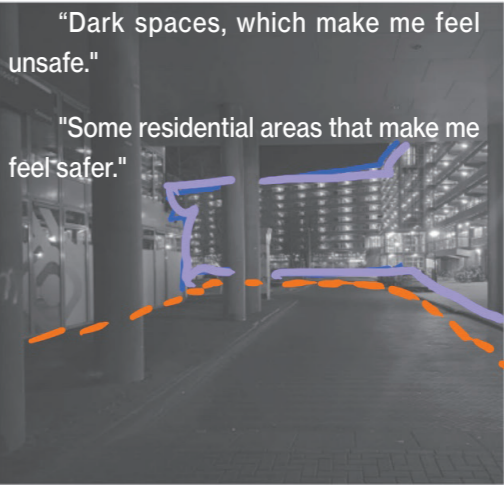
"The lighting in the area is important."

"Not many people, dark, it feels empty."

"Other people/houses present made me feel safer."

"Unsafe: Closed/Closed-in feeling and older buildings."

"No, not the photos, but I know these places personally and there are always men hanging around."

"In Photo E, people were hanging around outside food spots, which usually means a lot of catcalling for women in general."
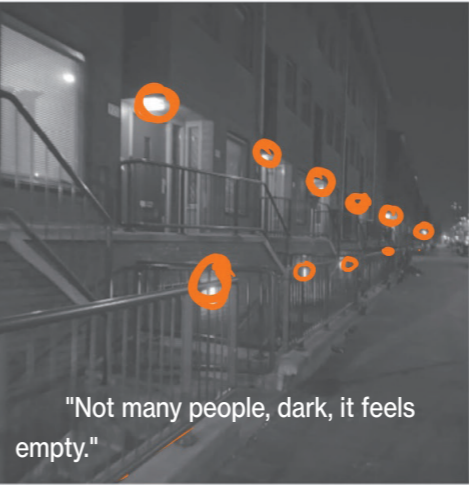
"Not many people, dark, it feels empty."

"Other people or houses present made me feel safer."

"Unsafe: Closed/Closed-in feeling and older buildings."

"No, not the photos, but I know these places personally and there are always men hanging around."

"In Photo E, people were hanging around outside food spots, which usually means a lot of catcalling for women in general."

Figure3.3.7 .Perception of photos
Made by Author

In Figure3.3.7, data from "PERCEIVED SAFETY OF WOMEN IN SUSTAINABLE MOBILITY ENVIRONMENTS," is presented. This figure provides a spatial analysis of objective safety factors in the Bijlmermeer area, based on various physical and environmental characteristics such as lighting, natural surveillance, and the presence of economic activities. By comparing both the objective safety data(Figure3.3.7) and the subjective safety ratings (from the survey responses)(Figure3.3.9), it becomes clear that the two sources of data align in certain areas.

Notably, the areas depicted in the six photographs(Figure3.3.9), as well as the corresponding subjective safety ratings from the survey, are located within regions that are consistently marked with lower safety perceptions in both the literature data and the survey data. These findings indicate that the locations in question are perceived as less safe by both objective and subjective measures, reinforcing the notion that certain areas within Bijlmermeer may require focused intervention.

By comparing these two sets of data, it becomes evident that the photo D is associated with a lower safety perception. Whether considering the objective data from existing literature or the subjective ratings from the street survey, the area consistently appears as one where safety concerns are prevalent.This alignment between the objective analysis and subjective ratings suggests that the area, as shown in the images, should be considered a high-priority zone for further investigation and urban intervention. The intersection of these two data sources allows for a more comprehensive understanding of safety perception, which can inform the design of urban policies aimed at addressing safety issues in these locations.

Conclusion

The integration of objective safety analysis with subjective safety ratings from the street survey has provided valuable insights into the urban spaces of Bijlmermeer. The findings highlight areas with consistently low safety perceptions, both from a physical analysis and personal experience perspective. These areas, marked by lower safety ratings in both the survey and objective measures, should be prioritized for future urban interventions aimed at improving safety and overall urban livability.

source: Aimee, n.d.

Figure3.3.8 .Perception of photos
Made by Author

Figure3.3.9 .Perception of photos
Made by Author

3.3.3 site survey: Interview Insights

The research also conducted several semi-structured interviews to gather insights on the interplay between different types of nighttime economic activities. Through conversations with stakeholders, particularly those with experience in cinemas and similar businesses, we learned that the nighttime economy is influenced by many factors, and different types of businesses tend to interact with each other.

The interviews highlighted how businesses can have mutually beneficial relationships. For example, more routine businesses like supermarkets and laundromats showed some positive correlation with nighttime activities, while businesses centered around alcohol sales and nighttime entertainment (e.g., bars, nightclubs) displayed a more complex interrelationship. These findings suggest that businesses within the same sector or adjacent sectors might benefit from being located near each other, creating a natural clustering effect that could support a stronger nighttime economy.

These insights will guide the design and planning of future nighttime economic activities, allowing us to consider how to foster mutually beneficial relationships between different types of businesses. Ensuring that these businesses are well-integrated within the urban environment can help improve their viability and enhance their ability to contribute to a safer and more vibrant nighttime community.

Conclusion

As summarized in Figure3.3.10 and the previous analysis, the various stakeholders involved in the nighttime economy represent different interests and power dynamics. For example, nighttime business operators (e.g., bar owners, nightclub owners) prioritize profitability, consumers focus on entertainment, and citizens are concerned about quality of life and the quality of public space. These differing interests often create two opposing camps: one focused on economic development and the other on enhancing public safety.

To foster a more harmonious and integrated development, an integration principle should guide future interventions. This principle seeks to leverage positive nighttime activities to enhance safety in areas that currently face safety concerns, while ensuring that the economic benefits of these activities are maximized. By aligning the interests of these stakeholders, it is possible to create a coherent, synergistic approach that promotes both economic growth and safety in the nighttime environment.

What do you think are the factors that influence your business?

There are always factors that impact any type of business. For example, transportation. This cinema is located right next to the train station, which definitely plays a role.

Also, you know, the cinema is close to Ziggo Dome.
That location can also influence the number of visitors, especially when there are big events.

Weather – when the weather is really nice, people are less likely to come to the cinema. Everyone prefers to stay outside. But when the weather is bad, more people tend to come and watch movies.

Have you ever witnessed any crimes or acts of violence around here?

There was one time when I witnessed a violent incident downstairs near the train station. But that was the only time I personally saw something like that.

What does happen more often is bicycle theft. A lot of our visitors have had their bikes stolen while watching a movie. Since we're usually busy with work, we can't constantly watch the bikes outside. It would be better if there were more security staff or monitoring in the area.

Figure3.3.10 .Interview
Made by Author

3.4 CONCLUSION AND INTERVENTION

3.4.1 NEAs selection： Nighttime Economy Activities and Safety

In the Analysis chapter, the relationship between Nighttime Economy Activities (NEA) and urban safety was explored. Some economic activities were found to have a positive correlation with nighttime safety, meaning that they contribute to creating safer urban spaces. On the other hand, certain economic activities were identified as having a negative correlation with safety, possibly exacerbating safety issues in the area.

Based on this analysis, we identified sixteen different patterns of nighttime economic activities. Each of these patterns represents a distinct economic activity that has either a positive or negative impact on nighttime safety. These patterns will become the chess pieces in our proposed model.

Stakeholders, whether they are Nighttime Business Owners or local residents, can select the activities (patterns) they believe are most relevant to improving safety or enhancing the vibrancy of their neighborhoods. They can then place these chosen chess pieces in the predefined grid (the city map), as shown in the Figure 3.4.1

As seen in the figure, the orange patterns represent economic activities that have a negative correlation with safety, while the blue patterns represent activities that have a positive correlation with safety. This visual classification helps stakeholders to easily identify which types of activities can be strategically placed in different areas to either enhance safety or attract specific types of nighttime activity.

1

Prostitute	Restaurant	Pub	Bar
laundry	stripclub	nightclub	coffeeshop
gym/fitness training	supermarket	massage	casino
cinema	fastfood	hotel	cafe

Figure3.4.1.Selection of patterns
Made by Author 97

3.4.2: Environment Factors & Nighttime Safety

According to the previous discussions in the document, several environmental factors have been identified as influencing safety in urban spaces(Figure3.4.2.). These factors include clear signage, transparent facades, areas designed for people to linger, adequate lighting, slow traffic, and the accessibility of public transportation. These elements not only enhance the visibility and usability of public spaces but also contribute to creating safer environments by fostering natural surveillance, improving pedestrian flow, and increasing the presence of people in the area.
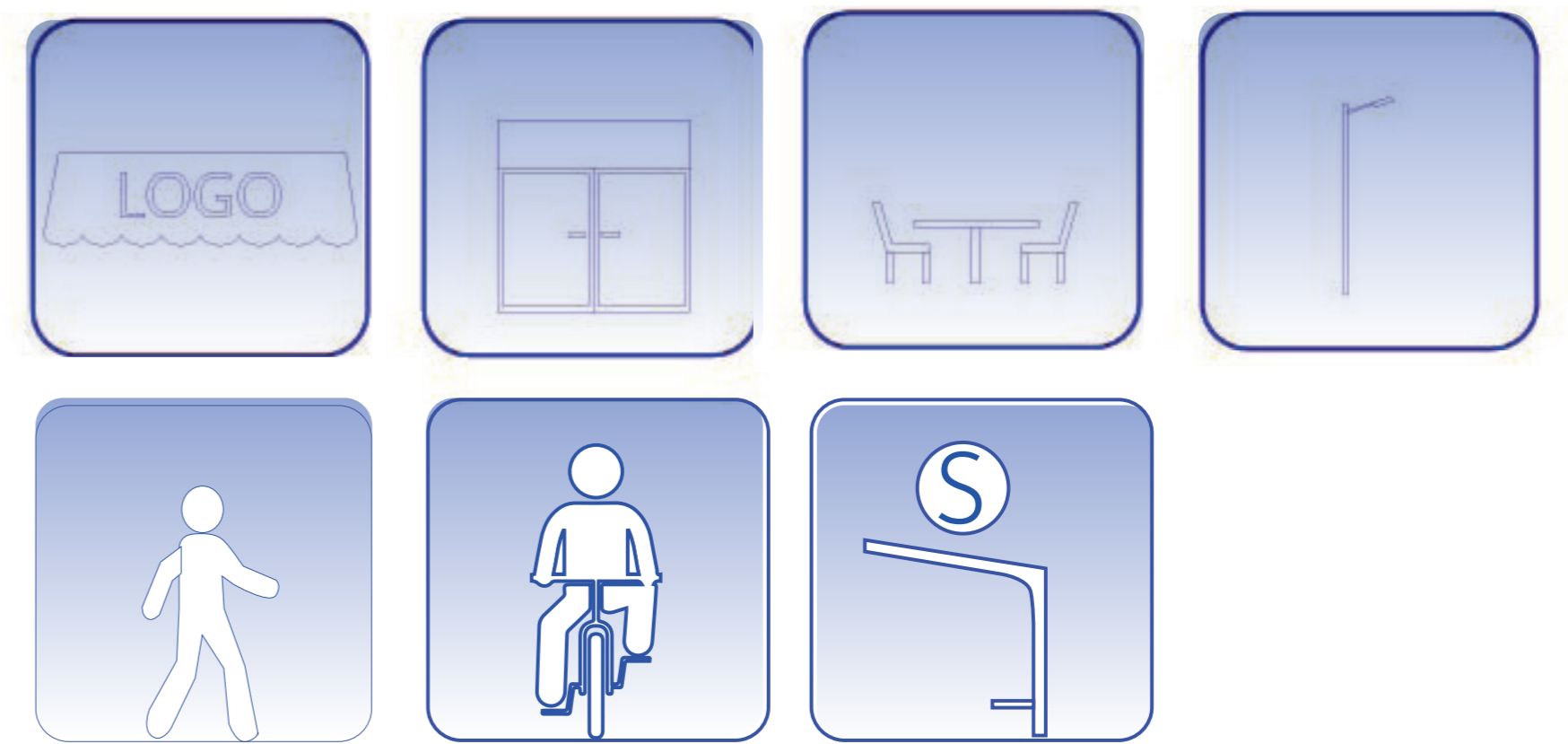
Figure3.4.2.Selection of patterns
Made by Author

3.4.3: Interventions

Based on this integration, several design interventions will be proposed. The methodology used for this is the Pattern Language approach. Patterns are tools that connect the research questions with the desired future outcomes. However, in this chapter, we extend this methodology, which illustrates how we filtered and refined existing patterns to identify those that promote safety. These patterns will then serve as the foundation for future interventions, as shown in Figure3.4.3.

