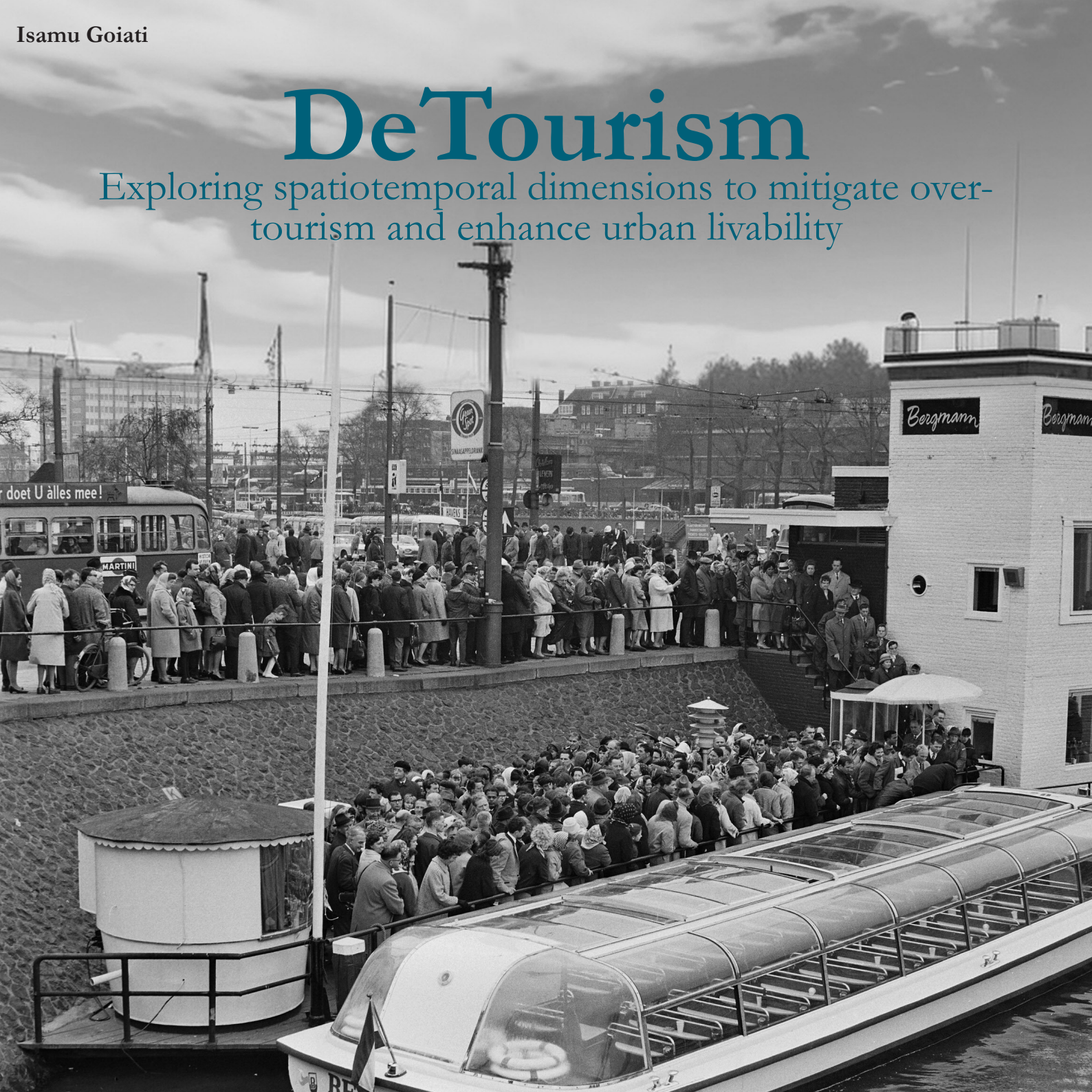
Isamu Goiati

DeTourism

Exploring spatiotemporal dimensions to mitigate over-tourism and enhance urban livability



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Acknowledgments

The thesis *DeTourism* represents the summit of an academic year dedicated to exploring the intersections of urbanism, data science, and tourism. As the final step in my academic journey, it reflects not only the research I have conducted but also how I have grown and specialised as an urbanist.

First and foremost, I would like to express my sincere gratitude to my mentors, Claudiu Forgaci and Achilleas Psyllidis. Thank you for your guidance, your thoughtful questions, and the critical lens you brought to every discussion. Your feedback did more than strengthen my project, it opened new directions in my thinking and personal development. I deeply appreciate the way you mentored me: giving me space to explore independently, while offering strategic insights that helped me reflect, challenge myself, and move forward with clarity.

I am equally thankful to the many teachers and fellow students who accompanied me throughout not only this master's program, but my entire eight-year academic journey. I began in 2017 with the ambition to become an architect, then found myself inspired by the broader perspective of urbanism, eventually discovering the world of data science and with it, the aspiration to meaningfully connect these disciplines. Your lessons, encouragement, curiosity, and conversations have shaped me, both as a designer and as a person. The knowledge and support you offered have all contributed to the realisation of this project.

Finally, to my friends and family, thank you for being there. Your support, whether through a motivating word or a critical question, helped me stay grounded and continue pushing forward. I am truly grateful.

One of the amazing experiences in my academic journey, teaching students in Nakuru, Kenya about Data Science.

Content

Abstract

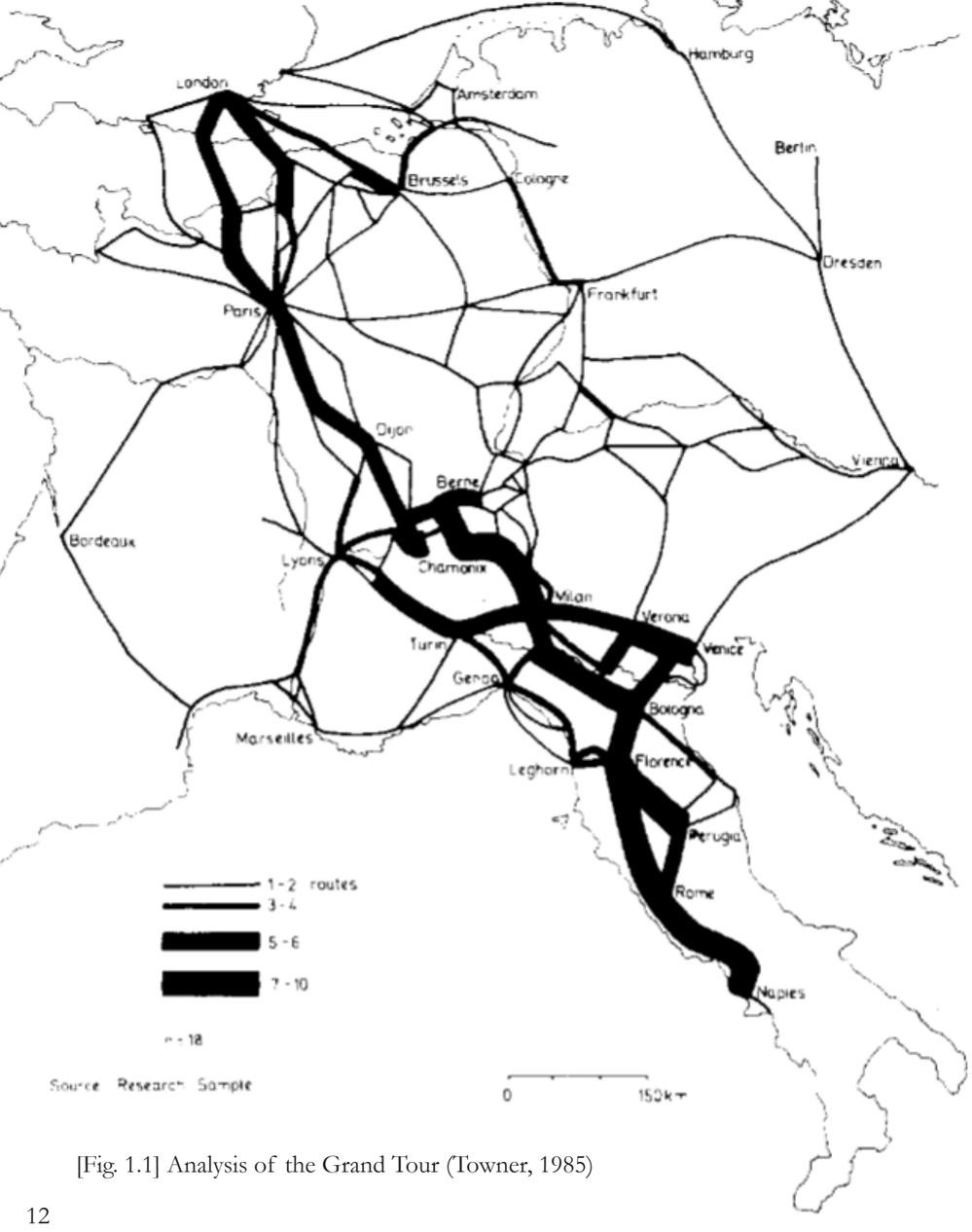
Amsterdam is increasingly confronted with the challenges of overtourism, where the influx of visitors exceeds the city's capacity to accommodate them without negatively impacting liveability. This thesis addresses the urgent need for a spatial and systemic response to overtourism by exploring how spatiotemporal and morphological urban data can inform new tourism strategies. Central to the research is the development of a novel method to measure tourist pressure using publicly accessible data from Google Maps—specifically, review counts and Popular Times data. These digital traces were processed to generate a continuous, time-based pressure metric, allowing for the spatial and temporal mapping of tourism flows across the city.