Figure3.4.3.Structure of pattern language method
Made by Author
Source： de Jonge, T. M., & van der Voordt, D. J. M. (2002). WAYS to study and research urban, architectural and technical design. Urbanism + Real Estate & Housing.

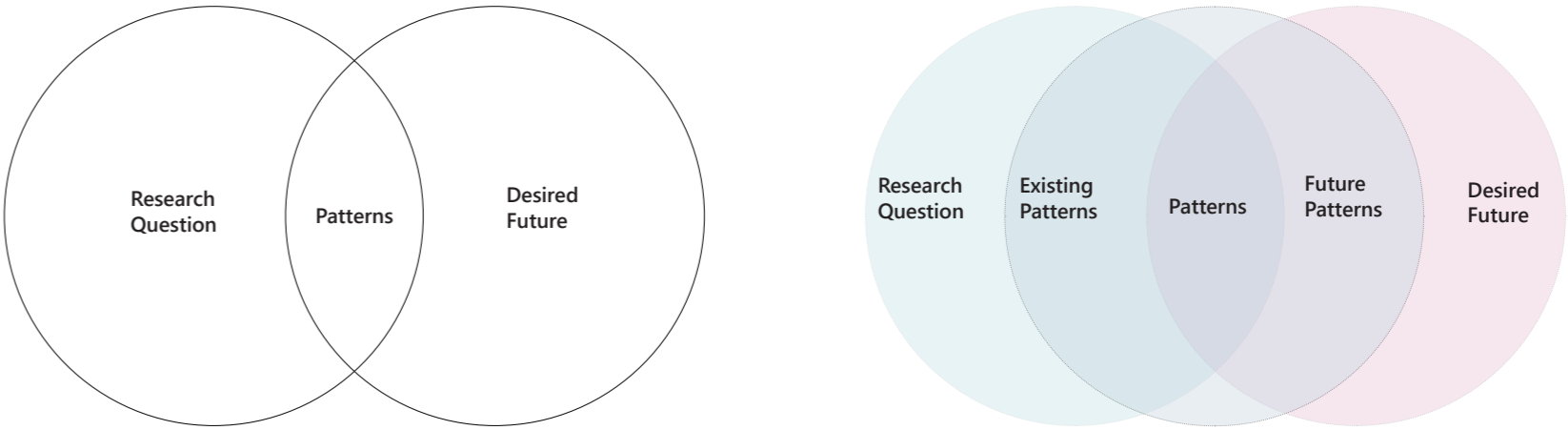Through the analysis in this chapter, we are able to answer the four research questions posed earlier. First, we identified the types of nighttime economic activities that contribute to safety and well-being. These activities are primarily everyday nighttime activities, such as laundromats, cinemas, supermarkets, gyms, restaurants, massage centers, and hotels. These activities foster regular, steady foot traffic, which enhances natural surveillance and reduces the likelihood of criminal activity.

Next, we explore which specific environmental factors promote safety. The most effective safety-promoting factors include slow traffic, the presence of public transport stations, and public furniture that encourages people to stay, as well as clear signage and logos. These elements contribute to a more accessible and visible environment, which directly enhances security.

We then address two key questions. The first question concerns the locations of safe and unsafe areas. Based on the literature review, we summarize that unsafe areas are often characterized by "blank areas" — spaces lacking natural surveillance, poor lighting, and low accessibility. These areas are more vulnerable to crime. The second question examines the factors that attract more nighttime economic activities. Higher accessibility and existing clusters of activities contribute to the growth of nighttime economies. The clustering effect of these activities can also enhance the sense of safety in these areas by ensuring continuous presence and engagement from the public.

Through the integration of these findings, this chapter provides a comprehensive analysis of how specific factors — both physical and social — contribute to the safety of urban public spaces. The identified patterns and interventions offer a targeted approach to improving safety and fostering a vibrant, inclusive nighttime economy in urban areas.

Research Question

Existing Patterns

What

Where

Desired Future

What types of nighttime economic activities contribute to public safety?

Use nighttime activities to contribute to public safety,and better management those activities lack of safety?

What specific factors help transform public spaces into safer environments at night?

Specific factors that help transform public spaces into safer environments should be more.

Where are the safe/unsafe areas?

LACK OF NATURA SURVILLIANCE

LACK OF LIGHTING

LOW ACCESSIBILITY

ARCHITECTURAL FORM

NEAs AND LIVELY STREET

Concentrate on the unsafe areas

Where are nighttime economic activities concentrated

HIGH ACCESSIBILITY

NEA Hubs' ATTRACTION

Providing favorable conditions for the concentration of nighttime economic activities
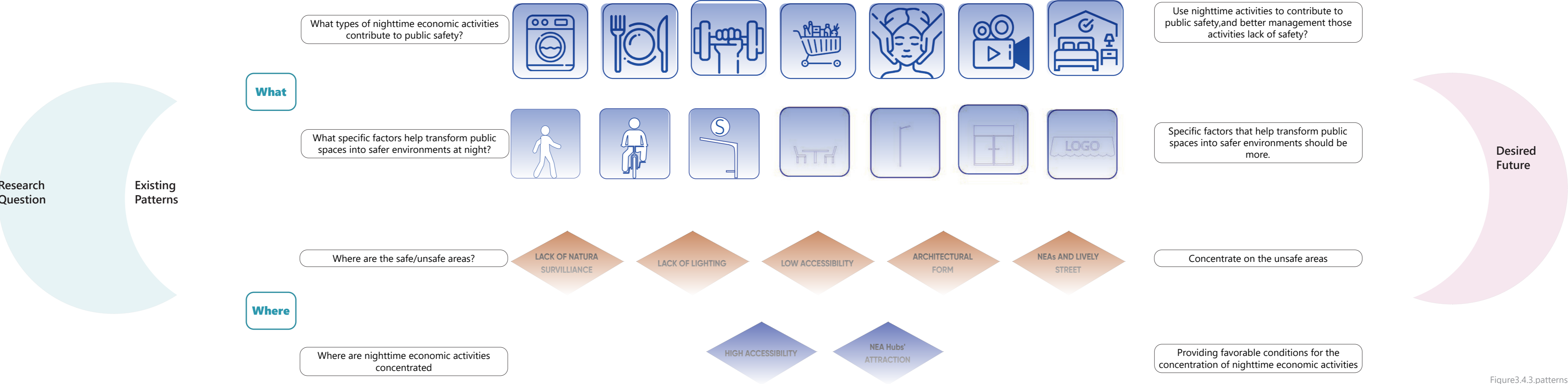
4 DESIGN-PILOT PROJECT

4.1. Construction of the Grid

The grid is primarily composed of cells with a scale of 25*25m(Figure 4.1.1). Human visual perception at night typically operates within the mesopic range, involving both rod and cone photoreceptors under low-light conditions—such as those found in street-lit urban environments (Cozens et al., 2005; Painter & Farrington, 1999). Urban lighting designs often maintain streetlight spacing of around 50 m to ensure consistent mesopic-level illuminance between poles (Painter & Farrington, 1999). This spacing facilitates reliable detection of obstacles and people, indicating that a 50 m × 50 m grid corresponds to human perceptual limits in such environments.

Figure 4.1.2 shows factors influencing nighttime safety, which were listed in the previous literature review(chapter3.1). These factors include lighting, natural surveillance (eyes on the street), traffic accessibility, and the presence of slow-moving traffic. This design section is built upon these foundational factors, and the following steps will be taken to analyze and assess the space.

The next step is to conduct an overlay analysis by superimposing different layers on top of each other. This method allows us to identify areas that have both safety issues and potential for nighttime economic activities. By overlaying the layers, we can identify areas where safety is compromised but that still hold potential for development, and also pinpoint spaces with significant safety hazards.

The final result of this analysis will allow us to determine the best areas to place the "pieces" on the grid, based on safety and economic potential. The orange layer represents factors beneficial to safety, while the purple layer identifies areas that pose safety risks. These overlapped layers will reveal areas that have both safety issues and economic potential, helping us target regions for future interventions.

By utilizing a 50m × 50m grid, we can systematically analyze and assess the factors that affect nighttime safety. Through the analysis of different safety factors in the space and the application of the overlay method, we can clearly identify areas that are best suited for intervention and optimization. This approach not only helps address safety concerns but also identifies areas with potential for economic development during the nighttime.
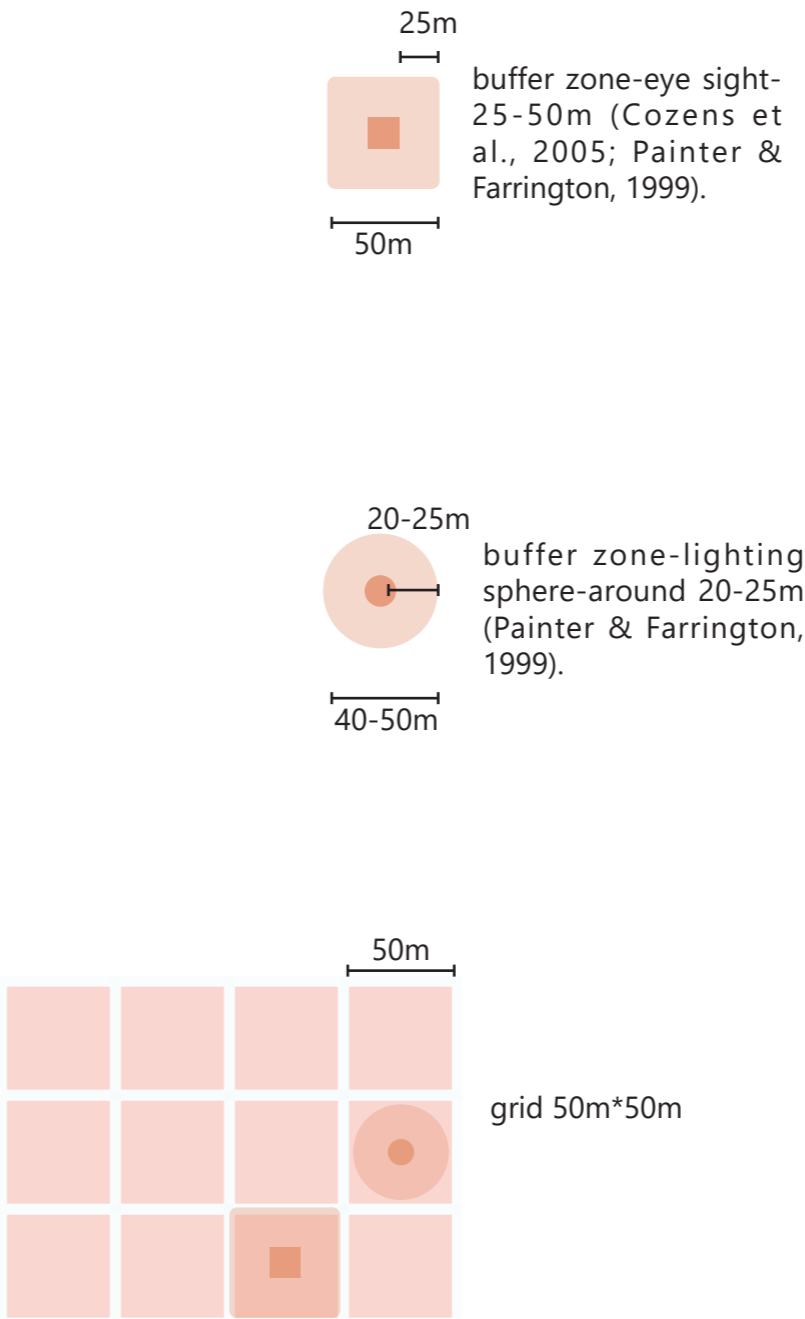

25m

buffer zone-eye sight-25-50m (Cozens et al., 2005; Painter & Farrington, 1999).

50m

20-25m

buffer zone-lighting sphere-around 20-25m (Painter & Farrington, 1999).

40-50m

50m

grid 50m*50m

Figure 4.1.1 LConstruction of the Grid
Made by Author

problem   potential

LACK OF NATURA
SURVILLIANCE

NEA Hubs'
ATTRACTION

LACK OF LIGHTING

HIGH ACCESSIBILITY

LOW ACCESSIBILITY
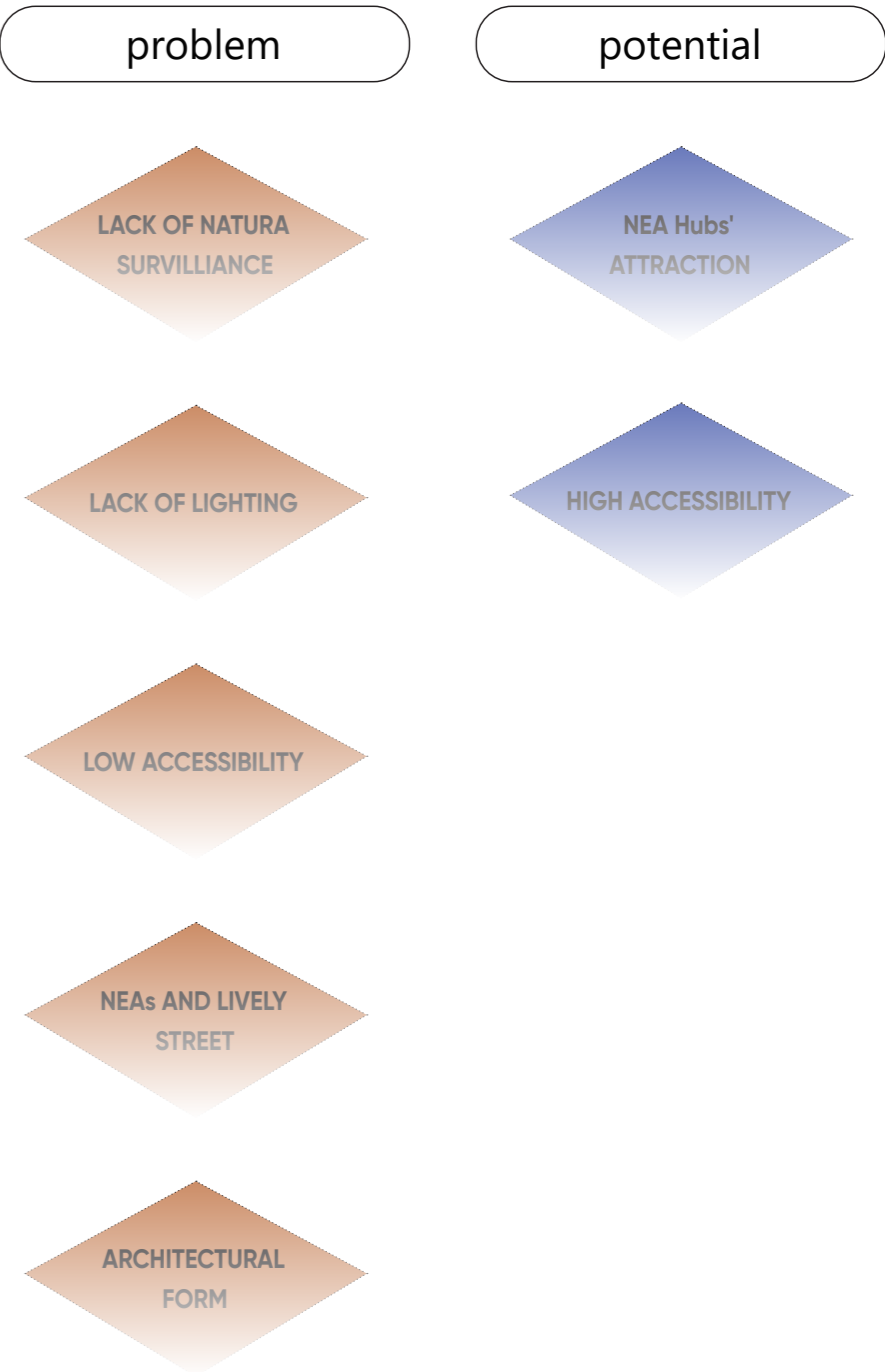
NEAs AND LIVELY
STREET

ARCHITECTURAL
FORM

Figure 4.1.2 problems and potentials
Made by Author

4.2. Application of the Grid-Based Method

As shown in Figure 4.2.1, the first step is to filter relevant layers based on real-world physical space data. These filtered layers include low-density residential areas, nighttime economic activities, etc(according to chapter 4.1).. We define these areas as either problematic spaces (indicating safety issues) or potential spaces (indicating economic development potential). The orange represents safety problems , and the purple represents economic potentials. This process helps us categorize the areas as either a problem or a potential.

The second step is to construct buffer zones around these spaces. The scale of these buffer zones is determined based on existing literature and actual data. For instance, the average lighting radius of street lamps is about 20 meters, so we set a 20-meter buffer zone for the lighting areas. Additionally, considering the maximum visible distance for the human eye in the dark (approximately 50 meters), we set the buffer zone for natural surveillance (i.e., "eyes on the street") to 50 meters, reflecting the effective range of natural surveillance in low-light environments.

The third step is to transform the generated buffer zones into either problem areas (danger zones) or potential areas (economic potential areas). These areas are visualized using a 25m × 25m grid, which helps us better understand the spatial distribution of these areas. The use of a grid makes the areas more structured and easier to analyze.

Next, overlay the problem layers and potential layers to identify areas that simultaneously face safety issues and have nighttime economic development potential. By overlaying these layers, we can clearly see which areas face both safety problems and potential economic opportunities. This process helps us pinpoint the key areas that require intervention. The final result, as shown in the figure on the right, displays spaces that have both issues and potential. These areas, once identified, will become the core targets for future interventions and planning, aiming to enhance safety while promoting healthy nighttime economic development.

For example, the black areas in the figure represent spaces that have safety risks (such as high crime rates or unsafe designs) but also have potential for nighttime economy development. These spaces can be improved through thoughtful design and management, enhancing safety while tapping into their economic potential.By using this grid-based method, we can comprehensively understand urban spaces and identify areas that need focused attention. The advantage of this approach lies in its systematic and actionable nature, allowing us to effectively visualize complex urban planning issues and provide clear intervention directions for decision-makers.