The analysis identified not only when and where tourism pressure is concentrated, but also how the urban environment mediates its effects. Spatial hotspots such as the city centre, Museumplein, and Vondelpark showed consistently high pressure, particularly in the evenings and weekends. Morphological and network analyses further revealed that certain neighbourhoods, despite being well-connected or underutilised, remain largely excluded from the tourism system. Indicators such as Angular Choice (space syntax), Floor Space Index (FSI), Ground Space Index (GSI), and Mixed-use Index (MXI) were used to assess urban capacity, and a moderation analysis showed how built form characteristics influence the relationship between tourist pressure and perceived nuisance.

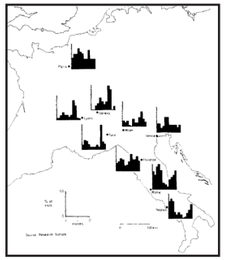
Building on these insights, the thesis introduces the "DeTour" strategy—a spatial corridor linking three underutilised but well-connected urban cores: Sloterdijk, Zuidas, and Bijlmer ArenA. These areas were selected based on their existing hotel infrastructure, high network capacity, and potential for spatial development without displacing residential life. The strategy reinterprets Amsterdam's multi-core vision, offering a phased and grounded alternative that redistributes flows through a network of interconnected nodes and transitions. Spatial designs for key areas demonstrate how these interventions can enhance tourist experience while strengthening local liveability.

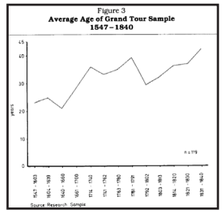
Ultimately, the thesis shows how integrating data science with urban design can yield actionable strategies for cities grappling with overtourism. The methodology developed is not only transparent and reproducible but also adaptable to other urban contexts, contributing both to academic discourse and to practical planning efforts aimed at creating more balanced and resilient urban environments.

1. Context



[Fig. 1.1] Analysis of the Grand Tour (Towner, 1985)





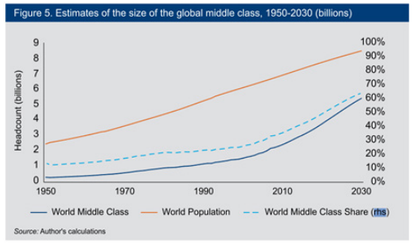
1. Context

Globalised tourism

Its in our essence to explore, it might be the thing that made us human. Never before have we as humans been able to explore as easily and much as now. Technological revolutions have brought us to a point where seeing the world has become easier than it has ever been. The origins of modern tourism can be linked to the custom called the “Grand Tour”. It is a frequently cited phase in the history of tourism and emerged in the 17th and 18th centuries (Burkart and Medlik 1974; Pearce 1982; Robinson 1976; Turner and Ash 1975). Wealthy European men would, as part of their education, visit cultural centres such as Paris, Rome, Venice and Florence (Towner, 1985). However, forms of tourism existed even earlier. In ancient civilizations such as Egypt, Greece, and Rome, wealthy individuals travelled for leisure, religious pilgrimages, or to attend events like the Olympic Games (Casson, 1994).

The ancient Romans, in particular, built a network of roads, making travel more accessible. Improving accessibility has been key in the process of making tourism more accessible. This focuses on both the mobility and financial aspect. Improved modes of transportation gave us quicker and more affordable ways to get to places, making traveling accessible for larger groups of people. The “regular” western people could travel to places for affordable prices with comfortable ways of transportations that didn’t take too much time. Especially the big commercialization of the air industry brought traveling to the big audience. Over the last 20 years the amount of passengers have increased from almost 2 billion to 5 billion (Statista, 2024). The amount of passengers have more than doubled, and so has the global middle class in the same time period, according to a recent report by the Brookings Institution (Kharas, 2017). The report indicated that today, looking to the future, the middleclass is set to grow by 160 million people per year on average through 2030 (Kharas, 2017). Nearly 90% of the next 1 billion entrants are expected to come from Asia, with the majority (78%) originating from India and China(Kharas, 2017).

The travelling class, consumers with sufficient disposable income to undertake leisure travel, will account for 21% of the global population in 2024. By 2030 and 2050, this audience is expected to grow significantly to 24% and 33% of the global population which presents huge opportunities for tourism growth (Tourism Economics, 2024).



[Fig. 1.2] Estimation of global middle class (Kharas, 2017)

A large part of this tourism focuses itself on popular locations. Popular travel spots do tend to experience a larger increase in visitors compared to less popular locations, which often leads to overtourism. Factors like social media visibility, better infrastructure, and concentrated tourism promotions contribute to this trend.
As demand for popular destinations surges, especially post-pandemic, it leads to overcrowding and places significant strain on local communities and environments(Cheer & Novelli, 2023).

And although these problems, caused by tourism, are well known by destinations, they lack control over the amount of tourist arrivals. They usually have no control over transportation facilities, in particular, airports and cruise ports. For example, many airports and most cruise ports are nationally or privately controlled and therefore the destination does not have control over when, how and how many people, boats and planes arrive through these entry points. Also highways and roads that lead to destinations are often not municipally controlled but are under federal or national jurisdiction, and therefore destinations cannot limit the number of people who wish to drive to that location. Many of the cities, islands, ski resorts and other destinations that are facing overtourism issues have tourists arriving via multiple transportation modes. This can cause major issues in terms of managing the flow of people (Dodds & Butler, 2019).

[Fig. 1.3] Multiple images from CNN article on Overtourism (Blane Bachelor, 2025)

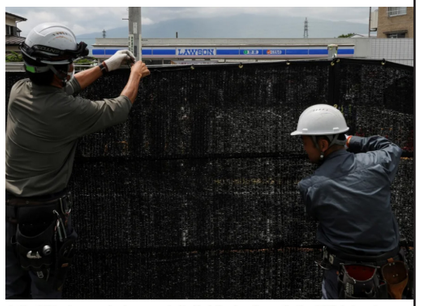
Overtourism was the buzzword of 2024. This summer looks to be just as crowded and chaotic

CNN

BLANE BACHELOR, CNN

January 15, 2025 at 1:23 PM

Venice has introduced an access fee for peak-season visitors. It's next due to be enforced over the 2025 Easter break. Andrea Merola/EPA-EFE/Shutterstock



In May 2024, a temporary barrier was erected to block the view of a popular Mount Fuji photo spot, near a convenience store in the town of Fujikawaguchiko in Japan's Yamanashi prefecture. Kim Kyung-Hoon/Reuters

Portugal saw a 26% increase in visitors in 2024. The Baixa district of Lisbon is pictured. Jorge Mantilla/NurPhoto/Getty Images

Tourism in Amsterdam

Amsterdam is a prominent example of a city experiencing this challenge of over-tourism. Iconic locations are attracting an increasingly large number of tourists, which contributes to congestion, environmental damage, and diminished quality of life for local residents. This phenomenon has only intensified as global travel has rebounded following the pandemic, with international travel and tourism spending on a rapid growth trajectory. Tourism numbers are expected to continue growing significantly in the coming years, driven by increasing global mobility and a rising demand for unique travel experiences (Tufft et al., 2024).