Conclusion

In summary, this method combines physical data layers, buffer zone construction, and grid visualization to identify problem areas and economic potential areas. Through color coding (orange for danger and purple for potential), we clearly distinguish between different types of spaces. Using this method, we can target areas that face both safety issues and have economic development potential for focused interventions. As shown in the figure, areas with both safety issues and economic potential (such as the black areas) will become the focal points for strategic development, balancing safety needs with the promotion of nighttime economy goals.
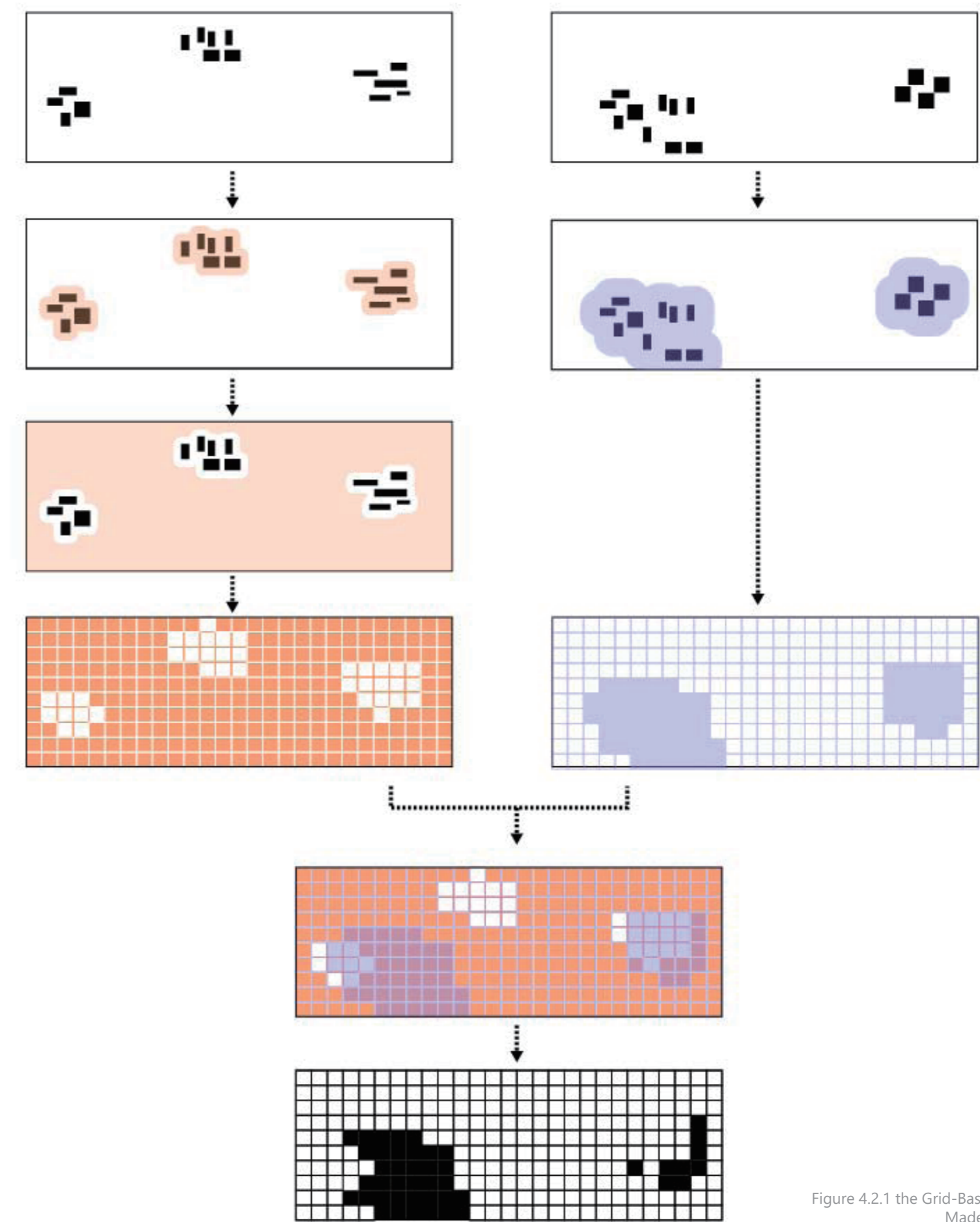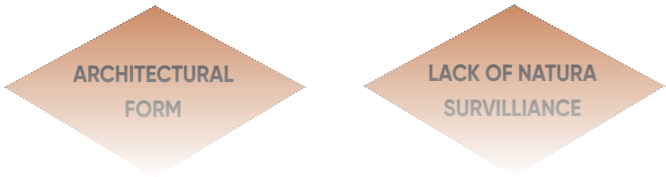

Figure 4.2.1 the Grid-Based Method
Made by Author

4.3 Analysis of layers

ARCHITECTURAL
FORM

LACK OF NATURA
SURVILLIANCE

Figure 4.3.1Natural Surveillance
Made by Author

4.3.1.Natural Surveillance

As shown in Figure 4.3.1, this section of the study focuses on analyzing the "I on the street" layer, also referred to as natural surveillance. Natural surveillance, as defined by Jane Jacobs, is the presence of "eyes" on the street, which is a critical factor in creating safer urban environments. Ideally, natural surveillance comes from individuals engaged in various activities such as pedestrians walking down the street or people sitting at cafés. However, in the Bijlmermeer area, as we can see, such activities are not as prevalent, especially during the nighttime when foot traffic is lower.

Despite this, residential areas, as noted by Jacobs, can also contribute to natural surveillance, even in the absence of dense foot traffic. People living in the area are naturally positioned to observe their surroundings and provide informal surveillance. Thus, in this study, we focused on building types that could provide more potential for natural surveillance. Specifically, we selected buildings with transparent facades and larger windows on the ground floor, as these are considered more conducive to offering natural surveillance compared to closed-off facades.

As shown in Figure 4.3.2, the areas represented in this figure are those where natural surveillance is minimal. These areas are considered to have higher safety risks, as they lack the level of vigilance that could be provided by residents or active public spaces.

Figure 4.3.2Lack of Natural Surveillance
Made by Author

4.3.2.Lighting

LACK OF LIGHTING

Next, we turn our attention to the lighting coverage in the Bijlmermeer area, as depicted in Figure 4.3.3. From this image, it is clear that while there is some lighting coverage, there are still significant blank areas that lack sufficient illumination(Figure 4.3.4). These poorly lit areas present higher safety risks, as they make it easier for criminal activities to occur unnoticed. By extracting these poorly lit areas, we obtain a layer that represents the lack of lighting in the region, further indicating areas of heightened safety concerns.

0   250   500 m

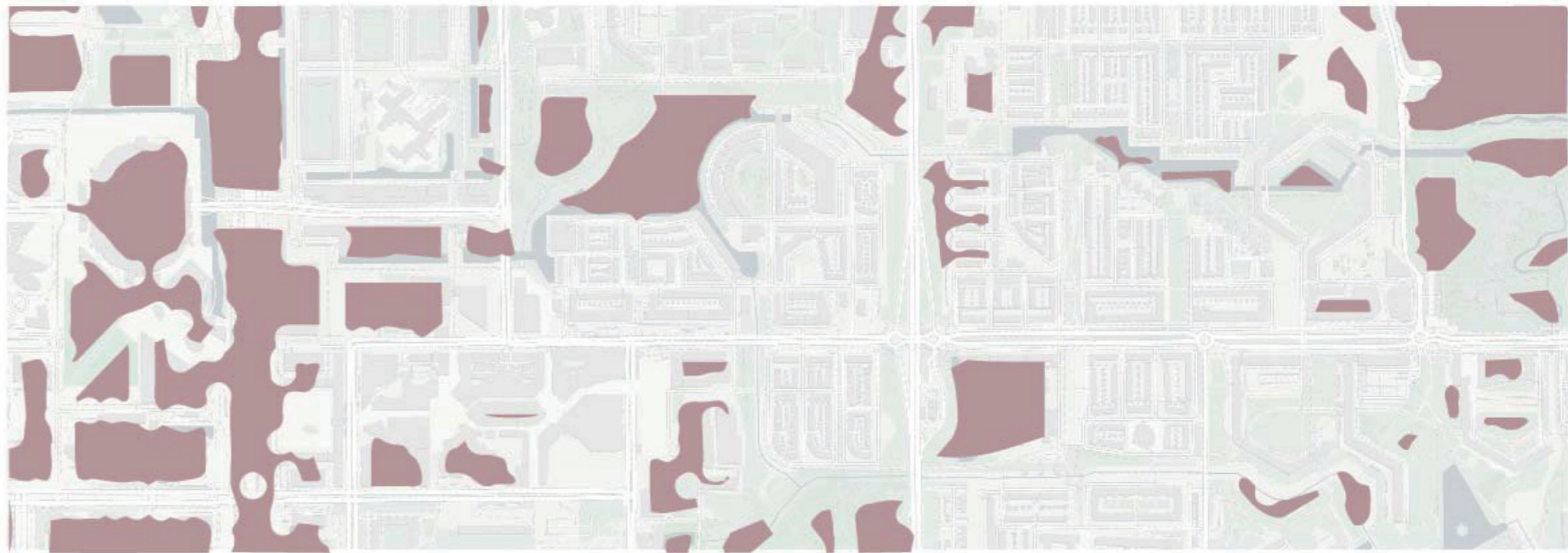Figure 4.3.3 Area with enought lights\
Made by Author

0   250   500 m

Figure 4.3.4 Area without enought lights\
Made by Author

4.3.3 Nighttime Economic Activities in Bijlmermeer Area

NEAs AND LIVELY STREET

In the following Figure 4.3.5, we explore the presence of nighttime economic activities around Bijlmermeer, such as restaurants, clubs, supermarkets, and laundromats. The common feature of these spaces is that they provide more opportunities for natural surveillance. These areas are generally more populated, and the presence of people contributes to the safety of the space. This layer provides insight into the economic activities in the area, and we observe that regions with more active nighttime businesses tend to be safer due to the increased number of people in the area.

In contrast, the regions without nighttime economic activities, shown in Figure 4.3.6, are identified as having higher safety risks. These areas lack the social interaction and activity that could help ensure natural surveillance during the nighttime. As a result, they are more vulnerable to safety issues.

The analysis of natural surveillance and nighttime economic activities in the Bijlmermeer area highlights the relationship between urban space design and safety. Areas with transparent facades, residential presence, adequate lighting, and nighttime economic activity tend to be safer, as they promote natural surveillance and increase foot traffic. Conversely, areas with poor lighting, empty spaces, and limited nighttime economic activities are more likely to experience safety concerns.

This analysis underscores the importance of designing urban environments that promote natural surveillance through both physical design (such as open facades and lighting) and social dynamics (such as active public spaces and economic activities) to improve safety, especially during nighttime hours.

Figure 4.3.5Area with NEAs
Made by Author

Figure 4.3.6 Area without NEAs
Made by Author

4.3.4. overlap and analysis

In this part, we conducted a comprehensive analysis of nighttime natural surveillance, lighting, and nighttime economic activities areas. Through the analysis of these factors, we were able to identify three types of spaces and further highlight areas that may face greater safety risks.

Next, by overlaying these areas, we identified several blank spaces. These blank spaces refer to areas lacking effective natural surveillance, lighting, or nighttime economic activities, which often lead to increased safety risks. By superimposing these blank space layers, we were able to clearly identify the spaces that face all three of these challenges. These areas are deficient in natural surveillance, lighting, and nighttime economic activities, making them more vulnerable to safety issues.

As shown in Figure 4.3.6, we performed a grid-based analysis of these blank spaces, with each grid cell set to 25m × 25m, forming a grid map. On this map, the brown areas represent those spaces that face safety risks. Through this grid-based method, we can clearly identify which areas require more immediate safety interventions and optimization. These colored areas represent the zones that are most suitable for intervention strategies, aimed at improving the safety of these spaces through design.

Conclusion

This analysis, by evaluating nighttime natural surveillance, lighting, and nighttime economic activities, helps us identify areas lacking safety features. Through grid-based analysis, we pinpoint the areas that require priority intervention. This method allows us to effectively focus resources on regions with higher safety risks and develop targeted intervention strategies to enhance the safety and vitality of these spaces.
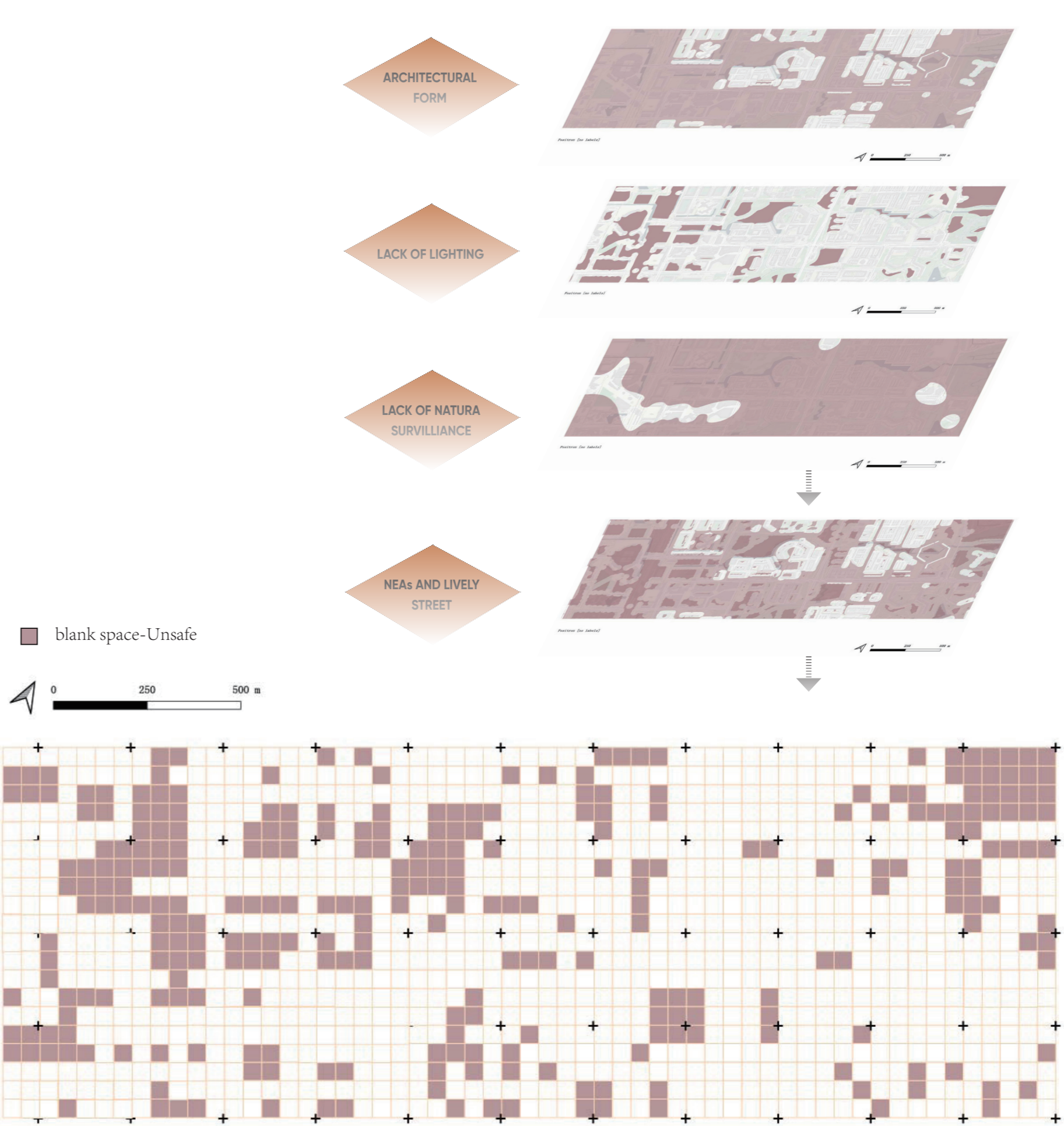

blank space-Unsafe

Figure 4.3.6 Area with safety problems
Made by Author

4.3.5 Potential： NEA clusters attracts more business

NEA Hubs' ATTRACTION

Data and Methodology

This study also analyzed nighttime economic activities across different time periods, using open-source data from OpenStreetMap (OSM). By scraping business hours and combining them with geospatial information, we were able to identify Points of Interest (POIs) that operate before and after 22:00. Specifically, we segmented POIs into two categories: those operating before 22:00(Figure 4.3.7) and those operating after 22:00(Figure 4.3.8). This approach allowed for a clear distinction between daytime and nighttime economic activities based on operating hours.

The rationale for choosing 22:00 as the dividing point is that in the Netherlands, most restaurants and general dining establishments close by this time. This hour is often considered a threshold for the transition from regular evening activities to more specialized nighttime activities, such as clubs, bars, and entertainment venues.

As shown in Figure 4.3.8, there is a noticeable sharp decline in the number of businesses still operating after 22:00. This sudden reduction indicates a significant shift in the types of businesses that remain active after this time. Specifically, businesses like restaurants and cafés, which are more common in the earlier hours, attract the majority of people before 22:00. These types of nighttime economic activities tend to have a broader appeal and attract a larger, more diverse crowd.

After 22:00, the businesses that remain operational are generally specialized venues such as nightclubs, bars, and other alcohol-serving establishments. These venues tend to attract a younger demographic and may serve more niche segments of the population. The shift from general dining establishments to more entertainment-focused venues highlights the differentiation in the type of crowd each segment attracts, contributing to a better understanding of the dynamics of nighttime economic activity.

Figure 4.3.7 Figure 4.3.8 provides an analysis of areas where various nighttime economic activities are concentrated. These concentrations are critical for identifying regions with potential investment opportunities, as businesses in these areas have shown to attract larger groups of people and generate more economic activity.

Based on interviews and insights from academic literature, commercial development in cities often exhibits a clustering tendency. The areas with a higher concentration of nighttime economic activities are more likely to continue attracting both consumers and future investments. Existing commercial hubs—especially those with a mix of restaurants, bars, and entertainment venues—will likely remain areas of investment interest in the future. This phenomenon is reflected in the geospatial data showing the investment potential of different areas in Amsterdam.

In particular, neighborhoods with a high density of nighttime economy activities before and after 22:00 offer greater opportunities for future urban development and economic growth. The clustering of these businesses creates an ecosystem where new businesses are more likely to open, and existing businesses can thrive due to the higher customer base. This concentration of businesses is often a key factor in the development of areas with strong investment potential.

Conclusion
This analysis of nighttime economic activities and business hours provides valuable insights into the dynamics of the nighttime economy in Amsterdam. By examining the correlation between operating hours, the types of businesses, and their geographic distribution, we can better understand the factors that contribute to economic vitality in urban spaces. The identification of areas with a high density of nighttime businesses offers practical insights for urban planners and potential investors. These areas, particularly those exhibiting commercial clustering, will continue to be attractive destinations for both economic growth and urban development.

This study highlights the importance of considering the temporal aspect of nighttime economic activities in understanding urban dynamics. The distinction between businesses operating before and after 22:00 offers a new perspective on how urban spaces function at night and the types of investments that could enhance the vitality and safety of these spaces.
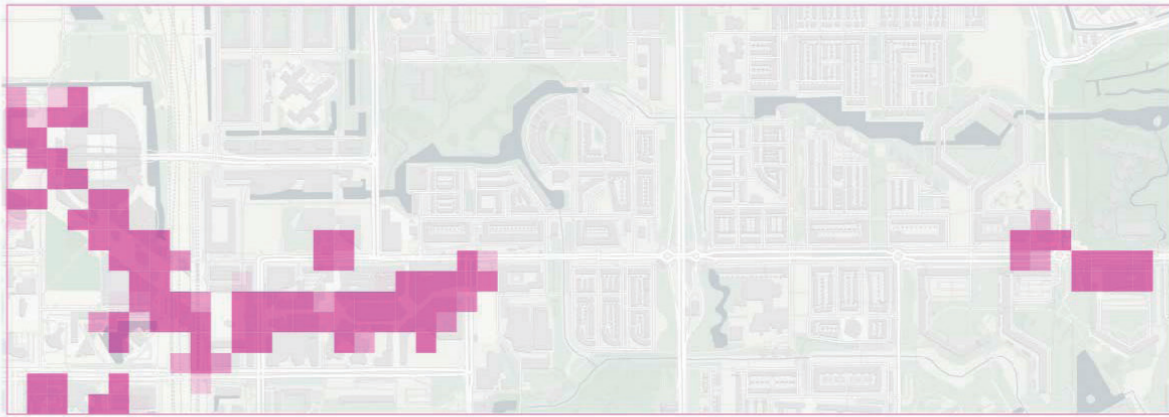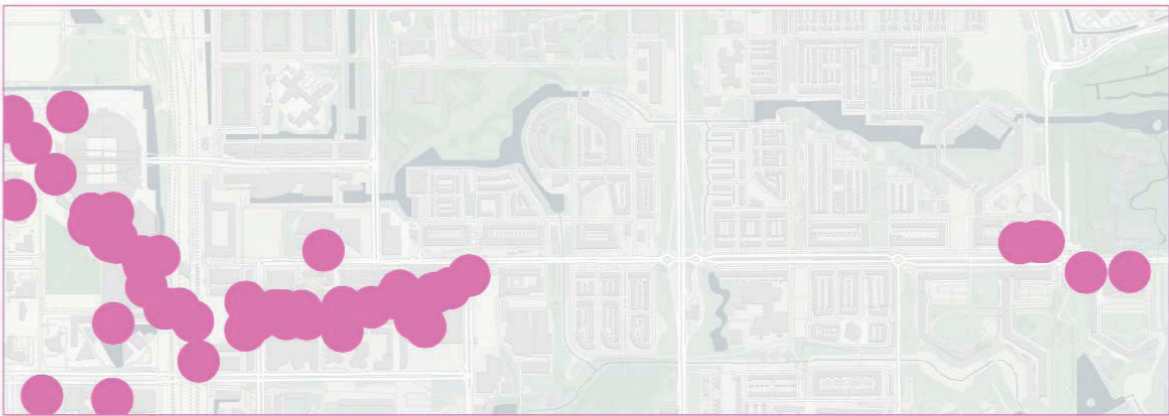

Figure 4.3.7 NEAS clusters before 22.00
Made by Author

Figure 4.3.8 NEAS clusters after 22.00
Made by Author

4.3.6 Potential: High accessibility and Spatial Accessibility Analysis: Angular Integration

HIGH ACCESSIBILITY

presents the results of a spatial accessibility analysis using theangular integration method. This analysisfocused on slow-speed transportation networks within the study area. Splocal transp that are relevantaccessibility of different roads and how well-connected they are to the surrounding urban areas.

Angular Integration is a space syntax method that measures how accessible a specific space or location is in relation to the rest of the network, particularly in terms of how well it can be reached from other locations. This method takes into account the angular distance between segments of the street network, calculating the amount of "turning" or deviation required to move from one point to another. In simpler terms, it determines how easily a particular street or area can be accessed based on the street layout and the number of turns needed to reach that location from other parts of the network. The method is particularly useful for understanding pedestrian accessibility and the movement flow of people through the urban fabric (Hillier, 1996).

By analyzing the angular integration, this steo visualize the results where darker-colored areas indicate high accessibility, meaning that these areas are easier to reach from other parts of the network. Conversely, lighter-colored areas represent low accessibility, meaning these areas are harder to reach and are more disconnected from the rest of the network.

This analysis reveals a significant correlation between high accessibility and commercial potential(Figure 4.3.10). Major streets, particularly those with high pedestrian accessibility, often develop into areas with dense commercial activity. This is because such areas naturally attract higher foot traffic, making them more attractive to businesses that thrive on large customer volumes (Jacobs, 1961).

Therefore, this analysiscan predict which areas in the city are more likely to experience higher commercial development potential in the future. Areas with better accessibility are often more conducive to business success, as they draw larger crowds and are easier for customers to reach. This predictive information can be valuable for nighttime economy operators and investors, helping them identify areas with potential for growth. Additionally, it offers valuable insights for urban planners, who can use this data to make informed decisions about where to focus efforts on improving transportation networks and fostering commercial development (Lynch, 1960).