This growing impact of tourism heavily affects the livability in neighbourhoods. It doesn't only translates itself into overcrowded spaces, but also in changes in local economies within neighbourhoods (Het Is Genoeg, 2023). The growing impact of tourism on the city have led to large irritations for local residents, this hasn't gone unnoticed by authorities. The municipality of Amsterdam is implementing various measurements and the Dutch government has responded to this by setting a limit of 20 million touristic overnight stays. Despite these acts, the amount of overnight stays in 2023 were 22,1 million, and this number only seems to increase in 2024 (David Hielkema, 2024). This problem of overtourism appears to be getting worse, resulting into protests as seen on the image.

[Fig. 1.4] Protest against tourism
(Het Parool, 2024)

Amsterdam 2050

Amsterdam envisions becoming a sustainable, inclusive, and thriving metropolis by 2050, balancing growth with environmental and social well-being. The city seeks to enhance its unique urban character while accommodating 250,000 new residents and fostering economic opportunities. Amsterdam's strategic approach involves densification within existing boundaries, rigorous greening, and fostering community engagement, all while navigating limited resources and spatial constraints (Amsterdam Municipality, 2021).

Key challenges include managing rapid urbanisation, mitigating the impacts of climate change, and addressing housing shortages and rising costs. It is also a major challenge to maintain quality of life for residents amidst increased internationalisation and tourism. Balancing the economic benefits of tourism with its social and environmental costs will remain a complex task. The city must adapt itself to the changing patterns of tourism, taking the benefits and keeping out the repercussions (Amsterdam Municipality, 2021).

[Fig. 1.5] Amsterdam Skyline (Amsterdam Municipality, 2021)

2. Problematisation

2. Problematisation

The issue with controlling Overtourism

Cities worldwide are dealing with overtourism. Overtourism addresses the problem of excessive tourism development and governance failures (Cheer & Novelli, 2023). Worldwide cities have been taking countless measurements to control this phenomenon, where the pressure from tourist presence exceeds whats seen as acceptable, to the point where demarketing has become part of the measurements (Amsterdam Municipality, 2022). Demarketing is any attempt that is made to discourage consumers from a particular product/destination. Although heavily utilised by cities, research shows that these attempts are often falling short in mitigating overtourism (Gülşen et al., 2021).

Although there being evidence of it not working, there is stil the focus on managing symptoms rather than addressing systemic drivers, also in the city of Amsterdam. Measurements like earlier closing times and crowdmanagement are an example of this (Amsterdam Municipality, 2022). Overtourism is arguably a social phenomenon too. In different places the socially accepted amount of tourism can differ a lot. This suggests that cultural expectations of personal space and expectations of exclusivity differ (Cheer & Novelli, 2023).

It shows that the complexity of the subject and the misunderstanding of tourist behaviour is causing the city to fail in understanding this phenomenon of overtourism. With the rising number of tourists this is a problem growing in its impact. The municipality of Amsterdam has produced several reports detailing its efforts to address the challenges of overtourism (Amsterdam Municipality, 2021, 2022, 2023, 2024). The efforts by the municipality of Amsterdam vary in scope and focus, but they converge in their need for a more holistic, systemic, and spatiotemporal approach. These measures frequently fall short of addressing the root causes of overtourism, as they fail to incorporate a holistic understanding of the interconnected factors driving tourist pressures.

Cheer & Novelli (2023) mention that ignoring historical precedents that have led to the current predicament of overtourism and pinning this on oversimplified prescriptions abandons any chance of more sustainable and equitable tourism futures. An holistic and systemic approach is needed that accepts the complexity of tourist flows in Amsterdam, identifying patterns of overuse, and suggesting strategies for redefining the system to reshape activity across the city space and time.

Despite attempts, there is no understanding of the complex tourism situation in Amsterdam, and the current approach is not able to grasp it. This is leading to failed measurements and growing overtourism related problems.

[Fig. 2.1] Amsterdam launches stay away ad campaign targeting young British men (Anna Holligan, 2023)

The Digital Era of Tourism

Tourism is rapidly transitioning, the digital era we are in is changing how destinations are experienced and managed. Travelers are increasingly turning to online reviews and recommendations to plan trips (Zhang et al., 2009). At the same time, tourists leave behind vast amounts of digital footprints, creating opportunities for data-driven insights into their behaviour. This shift demands innovative approaches to tourism management that embrace big data and analytics. The digital era not only enables more precise monitoring of tourism flows but also presents important challenges in privacy, data access, and the ethical use of information.

Big data offers new opportunities in tourism research by providing high spatial and temporal data that make it possible to analyse the spatiotemporal patterns of a large numbers of tourists (Salas-Olmedo et al., 2018). Zelenka & Kacetl (2014) describe that to apply the concept of carrying capacity correctly and efficiently it is useful to perceive tourism impacts as a time-space variable. Therefore, utilising spatiotemporal data could be an useful tool for understanding the connection between tourists and their environment.

Big data supplies a large quantity of information to complement the traditional sources. In contrast to statistical data, big data offers information of a different nature and can be explored to complement statistical data. Big data indicators capture social attractiveness (Schuh et al., 2020). Tourists leave a digital “footprint” in most of their activities, and these new data sources now make it possible to analyse tourists’ behaviour in the cities they visit (Salas-Olmedo et al., 2018). Media that allow web crawling of user posts can lead to new understanding of tourist travel choice dynamics (Schmöcker, 2021). It is argued that the estimation of city tourism flows is a research area deserving more attention not just from a tourist management point of view but from an overall, city level travel demand estimation point of view (Schmöcker, 2021). There are fundamental differences with respect to demand dynamics and decision-making aspects between resident flows and visitor flows.

Since the presence of tourists is a major issue, spatiotemporal data that shows when and where tourists move to can provide useful insights. The municipality of Amsterdam has made use of reviews from TripAdvisor to measure popularity of tourist attractions, but this has not been utilised in a spatial or temporal way (Amsterdam Municipality, 2023).

Google Maps also provides reviews, connected to places and showing when the review was made. Another promising data source is Google Popular Times, showing the busyness in a certain place. These data sources can provide insights on the dynamics of tourists within the city. The Google Maps application is widely used across the world and across demographics, with more than 2 billion monthly users (Abner Li, 2024; Pawar, 2024). It is a widely utilised source making it valuable for academic research. Google Popular Times data matches theoretical and logical assumptions to a high degree. Thus, the data source is potentially powerful for providing valuable information (Möhring et al., 2020). This lack of research with this data source is somewhat surprising given the usefulness of the prediction of consumer behavior in relation to places, the number of visitors and visit duration for tourism research and practice (Möhring et al., 2020).

As mentioned earlier in the thesis the digitalisation of tourist activities has brought a potential way to better understand tourists flows, therefore this thesis will contribute to the research area of tourists flows. Various new data sources have been noted that can support this task, but all have challenges to convert the information into flow estimates.(Schmöcker, 2021).

The digitalisation of tourism brings opportunities to better understand how tourists use the city, specifically through Google Maps data sources. They leave traces in the form of reviews and by sharing the geographic location from their mobile devices. The challenge lies in converting these sources into insightful spatiotemporal data.