In conclusion, the angular integration analysis not only highlights the accessibility of various roads but also provides insight into how connectivity is linked to commercial development. By identifying high-accessibility areas, this project can guide future development and ensure that nighttime economic activities are strategically placed in locations that maximize potential customer engagement and business success.

angular_integration
0 – 0.233
0.233 – 0.278
0.278 – 0.324
0.324 – 0.392
0.392 – 123

High accessibility

low accessibility

medium accessibility

Figure 4.3.9 NEAS spatial accessibility analysis using theangular integration method
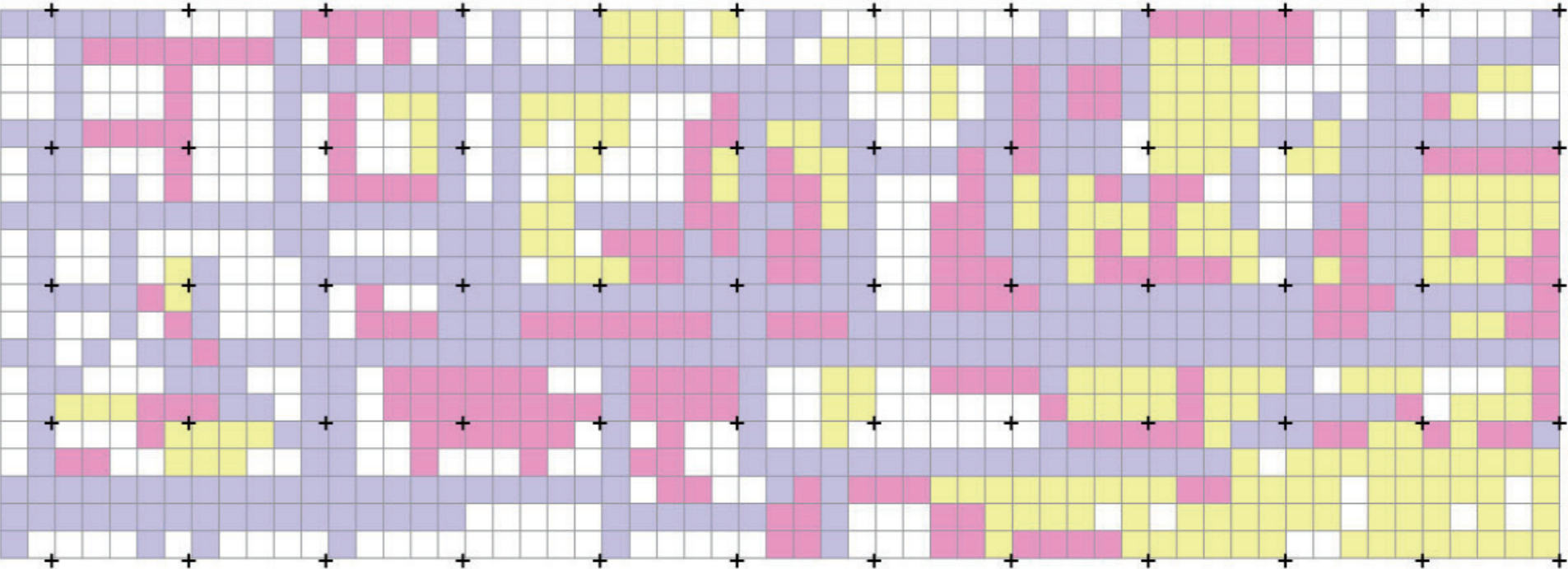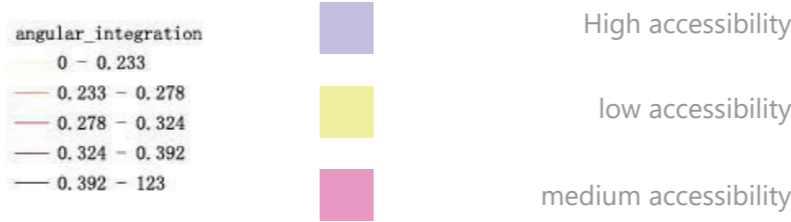Made by Author

Figure 4.3.10 accessibility
Made by Author

4.3.7 Prioritizing Intervention Zones

Spatial Analysis and Commercial Potential Mapping

In this study, two key factors influencing commercial potential were selected: transportation accessibility and the attraction of business clusters, or the commercial clustering effect. These factors were analyzed to determine which areas within the city hold the most promise for economic development, particularly in relation to nighttime economic activities.

Data Processing and Overlay

The analysis began with the grid-based processing of data. Initially, the data was transformed into a grid format, enabling a detailed spatial analysis. The next step involved overlaying business clustering areas with public transportation networks and high-accessibility areas identified through space syntax analysis. This overlay process is illustrated in the figures provided, where the areas with high concentrations of commercial activity (business clusters) are combined with transportation networks to visualize their spatial relationships.

The resulting maps are referred to as Potential Maps. Figure 4.3.10 clearly highlight areas with high commercial potential, derived from the combination of accessibility and the clustering of business activities. These regions stand out as prime candidates for investment in urban development, especially in areas where nighttime economic activities are likely to flourish. The identified zones, due to their high commercial density and excellent accessibility, are seen as key locations that could attract further development and support a vibrant nighttime economy.

This approach not only offers a clearer understanding of the spatial dynamics between commerce and accessibility but also provides a strategic framework for urban planners and investors looking to promote economic growth in targeted areas, particularly those that are conducive to the growth of nighttime economic activities.
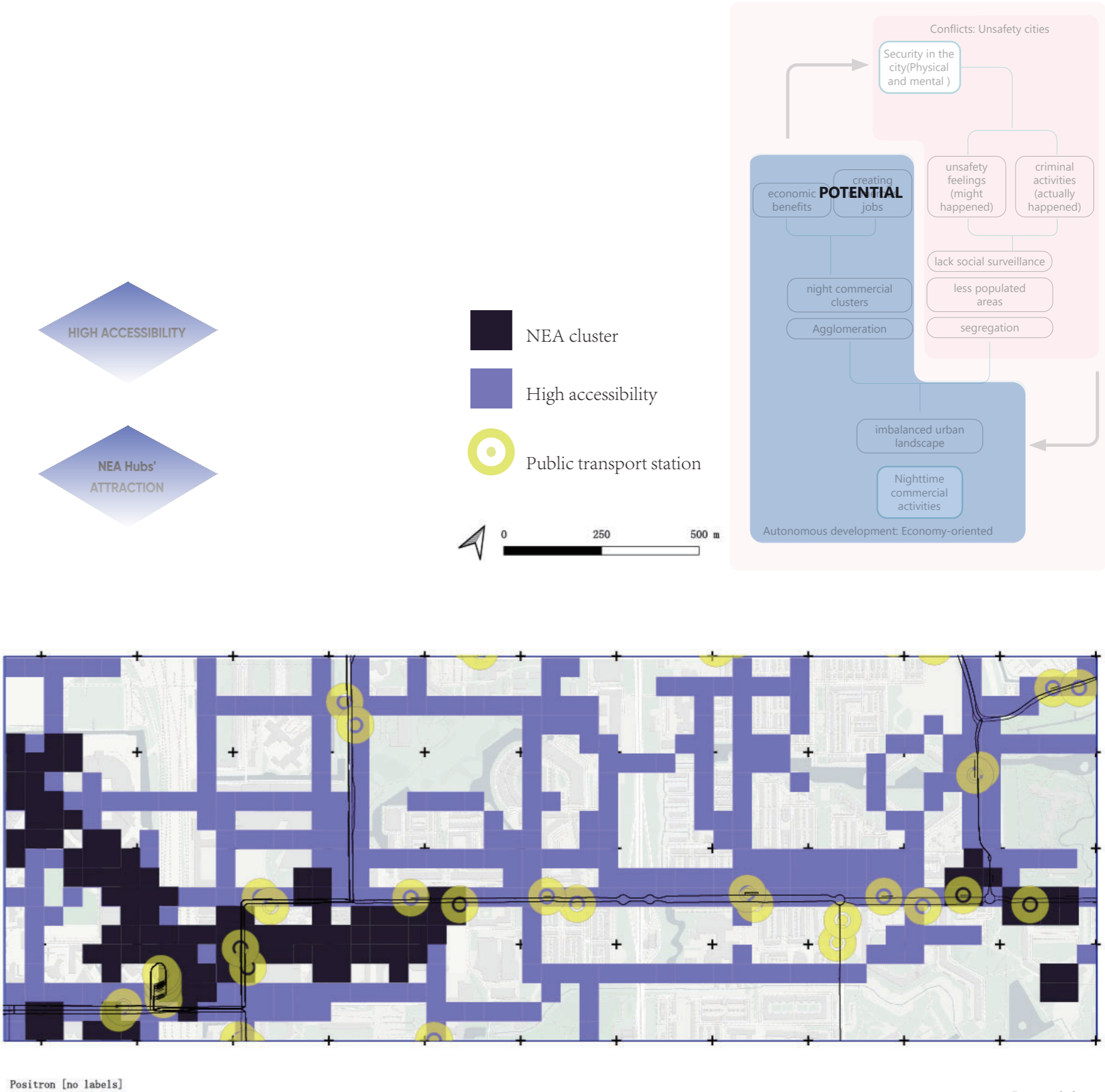

Figure 4.3.10 Potential map
Made by Author

4.4 Outcome

4.4.1 Overlaying Problem + Potential
– Identifying priority zones

In the subsequent phase of this research, the Potential Maps and Problem Maps are overlaid to reveal areas that exhibit both commercial potential and safety concerns. The Problem Maps highlight regions with high crime rates, inadequate lighting, or other safety risks, while the Potential Maps illustrate areas with strong prospects for business development. The combined analysis of these maps allows for the identification of spaces where both opportunities for economic growth and challenges related to safety coexist.

These overlapping regions present a dual challenge (Figure 4.4.1) : they hold significant potential for business development but also carry inherent risks that need to be mitigated in order to ensure sustainable growth. As such, these areas are critical focus points for urban interventions, where careful planning can address safety concerns while fostering economic vitality.

The identification of these high-priority areas, marked on the map, enables urban planners and decision-makers to strategically target interventions. By focusing efforts on these spaces, it is possible to implement urban design improvements, policy changes, and infrastructural developments that will not only enhance safety but also promote economic vibrancy. In essence, these areas represent the most optimal "spots" on the metaphorical chessboard for implementing interventions aimed at balancing economic development with safety improvements.

The combination of Potential and Problem Maps provides a valuable tool for identifying areas that require immediate attention. This spatial analysis helps urban planners prioritize their efforts, ensuring that resources are directed towards the regions with the highest potential for positive change. Targeted interventions in these areas will contribute to creating safer and more vibrant urban environments, which is vital for the success of nighttime economic activities.