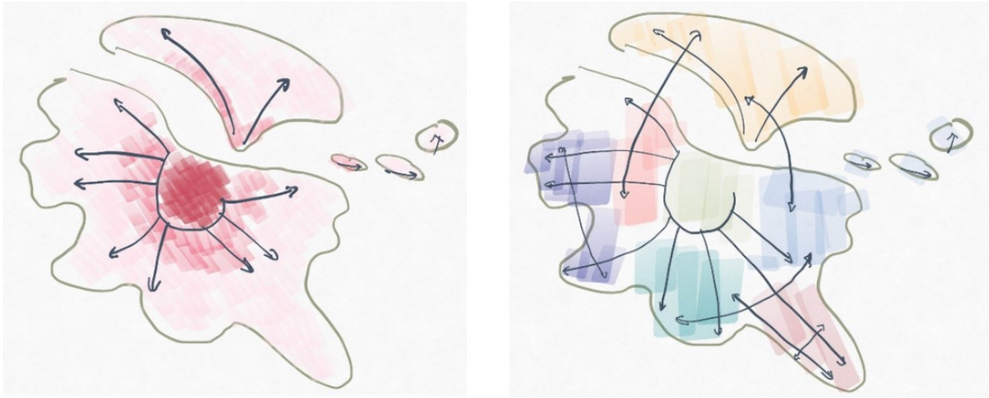
Metropolitan Amsterdam

Spots of overtourism are pain points asking for relief. The city of Amsterdam is aware of the need of spreading tourists and connects this to one of the five strategic choices of their 2050 vision. In Amsterdam 2050 Masterplan it is mentioned that the city wants to focus on multi-core urbanisation. Multi-core urbanisation also involves a distribution of facilities and institutions with an urban and regional appearance (Amsterdam Municipality, 2021). ArenAPoort, Buikslotermeerplein, Sloterdijk-Centrum, Osdorpplein and Zuidas will be places with urban significance and metropolitan facilities (Amsterdam Municipality, 2022).

Amsterdam Municipality (2022) also mentions in the Nota Overtourism: “These places become interesting for leisure facilities (and therefore visitors) if they have a distinctive image, an attractive urban environment, a range of accommodation and good accessibility and findability. The areas differ greatly in character and in phase of development.”

Although the realisation of a strategy is present, the municipality does not mention further plans. The prior information showed that working with the complexity of tourism requires a thought-through case specific approach. Therefore, there is a clear need for a strategy that is grounded in a deep understanding of the tourist system in the city. Such a strategy should be carefully tailored to account for both the fixed nature of the urban fabric, and the effects of it on overtourism, and the fluctuating patterns of tourist activity.

Amsterdam is aiming to transform its tourism system as part of a broader multi-core urban strategy. The vision promotes a more balanced spatial distribution of visitors, but a concrete plan on how this strategy could effectively mitigate overtourism is still lacking.



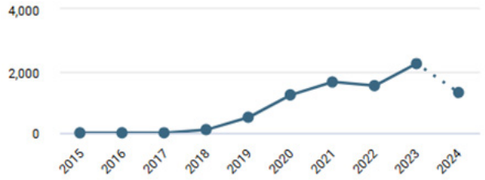
[Fig. 2.2] Mulit-core strategy (ARCAM, 2023)

Problem Statement

Amsterdam faces growing challenges with overtourism, as current strategies fail to address its systemic drivers and rely on symptom-focused solutions. The digital era presents opportunities to leverage sources of data for understanding the dynamics of overtourism. Google Maps data, in particular, offers the potential to reveal spatiotemporal patterns of tourism pressure. The challenge lies in translating this data into meaningful spatial insights. These insights can help uncover how the urban environment influences overtourism, enabling cities like Amsterdam to develop more targeted, data-driven strategies for managing tourism sustainably and effectively.

Scientific relevance

Overtourism is a multifaceted and complex issue, increasingly recognized as one that needs to be understood within the broader context of societal and urban development (Koens et al., 2018). As the side effects of tourism have started to become more and more evident, the concept of overtourism became increasingly widespread amongst experts. Consequently, it has become a popular topic that has attracted the attention of researchers (Gülşen et al., 2021). In academia, overtourism has become commonplace overnight, too. Whereas it was largely non-existent prior to 2017, no less than four Special Issues of academic journals and three edited books on the topic came out in 2018 and 2019. The marketability and popularity of the term overtourism appears to be at least partially accountable for its entry in academia, rather than its explanatory value (Koens et al., 2018). This project contributes to the evolving field by taking a new, data-driven approach to analyse spatiotemporal patterns, offering a new way to measure and understand how urban spaces are used. By incorporating media data it provides insights that go beyond traditional data sources.



Publications connected to overtourism

Societal relevance

The societal relevance of the thesis lies in addressing the challenges of overtourism in Amsterdam by leveraging spatiotemporal data to better understand and manage the flow of tourists in the city. By looking at efficient space and time use, the research can inform sustainable urban planning strategies, reduce strain on heavily visited areas and enhance the quality of life for residents while maintaining an enjoyable experience for visitors. This work contributes to creating balanced urban environments, where tourism benefits the economy without compromising local communities or the integrity of the city.

3. Approach

3. Approach

Building on the identified challenges and opportunities, this thesis aims to reshape tourism flows in Amsterdam by developing a new strategy informed by insights from spatiotemporal data analysis. In addition, the thesis will include a deeper dive into the strategic interventions, to demonstrate how addressing overtourism rolls out in the city to enhance livability and improve the quality of urban life.

Research Question

Following, the research question is formed:

How can a data-informed strategy, based on spatiotemporal and morphological urban dimensions, be developed to better understand and address overtourism in Amsterdam?

Research Subquestions

To answer the research question, these subquestions will be answered:

1. What are the current moments, places and impacts of overtourism in Amsterdam?
2. What are the spatiotemporal dynamics of tourism flows in Amsterdam?
3. How does the urban environment influence the impact of tourist pressure on liveability?
4. How can the development of a new tourism strategy contribute to addressing overtourism in Amsterdam?

Theoretical Framework

In this part, the theories used in this thesis will be examined. To answer the research question, first a foundation should be set, consisting of theories, concepts and models.

Carrying capacity

When we talk about terms like ‘over-something,’ such as overtime, overpopulation or overtourism, we are referring to a situation where a certain limit or threshold is exceeded, an overshoot. This exceeding of the limit is influenced by two factors: the level of the threshold itself and the level of the supply or demand. When the supply or demand surpasses the set threshold, an overshoot situation occurs. The term ‘overshoot’ comes from the ecological concept of ‘carrying capacity’. Defined by Hui, “The carrying capacity of a biological species in an environment is the maximum population size of the species that the environment can sustain indefinitely, given the food, habitat, water, and other necessities available in the environment.”(Hui, 2006)

Tourism carrying capacity can be simplistically defined as the maximum number of tourists that can be contained in a certain destination area. However, the definition of this concept has made quite a journey. The evolution of the concept of carrying capacity has evolved from community CC, resource CC and ecological CC to more integrated or integrated carrying capacity (Figure 3.1) as humans not only depend on natural ecological environments, but are also supported by complex environmental systems such as artificial/artificial environmental systems and socioeconomic systems. Therefore, it is necessary to expand the study from a single element carrying capacity to an integrated carrying capacity. Integrated carrying capacity refers to the carrying capacity of a city or area of natural resources, ecological environment, infrastructure and social facilities for the urban population and for economic and social activities. It consists of the carrying capacity of the natural

environment and the carrying capacity of the artificial environment, both in terms of population and socio-economic activities and it is influenced and constrained by the socio-economic support system itself. For large cities today, especially metropolitan areas, research on carrying capacity elements is clearly insufficient (Wen and Zhu, 2013).

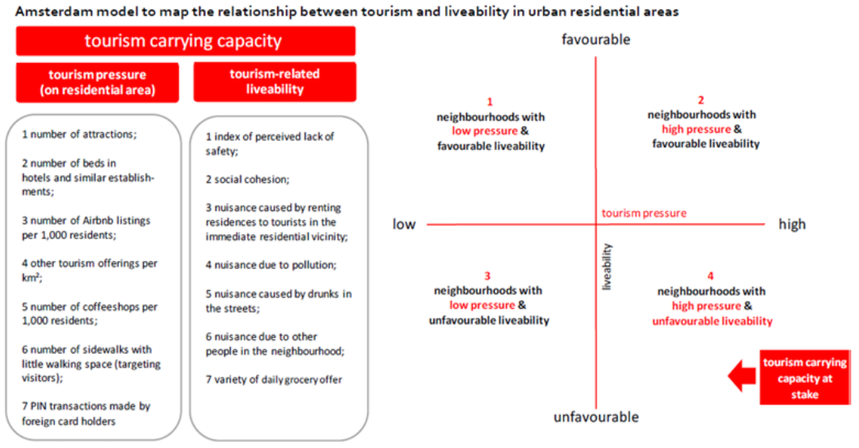
Although multiple approaches have been developed in several context, a reflection on existing methodologies by Schuh et al. (2020) shows:

- There is no single denominator for carrying capacity
- There is no single way of capturing the carrying capacity
- There is no unified way to take territorial specifics of tourist destinations into account when assessing their carrying capacity

This shows that for defining the carrying capacity, a method has to be made. The municipality of Amsterdam currently has a carrying capacity model. The model uses two parameters to connect tourism related indicators: 'tourism pressure' and 'tourism related liveability'. Both parameters are composed of several indicators (Figure 3.2). The 99 Amsterdam neighbourhoods are divided into quartiles based on their scores for each indicator.
The existing model on tourist carrying capacity actually does not aim to define a carrying capacity for neighbourhoods. The existing model is used to understand the impact of tourism and provides a way to assess the impact of tourism on Amsterdam's neighbourhoods. It also relies heavily on survey data and lacks the inclusion of spatial and temporal elements and the interconnective aspects of the neighbourhoods (Amsterdam Municipality, 2024). In this thesis, the method to define the carrying capacity for the neighbourhoods will include these spatiotemporal and morphological elements.

Name	Background	Definition
Comunity Carrying Capacity	Ecological development	The quality of the ecosystem is bearable for the communities that live in it.
Soil carrying capacity	Population growth, scarcity of land resources	The productive carrying capacity of land resources in an area, as well as the population that can be accommodated under certain conditions
Water, minerals and other resources carrying capacity	Lack of water, minerals and other resources, population increase, surge in water industry	Population that can be borne/accommodated by water and other resources in an area, energy/capacity that can be accommodated by water and other resources for industrial and agricultural production activities in a region.
Environmental carrying capacity	Environmental pollution	Maintain the environmental capacity from pollution, the ability to accommodate the energy of the regional environment for the development of human activities
Ecological carrying capacity	Integrity from ecosystem damage, function is reduced	The strength of the maximum socio -economic activity that can be borne or the limit of ecosystem disturbance
Complex carrying capacity	"Urban disease" and mega cities	Natural resources and environment, resources and economic and socio -economic and environment form complex, multi -level ecosystems; And the "land-human system" is the opposite

[Fig. 3.1] Evolution of the Concept Carrying Capacity (Wen and Zhu, 2013)



[Fig. 3.2] Carrying Capacity model Amsterdam (Municipality Amsterdam, 2024)

Spatiotemporal Pressure

The pressure being applied on the urban environment by tourists shows itself in many forms. The main, and maybe most essential is the actual influx of tourists. Compared to residents they use their environment very differently, they connect differently to it and they move through it differently. All of this comes together in the presence of tourists, putting a certain pressure on its environment. The dimensions of this presence can be localised into time and space. Space referring to the location where the pressure is being applied, and time referring to the when the pressure is being applied.

Recognizing that spatiotemporal pressure results from the cumulative presence of tourists in a given place and time, it is essential to understand its composition. This pressure is shaped by two key dynamics: to-movement, referring to tourists traveling to the location as a destination, and through-movement, involving those passing through the location as part of their journey. The interaction between these movement types and urban form is critical, as the design and configuration of urban spaces directly influence how people navigate and experience these spaces, ultimately shaping the spatiotemporal pressure they generate.

Urban form plays an important role in shaping these spatiotemporal patterns. Spatial layout inherently generates a probabilistic field of encounters, influencing the density and predictability of movement patterns (Hillier et al., 1987). The geometric and topological properties of the street network further mediate movement flows. As Hillier and Iida (2005) suggest, human navigation relies not solely on metric distance but on the visual and topological cues provided by the urban grid. For instance, areas with high visual integration and connectivity tend to channel both types of movement effectively, creating hubs of activity and spatiotemporal pressure.

This thesis focuses on the spatiotemporal pressure that consists of the flows of tourists who are present in the city. With a larger amount of tourists and an increased demand in “experiences” per tourist (Tourism Economics, 2024), this flow puts a growing spatiotemporal pressure on the carrying capacity.

Overtourism

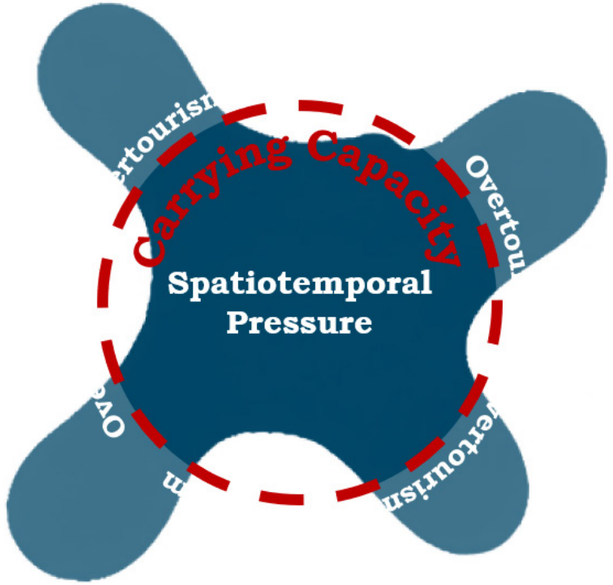
The issue of overtourism is becoming increasingly critical in many cities worldwide. Originally coined by Freya Petersen in 2001, the term “overtourism” addresses the problem of excessive tourism development and governance failures, with Pompei being one of the earliest documented cases (Cheer & Novelli, 2023). Overtourism manifests as an overwhelming influx of tourists that exceeds the carrying capacity of urban infrastructure and natural environments, leading to significant strain on local communities, the environment, and the cultural heritage of cities.

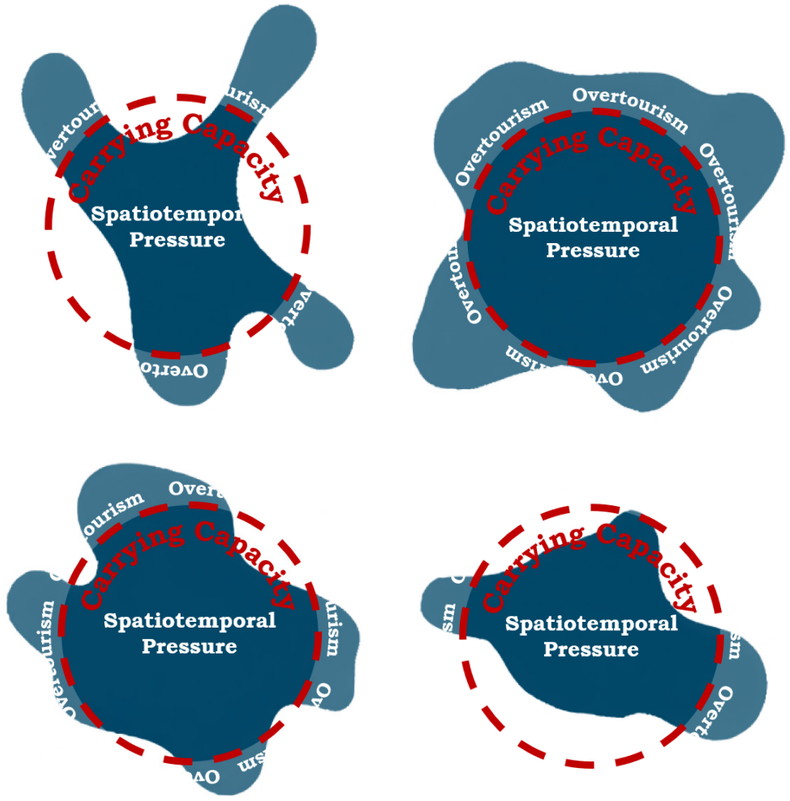
This definition shows that when the spatiotemporal pressure by tourists surpasses the threshold of the carrying capacity, it has negative consequences. The complexity of overtourism lies in its multifaceted nature. It is not merely about the volume of tourists but also about the temporal and spatial concentration of visitor activities, the lack of strategic urban planning to mitigate tourist pressures, and the interaction of these factors with wider societal trends (Koens et al., 2018). Addressing overtourism requires not only regulating tourist numbers but also implementing strategic urban planning that considers the temporal and spatial dynamics of tourism flows.