Furthermore, the methodology presented can be adapted for other urban contexts, providing a framework for fostering sustainable urban development. It is crucial to engage residents and stakeholders in the decision-making process to ensure that the final design solutions meet the needs of the community. In the next phase of this project, the aim is to create a physical model that demonstrates how the chessboard game method can be used collaboratively by different stakeholders to plan the nighttime city. This model will serve as a tool to facilitate discussions and collective planning, allowing for greater audience participation and stakeholder engagement in shaping the future of urban spaces.
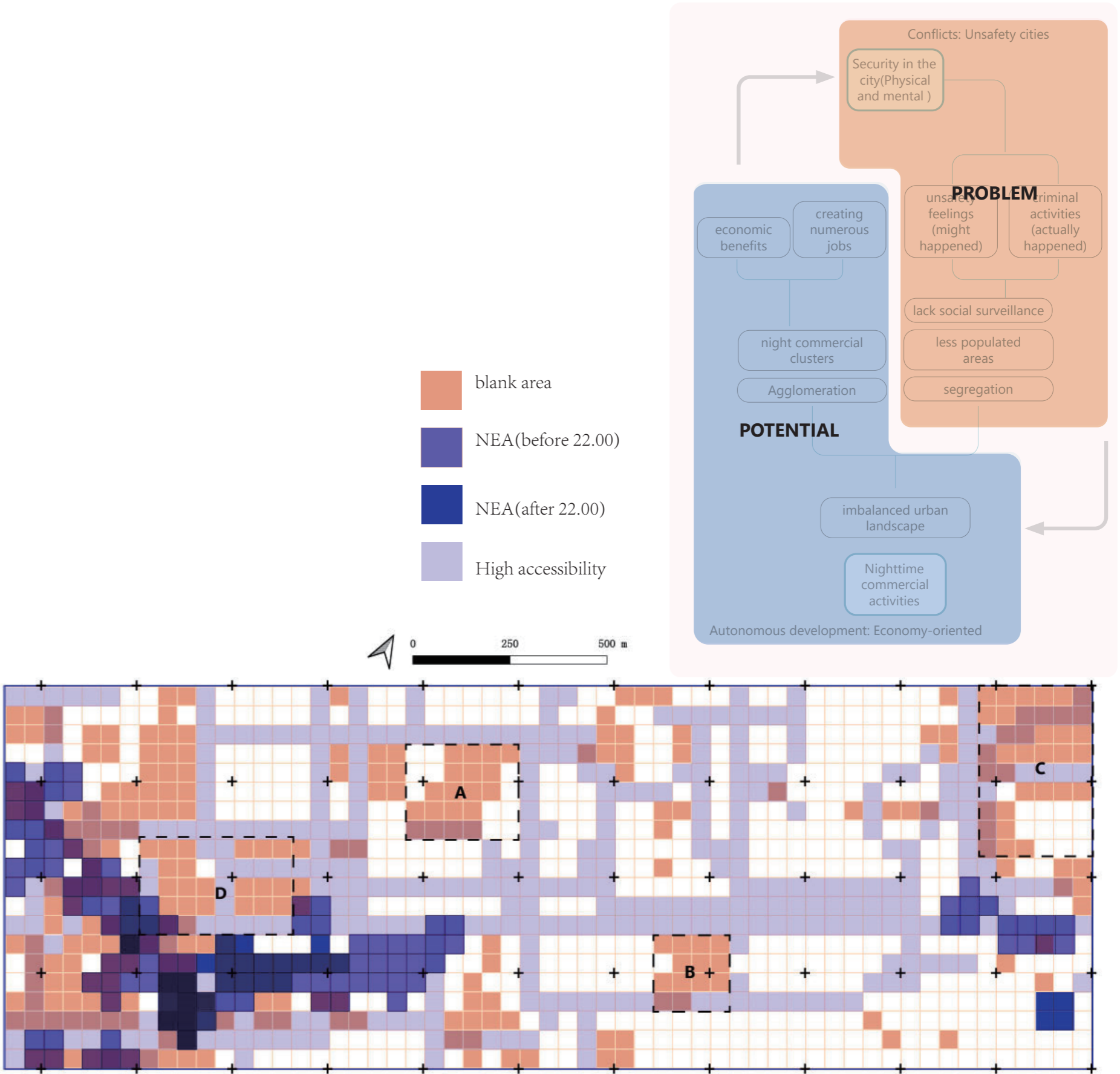

Figure 4.4.1 conclusion map
Made by Author

Figure 4.4.2 Intervention
Made by Author

A

B

C

D

0   250   500 m

4.4.2 Zone A – Detail Design Description

Figure 4.4.3 demonstrates a distinctly commercial character, with a concentration of existing businesses such as retail stores, a cinema, and a hotel. Building upon this foundation, the proposed intervention aims to enhance the nighttime economy by diversifying services, activating public space, and improving the pedestrian environment. The design strategy is articulated as follows:

First, to address the current lack of diversity in nighttime services, the proposal introduces complementary service-oriented activities, focusing on food and beverage establishments as well as wellness services such as massage. These additions aim to supplement the existing retail and entertainment offerings, creating a more comprehensive and attractive nighttime economy that encourages longer visitor stays and supports broader user needs

Second, improvements are made to the street environment and accessibility infrastructure. A new bicycle lane is added adjacent to the existing parking facilities, promoting sustainable and multimodal transport options. Simultaneously, the wide sidewalks are reprogrammed to incorporate additional spaces for outdoor seating and public use—such as terraces for dining and informal gathering—thus enhancing the vibrancy and social function of the street in evening hours.

Third, to improve safety and comfort during nighttime, the design addresses the insufficient pedestrian lighting observed in the current condition. Additional lighting installations are placed along sidewalks, with particular emphasis on areas of high foot traffic and designated public activity zones. These measures aim to foster a sense of security, encourage nighttime use, and ensure that pedestrian spaces remain inviting after dark.

Figure 4.4.3 Detail of Area a
Made by Author

4.4.3 Zone B – Detail Design Description

As shown in the Figure 4.4.4, the before-and-after scenario in area B demonstrates several key changes aimed at improving safety and functionality. The first improvement involves the addition of clear signage, which is crucial for guiding movement and ensuring a sense of order in the space. Effective signage not only aids navigation but also signals that the area is well-maintained and cared for, which can positively influence the perception of safety (Blaker & Poort, n.d.).

The second change is the creation of spaces that encourage people to linger, in line with Gehl's theory on public life. These "areas of stay" include benches, plazas, and small cafes, which provide opportunities for social interaction and enhance the vibrancy of the space. As more people engage in these spaces, natural surveillance increases, contributing to a safer environment.

The third improvement focuses on accessibility, particularly through the addition of bike lanes and public transport stations. These infrastructure improvements make the area more connected and accessible, which in turn increases foot traffic and encourages more people to use the space. This can also foster a safer environment by ensuring that the area remains active and visible.

Finally, the addition of various activities—such as small restaurants, a supermarket, and a gym—supports the development of a more dynamic and inclusive neighborhood. These activities cater to the daily needs of the community, offering quieter, more routine options that are in harmony with the primarily residential nature of the area. By attracting local residents and encouraging regular activity, these businesses help to maintain a balance between safety and economic vitality, creating a more secure and sustainable environment for all users.

Figure 4.4.4 Detail of Area B
Made by Author

5 CONCLUSION & REFLECTION

5.1 Conclusion

This project aimed to explore the relationship between nighttime economic activities and public safety in urban spaces, particularly focusing on the Bijlmermeer district in Amsterdam. Through the combination of spatial analysis, data-driven insights, and stakeholder engagement, the project has highlighted how urban design and economic activity intersect to shape perceptions of safety and contribute to the overall vibrancy of urban environments.

Key findings from the analysis suggest that certain types of nighttime economy activities, such as restaurants, cafés, and gyms, are positively correlated with perceptions of safety, while activities like nightclubs and alcohol-serving venues may contribute to a feeling of unsafe spaces. Additionally, factors such as building facades, transportation networks, and the presence of people (e.g., residents and workers) were found to play a critical role in enhancing or diminishing safety in these areas.

The integration of angular integration and commercial clustering analyses with safety perception mapping has provided valuable insights into which areas of the city hold the most promise for economic growth and safety improvement. By creating Potential Maps and Problem Maps, this project offers a tool for identifying areas that require targeted urban interventions to improve both safety and commercial vitality.

Furthermore, the introduction of the chessboard game model provides an innovative method for stakeholders, including nighttime business owners, residents, and urban planners, to collaboratively design safer and more vibrant nighttime urban spaces. By incorporating different stakeholders' perspectives, the project underscores the importance of community involvement in shaping the future of the nighttime economy.

In conclusion, this research not only offers a framework for analyzing the impact of nighttime activities on urban safety but also provides actionable insights for creating more inclusive, safe, and dynamic urban environments. By leveraging the intersection of spatial data, economic activity, and public safety considerations, this project contributes to the broader discussion on how cities can design for both economic prosperity and public well-being.

5.2 Reflection

1. Relevance to the society

The central theme of my graduation project is the interplay between nighttime economic activities and public safety in urban areas. As our cities never sleep, understanding what kinds of nighttime activities contribute to safety—or the lack thereof—is an essential societal question. However, a critical reflection on my work reveals an oversight: insufficient attention to social diversity, particularly regarding age, rac

While my data analysis mainly reflected the interests and behaviors of young people—who are the primary participants in nightlife—it neglected older residents. Interviews and city survey data suggest that older individuals often perceive nightlife as a source of nuisance, primarily due to noise and light pollution. These groups may feel excluded or even threatened by nighttime urban environments. Their views and lived experiences deserve equal attention in urban planning discourse. Similarly, different cultural and racial groups engage with nightlife in ways shaped by their backgrounds. For instance, bars, discos, and clubs have roots in Western cultural paradigms, and not every ethnic group embraces these spaces equally or comfortably.

Another underrepresented dimension is gender. Most public safety datasets categorize gender in a binary framework, leaving out non-binary and LGBTQ+ identities. This limitation reduces the inclusivity of urban analysis. Safety concerns, especially at night, are deeply personal and influenced by identity—often intersecting with race, gender, and socio-economic status. By ignoring these nuances, the findings risk reproducing an incomplete picture of urban nightlife.

2. Relevance to the Profession of Urbanism

From a professional perspective, this project reflects a broader disciplinary shift: integrating qualitative and quantitative methodologies within urban research. Traditionally, Urbanism has emphasized design, spatial theory, and visual mapping. However, increasingly, data-driven approaches are becoming indispensable. In my project, I experimented with spatial regression models, GIS-based mapping of POIs (Points of Interest), and neighborhood-level statistical analysis. These tools enabled a systematic examination of where and when people feel unsafe, and how these perceptions align with urban form and economic activity.

Yet, as I delved deeper into data, I also realized a professional dilemma: the more variables I introduced to increase robustness, the more uncertainty emerged. Spurious correlations became an issue. Was higher nighttime activity correlated with crime because of causation— or simply co-location? This led me to the realization that correlation is not causation. Data analysis, while powerful, is not omniscient. It requires constant cross-checking with theoretical models and, perhaps more importantly, with people's lived experiences.

Furthermore, established theories in Urbanism, such as Jane Jacobs' "eyes on the street," were both helpful and limiting. While they provide a conceptual direction, applying them mechanically to every context is flawed. Not all street activity enhances safety; not all public visibility discourages crime. For example, my data showed that in certain clubbing zones, despite high foot traffic, safety perceptions were low—often due to alcohol-induced aggression or lack of public transport at night. This suggests that theory must always be tested against localized data, not simply assumed to hold true.

3. Scientific Framework

In terms of methodology, I aimed to combine a scientific framework with empirical validation. I used survey results to understand subjective safety perceptions, spatial-temporal POI data to analyze activity patterns, and regression models to identify correlations with demographic and socio-economic covariates.

However, I began to see cracks in the "data objectivity" narrative. For example, some

responses in the questionnaires were likely biased by participants' recent personal experiences. Others may have misinterpreted the questions. Additionally, large-scale data extracted from open sources (e.g., Google Maps POIs, crime reports) is often patchy, outdated, or skewed. Particularly post-COVID, the pandemic has significantly altered nightlife habits. Data from 2019, for example, may no longer accurately reflect current patterns. Thus, I learned to treat all data—quantitative or qualitative— with a degree of skepticism.

Moreover, I came to appreciate that no method is inherently superior. Big data might offer scale, but interviews offer depth. Theory offers structure, but local narratives offer insight. As an urban researcher, learning to navigate among these tools, rather than worshiping one, is crucial.

4. Personal Reflection and Process

One of the biggest lessons from this project was in project management. I underestimated how much time would be consumed by data collection, cleaning, and statistical modeling. This left less time for synthesizing results into a clear urban strategy. At times, I was too absorbed in running regressions or checking for multicollinearity, and forgot to ask the bigger questions: What am I trying to argue? How do these numbers feed into a story? I learned that data analysis should not be an end, but a means.

I also confronted my own biases as a researcher. Initially, I assumed nightlife had an inherently positive effect on urban vitality. But conversations with older residents, Muslim women, or queer individuals painted a more complex picture. For some, nightlife is freeing. For others, it's dangerous or exclusionary. This taught me that even the "coolest" urban strategies must be filtered through inclusivity and empathy.

5. Growth and Skills

Before this project, I had only basic GIS and no experience with statistical software. Now, I can run regression models, handle spatial data, and clean large datasets. More importantly, I have learned to approach urban phenomena from a systems perspective—balancing micro-level detail with macro-level patterns.

I can now engage with urban safety not just as a design problem, but as a multi-dimensional challenge involving economics, psychology, and cultural values. I also developed a more critical eye for methodologies. Whether it's a seemingly clean correlation in a chart, or a beautiful diagram of urban flows, I now ask: Who is missing from this picture? What assumptions are being made? These questions are what will shape me as a better urbanist.
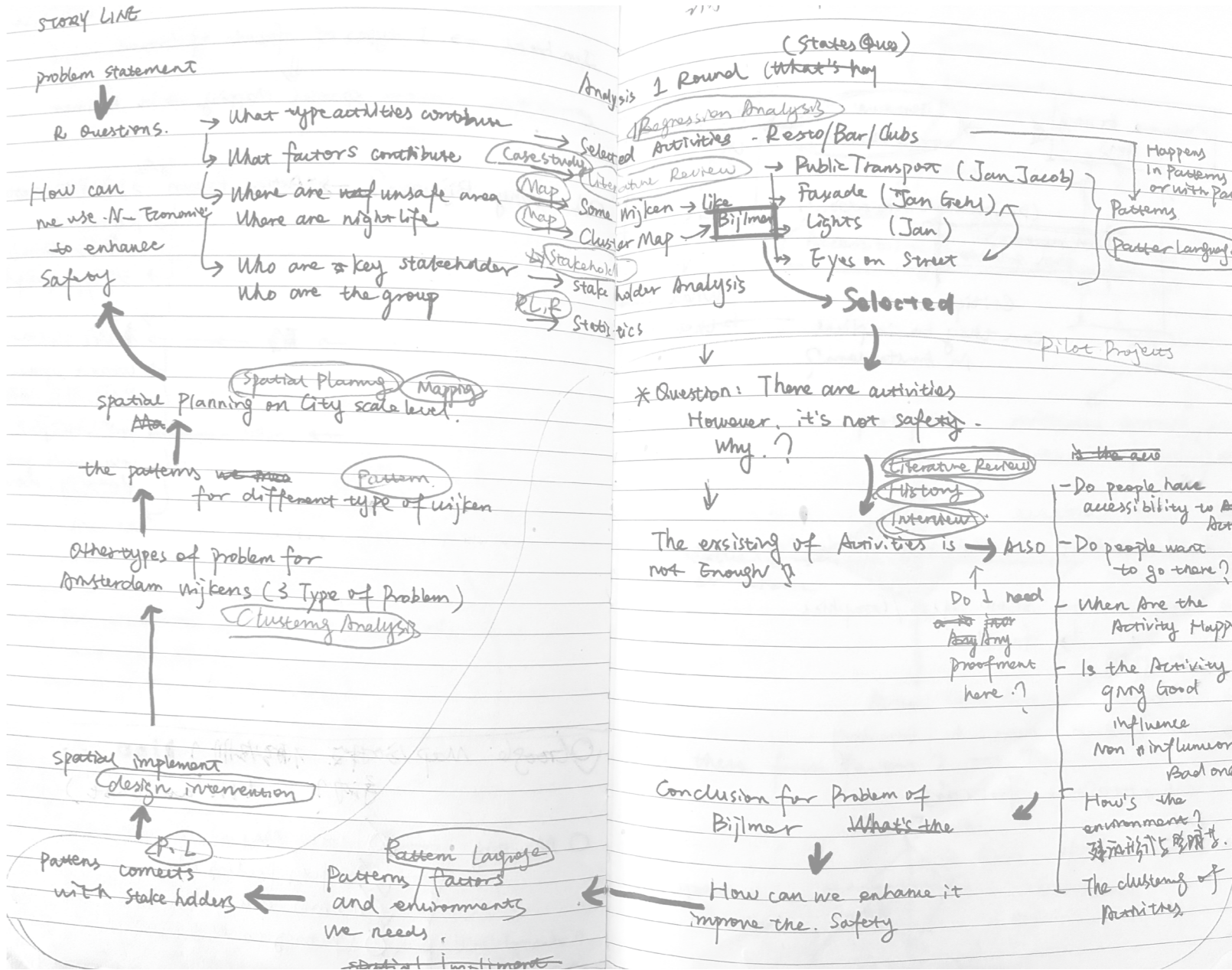
6. Final Thoughts

In sum, this project was as much about learning methods as it was about unlearning assumptions. I came into it seeking answers—what kinds of nightlife improve safety? Where are the dangerous zones? But I leave with more nuanced questions: Why do some people feel unsafe even in busy places? How do race, gender, and age complicate the notion of "safety"? And perhaps most importantly: Who gets to decide what counts as safe or vibrant nightlife?

The urban night is messy, contested, and rich with meaning. My work only scratches the surface, but it has equipped me with the tools—and humility—to keep exploring.

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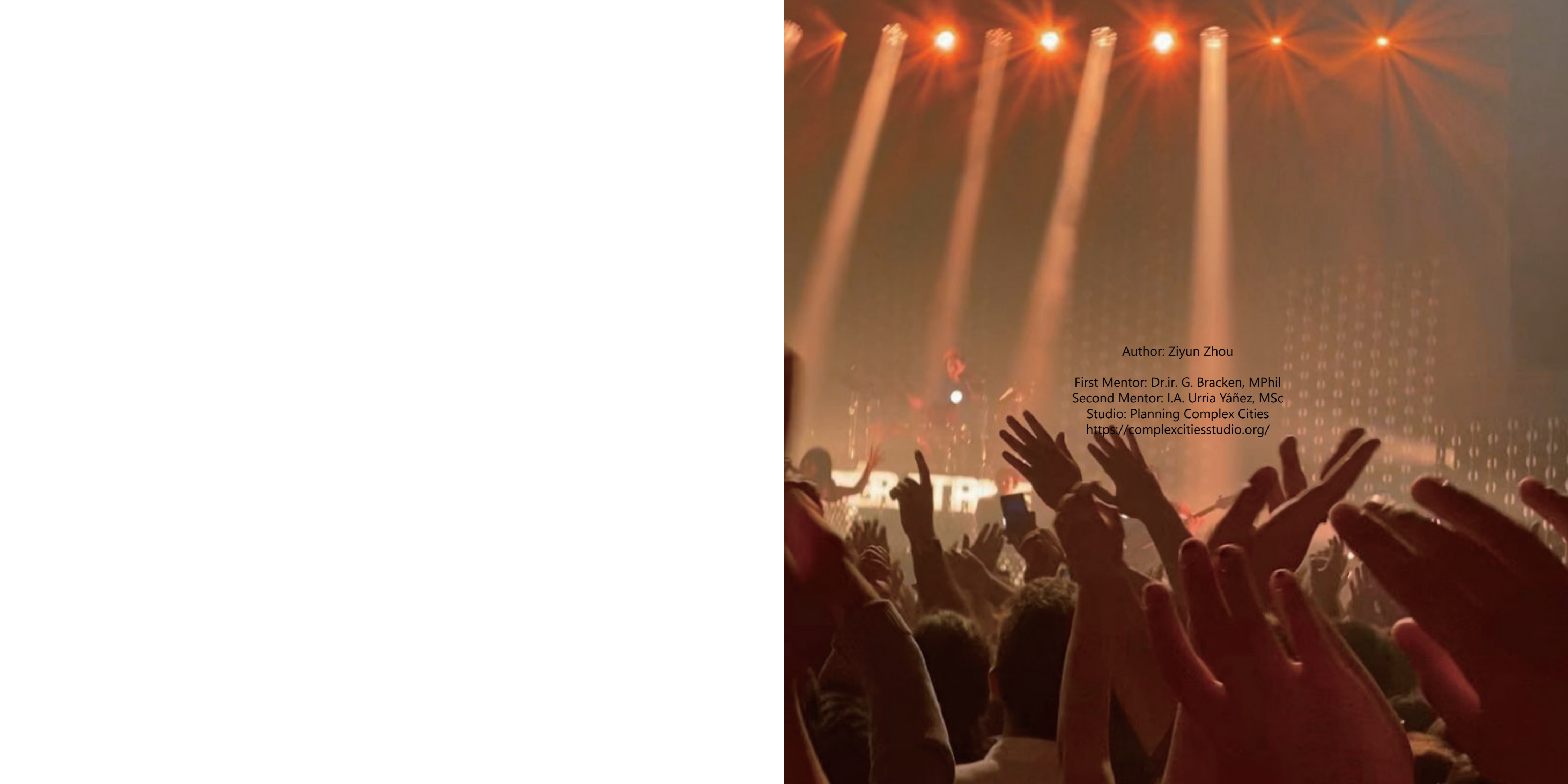Wang, X., Zhang, L., & Xu, Y. (2024). Analyzing temporal income segregation and its spatial variations in Guangzhou. Scientific Reports, 14, 217–230. https://www.nature.com/articles/s41599-024-02833-9

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