Overtourism is a multi-dimensional issue that demands an equally multi-faceted approach. Effective management strategies must address not only the quantitative aspects of visitor numbers but also the qualitative impacts of tourist behaviours and their spatial-temporal distribution.

Conceptual framework

This conceptual framework interlinks the concepts of overtourism, carrying capacity, and spatiotemporal pressure/presence to explore their dynamic relationships. At its core is the spatiotemporal pressure, represented as a morphing, uneven form that symbolizes its growth and variability across time and space. Movement to and through places in the city put pressure on a certain place at a certain time. This pressure interacts with a defined threshold—the carrying capacity—which it occasionally surpasses, but not uniformly across locations and time. When spatiotemporal pressure exceeds the carrying capacity, the framework identifies this as overtourism, represented by the space beyond the threshold. This framework highlights the fluctuating and site-and-time-specific nature of spatiotemporal pressure, illustrating how certain areas and moments experience overtourism while others remain within sustainable limits.





The spatiotemporal pressure is something that changes in time and space. Therefore, the conceptual framework should not be seen as a static, but a dynamic framework.

Methods

To answer the questions asked, it is important to know how the questions can be answered. The following methods will be used to answer the subquestions, and altogether the main research question. The description explains how the methods are used and what their outcomes are. These outcomes are connected to methods or other outcomes to answer questions and/or make steps in the research.

What are the current moments, places and impacts of overtourism in Amsterdam?

Media content analysis

The problematisation showed how the municipality has difficulties in understanding where, when and how overtourism is taking place. By doing a Media Content Analysis, media sources as social media, news articles, documentaries, podcasts and online platforms are analysed systematically to understand the Location, Time and Actions relevant to the phenomenon of overtourism. Since the project is following a data-driven approach, it is also of importance to be able to quantify overtourism. Therefore survey data is used from the municipality.

What are the spatiotemporal dynamics of tourism flows in Amsterdam?

Data Scraping

To be able to know what the tourism dynamics in the city are, it is important to have a source of information that can provide insights on this. In this thesis the data that is used to get to these insights comes from Google Maps. To be able to use this data, data scraping is done. Data scraping is the process where information is imported from a website and saved into a file. By doing this, two forms of data are gained that are of importance for understanding tourism dynamics, Review Data and Popular Times Data.

Data Manipulation

The gathered data can give insights on tourism dynamics, but first needs to be transformed. An important step in this is anonymising the Review Data, where user information is removed and the user isn't traceable anymore. In the following steps with the data, it will also be used in aggregated forms therefore, removing specific review information. The Popular Times Data, containing information about the busyness of a place, is connected to its location in the city, its neighbourhood and its district. This can give information about how busy those places are. But this source does not differentiate between tourists or residents. To gain the Tourist Share in this busyness, the Review Data is used to see how many reviews are placed within a certain time period (for example in 2024). The amount of reviews being placed translates in the amount of new visitors to a place. Connecting this value to the busyness gives the tourist pressure of a place.

Spatiotemporal Analysis

Tourist use the city at certain moments and in certain places. With combining the Tourist Share and Usage of Place known, this can be find out through a spatiotemporal analysis. This method focuses on analysing and visualising the Tourist Dynamics, data across both space and time to understand patterns of movement, distribution, or change. By visualising and interpreting on different spatial and temporal scales insights can be gained on the spatiotemporal pressure of tourists.

How does the urban environment influence the experience of pressure from overtourism?

Morphological Analysis

The urban environment shapes how space is used, and therefore how tourist pressure is felt. In this part, the Tourist Dynamics and Media Content Analysis are combined with a morphological reading of the city to better understand the Influence of Morphology on Overtourism. By analysing the morphological features of the urban environment, it becomes possible to see why some areas are more affected by overtourism than others. The pressure is not only caused by the amount of tourists, but also by how space is organised.

To explore this, several spatial indicators are used within walking-distance isochrones around hotels. Angular Choice is used to analyse the connectivity of the pedestrian network. FSI, GSI, and MXI are used to describe the physical intensity and functional mix of the built environment. Besides this, a moderation analysis is performed to see how the built form influences the relation between tourist pressure and the nuisance that is experienced. This is done by testing the effect of private outdoor space, pedestrian space and built-up space.By bringing together these layers, the analysis gives insight into how the city's spatial form can either absorb or amplify the effects of overtourism.

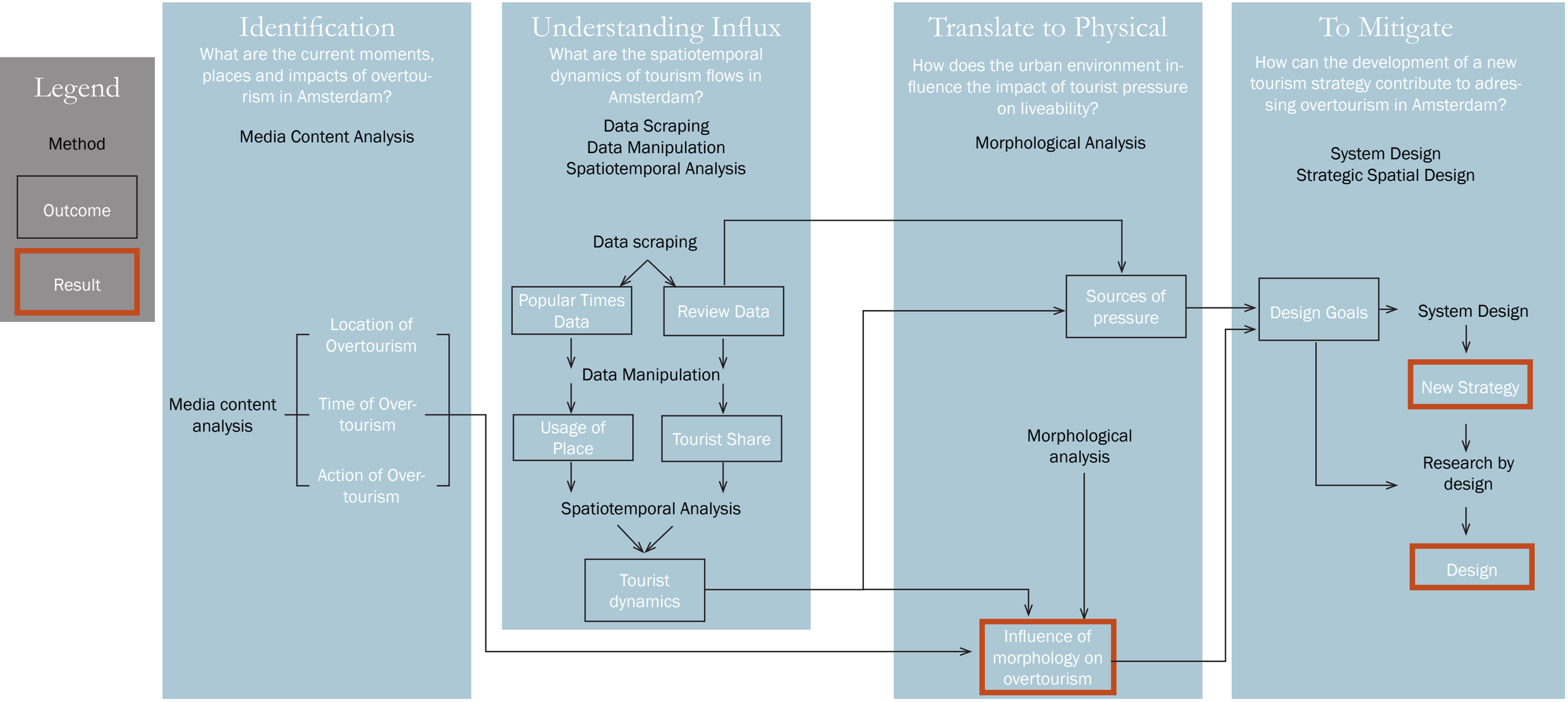
How can the development of a new core within a multi-core strategy contribute to the relieve of overtourism pressure within Amsterdam?

System Design

The development of the strategy follows a process of System Design. Based on the outcomes of the previous subquestions, Design Goals were defined. These goals relate to redirecting tourist flows, increasing spatial and temporal capacity, and improving liveability. Using these design goals, a New Strategy was developed that proposes a reconfiguration of the tourism system. This strategy introduces a spatial corridor that connects existing and potential tourism zones outside the city centre. It is built upon existing urban dynamics and capacities and aims to create a more balanced and resilient tourism structure.

Strategic Spatial Design

In the next step, Strategic spatial design was used to test and refine this strategy spatially. This includes zooming into specific areas within the proposed corridor to explore how interventions can respond to local conditions. The Design in these areas focus on enhancing tourist experiences while reducing nuisance for residents, using the earlier findings on network capacity, spatial form, and pressure moments. This method shows how a data-informed and spatially grounded strategy can be developed to not only spread tourism more evenly, but also align better with the city's structure and residents' needs.


Legend
Method
Outcome
Result
Identification
What are the current moments, places and impacts of overtourism in Amsterdam?
Media Content Analysis
Media content analysis
Location of Overtourism
Time of Overtourism
Action of Overtourism
Understanding Influx
What are the spatiotemporal dynamics of tourism flows in Amsterdam?
Data Scraping
Data Manipulation
Spatiotemporal Analysis
Data scraping
Popular Times Data
Review Data
Data Manipulation
Usage of Place
Tourist Share
Spatiotemporal Analysis
Tourist dynamics
Translate to Physical
How does the urban environment influence the impact of tourist pressure on liveability?
Morphological Analysis
Sources of pressure
Morphological analysis
Influence of morphology on overtourism
To Mitigate
How can the development of a new tourism strategy contribute to adressing overtourism in Amsterdam?
System Design
Strategic Spatial Design
Design Goals
System Design
New Strategy
Research by design
Design

Scalar Framework

Spatial Scale

The thesis will focus itself on 3 spatial scales, City, Neighbourhood and Street. These scales of focus are based on the dynamics within the city:

City Scale

Analysing connections between different parts of the city to understand how movement and flows link various neighbourhoods and urban hotspots.

Neighbourhood Scale

Examining spatial dynamics and movement patterns within a specific neighbourhood to uncover local interactions and characteristics of spaces.

Street Scale

Focusing on eye-level perspectives to capture detailed observations of human activity, interactions, and spatial experience at the street level.

City

Neighbourhood

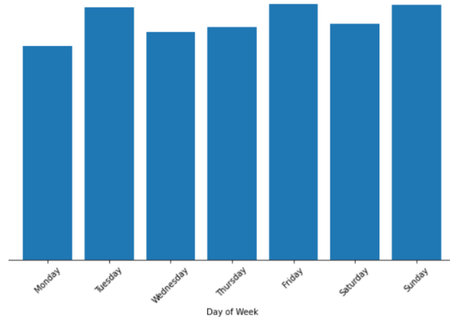
Street

Temporal Scale

The temporal scale will be focused on 2 levels, Week and Day. The time scales are based on the format of the retrieved data and visualise the pressure/crowdedness of a place:

Week Scale

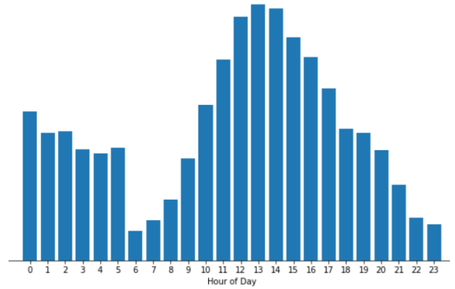
Graphing daily pressure throughout the week to identify patterns and differences between different days. Time periods like Weekdays and Weekends are looked at specifically.



Week

Day Scale

Visualising hourly pressure to capture the daily rhythms of activity and peak usage times. Time periods like Mornings, Afternoons, Evenings and Nights are looked at specifically.



Day

Tourist Activities

Tourists visiting cities engage in a wide range of activities that reflect different motivations and patterns of spatial use. A categorisation is made of urban tourist activities to structure the analysis of this thesis. This framework allows us to better understand where and how tourism pressure manifests in the city and to compare different locations based on the dominant types of tourist activity. The categorisation used in municipal reports often overlooks everyday yet widespread tourist behaviours such as dining, visiting cafés, or shopping activities that, while less visible than museums or events, represent a significant part of how tourists actually use the city.

The list on the right explains the different categories used in the project. It also shows the keywords on which the dataset with reviews was filtered.

[Fig. 3.3] Tourists standing in line for food (Grachten 9+, 2023)

Activities

This category includes recreational activities that are often active. These activities contribute to a broad engagement with the city and are typically spread across various urban settings.
keywords: [‘amusementscentrum’, ‘midgetgolfbaan’, ‘bowlingbaan’, ‘poolcentrum’, ...]

Dining & Cafe

Food and drink are integral to tourist experiences, with restaurants, cafés, and local gastronomy forming both an attraction and a way to engage with local culture.
keywords: [‘restaurant’, ‘breakfast’, ‘lunch’, ‘pizzeria’, ‘bar’, ‘cafe’, ‘brasserie’, ...]

Cannabisshops

Cannabis tourism represents a niche but significant form of urban tourism to Amsterdam. It draws visitors with a distinct motivation and leads to concentrated activity around particular venues.
keywords: [‘cannabis’, ‘wiet’, ‘zaadleverancier’, ‘smartshop’]

Green recreation

Parks and urban green spaces offer spaces for relaxation and outdoor leisure, serving as quieter counterpoints to the city’s busy core while still attracting tourists.
keywords: [‘park’, ‘stadspark’, ‘botanische tuin’, ‘tuin’]

Conferences

Conference tourism reflects business-oriented travel tied to meetings, conventions, or exhibitions. It generates a specific flow of visitors whose behaviors differ from leisure tourists.
keywords: [‘conferentiecentrum’, ‘congrescentrum’]

Shopping

Whether it is in high-end boutiques, local markets, or souvenir shops, shopping is a core part of the urban tourist experience and a major driver of spending.
keywords: [‘winkel’, ‘mode’, ‘warenhuis’, ‘parfumerie’, ‘horlogerie’, ‘kleding’, ‘markt’, ...]

Cultural & Historic

Cultural and historic tourism is motivated by the desire to experience heritage, art, and local identity. It often involves structured visits to concentrated use of culturally significant areas.
keywords: [‘museum’, ‘kunst’, ‘cultureel centrum’, “dierentuin”, ‘monument’, ‘kerk’, ...]

Nightlife

Nightlife and entertainment form a distinct part of urban tourism, often linked to younger audiences and evening activity patterns. These attractions can create tensions with locals.
keywords: [‘nachtclub’, ‘club’, ‘discotheek’]

Event Venues

Event-based tourism is centreed around temporary but high-intensity occurrences such as concerts or sports games. These events can create sudden peaks in visitor numbers and have spatial and infrastructural implications.
keywords: [‘concertzaal’, ‘locatie voor live muziek’, ‘stadion’, ‘theater’, ‘evenementenlocatie’]

4. Analysis

4.1 Overtourism

The subquestion being answered in this chapter:
What are the current moments, places and impacts of overtourism in Amsterdam?

4.1.1 MCA on overtourism in Amsterdam

The occurrence of overtourism happens at certain times and places in the city. This is very present in the city of Amsterdam and outs itself in publications. These differ in form and depth, but together give a comprehensive view on the state of overtourism in the city. By looking at municipal documents, platforms, news articles and documentaries information can be gathered about when, where and how this is happening. This information is used to identify the Time and Space where overtourism is occurring, and to identify the impact on the Liveability.

Het is genoeg!, Amsterdam platform against Overtourism

Platform, 2023

“Het is genoeg!” is a platform, set up by multiple organisations and individuals to work together in the fight against overtourism in Amsterdam. The platform emphasises collaboration and advocacy for reducing the dominance of commercial interests that harm the urban environment and quality of life for residents. The parties of this platform predominantly focus their efforts on neighbourhoods centred in Amsterdam. In the published document they sketch the current tourism situation in Amsterdam. The Red Light District in particular has been exposed to heavy tourism pressure, especially in the evening. Overtourism is even more prevalent in certain places and at certain times. This also is the case in the 9 Straatjes, Nieuwmarkt and hospitality focused areas like Rembrandtplein and Leidseplein (Het Is Genoeg, 2023).

Nota Nuisance and Overtourism Amsterdam, Municipality of Amsterdam

Municipal document, 2022

The municipality of Amsterdam is aware of the challenge on overtourism. The document focuses on the current and new measurements tackling nuisance, and the current state of overtourism in the city and new measurements tackling it. It states clearly that the liveability is under big pressure by the large amount of visitors at certain times in certain areas. The most vulnerable areas are located in the Centre city district, but also in the East, West and South district crowdedness and nuisance are increasing. The waterbed effect is lurking with every measurement being taken in the Centre district (Amsterdam Municipality, 2022).

Numerous measurements are already taking place, like stricter supervision and crowd management. Crowdmanagment is applied on Friday- and Saturday nights in the Red Light District to control the pressure. When a certain threshold gets surpassed measurements like one-way pedestrian traffic are applied to control the pressure better (Amsterdam Municipality, 2022).

The city realises that tourism has left a big trace in the city. In the document the proposed measurements vary in location and severity. The most controversial one being the future development of an “Erotic Centre” outside the city centre. This to decrease tourism pressure and nuisance in the Red Light District. Besides this the city also has prohibited the development of services aimed at

entertainment and tourism in the zoning plan. In zoning plans of Oud-West and De Pijp tourism aimed services are also forbidden. The Museumkwartier besides this, also prohibits food stores. Likewise measurements have been taken into account for the new plan of the Oosterparkbuurt. For the plans of other neighbourhoods in the East district of Amsterdam, Indische Buurt and Oud-Oost, this also is desirable.

Nog nooit zoveel bezoekers in Amsterdam als in 2023 (en toeristen blijven langer), Het Parool
News article, 2024

The problem of overtourism in Amsterdam is mentioned a lot over the last years, with a break during the covid pandemic. The Amsterdam based newspaper, Parool, gives a comparison, showing that in tourism in Amsterdam is back on the upward trend it was in 2019. Amsterdam has never welcomed as many day visitors as in 2023, 15.1 million people, a big increase in comparison to the 12.6 million visitors in 2019. Around 60% of these visitors came from in the Netherlands, 40% from abroad. This also shows that tourism doesn't limit itself to foreign visitors. This group of native visitors are difficult to keep out, the city council also has never specifically demanded measurements against them (David Hielkema, 2024).

The statistic from CBS also show that the amount of overnight stays increased from 21.6 million in 2019 to 22.1 million in 2023. This while the amount of visitors dropped from 10.2 to 9.4 million, indicating that these visitors are staying longer. Councilman Sofyan Mbarki says that the longer stays give an opportunity for better spreading, but that the effect of it on the city is being researched now (David Hielkema, 2024).

He also mentions that the limit of 20 million overnight stays, set by the municipality, is being well exceeded. The worldwide growing middleclass, cheaper flights to Schiphol and attraction of Amsterdam make not exceeding the limit a virtually impossible challenge. Instruments used by the municipality, like increasing tourists tax and a hotelstop, don't seem to have a large effect. Mbarki mentions that with these measurements its also important to ask if you want to stay a accessible city. Everybody should be able to visit Amsterdam, therefore you need affordable hotelroomprices in different segments (David Hielkema, 2024).

Numbers also show that its mostly inhabitants from the city centre that experience nuisance. Although this is also spreading to neighbourhoods outside of the centre. Oosterpark, the Jordaan, De Pijp, the Dapperbuurt and Vondelpark, see more pressure on their liveability, despite efforts of the municipality to work on it by stricter rules for private holiday rental, making shopping offer more attractive for citizens and campaigns to change the perception of Amsterdam as a "party-city" for tourists. Mbarki says that they will continue with the measures that have been taken, like the "smoking-ban" and early closing time for the Red Light District, that seem to have a positive effect. The North, Southeast and West district don't seem to experience a lot of nuisance by tourism (David Hielkema, 2024).

Documentary Slapend Rijk – VPRO Tegenlicht
Documentary, 2016

Airbnb is a popular platform where people can rent out their properties to tourists. This documentary examines the impact of Airbnb on Amsterdam's social fabric. It shows perspectives from various stakeholders, including journalists, landlords, tenants, citizens, activists, and municipal enforcement teams, highlighting the complex debate over urban space usage.

George and Frankie, two “Amsterdammers”, elaborate on how they have seen the city change in their lifetime. “It has gotten extremely busy in the last few years, its like a Disneyworld with all those tourists. We as “old-Amsterdammers” are not used to it”, says George. Frank follows up: “It is very bitter, if you used to live in a street where you knew a lot of people, and its now being sold to some person. Although the buyer says he does it for renters, I wasn’t born yesterday. Everyday there are different people, they don’t know the rules. Back in the day we used to look out on eachother, this is totally gone. People just walk past eachother and don’t recognize eachother, that is the ugly thing. Just like the Haarlemmerbuurt, it used to be a beautiful neighbourhood with a lot of livelihood and stores. Now its just filled with illegal hotels, its crazy and something isn’t right, something isn’t right.”

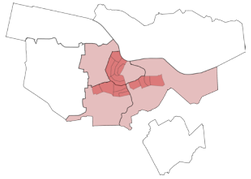
The following scene shows a meeting of the residents platform of the Haarlemmerbuurt. “We were so done with it, we might just move to south France. Outside its only noise noise and screaming and shouting. You cant relax in your own street. It has changed so much. Like today at this time its just gezellig, but sometimes I have periods that I just lock myself up in my house, I don’t want to sit outside because its way too busy, way too much noise.” Another residents adds up to this, “Its very clear, on Thursday the trolley cases come in, and they leave on Sunday evening or Monday morning. Tuesday and Wednesday we have the quietest nights.” Teunkie van de Sluijs, also a resident of the neighbourhood, gives his view on the situation in the Haarlemmerbuurt, “In Amsterdam and the Netherlands we have worked for decennia on making good agreements on living in this country, in this city. By doing nothing, we are letting this American billion dollar company, that goes around

these rules for profit, and decides to make hotels from homes. Of course there are obvious reasons why you cant make a hotel from your house, you cant open a restaurant in your own kitchen, you cant open a nightclub in your living room, because that’s not what they are intended for. Homes are meant to be homes. If its just for a few days or weeks sure, but that’s already not the case here for a long time. The inhabitant from the house across the street left, and its permanently empty, or atleast its filled with tourists. The inhabitant there, gone, the inhabitant there above the coffeeshop, gone! And they can all be found on Airbnb.” He also continues later in the documentary and explains how it affects the social fabric “It makes the neighbourhood unstable, an unstable neighbourhood attracts problems like drugsdealers, public drunkenness, disrupment of the public order, because you don’t have permanent residents anymore. It really brings problems for the neighbourhood.” He also mentions a research that has been done in the U.S., “every house that’s taken away from the housing supply for holiday rental costs the local economy approximately $250.000. translate that to the Netherlands and you are talking about 200.000 euros per house. That means that because of this illegal holiday rental you are really disrupting a local economy. Because you take people out of a neighbourhood that live there, pay taxes, contribute to the local businesses, and living there maybe 20-30-40 years and contributing to the neighbourhood. You take those people out!”

Stephan van Kappel, private-detective, has made his work from going after illegal Airbnb renting. He is sitting in his van watching a suspicious house, “Its Friday, so the chance that they will arrive is pretty big.”

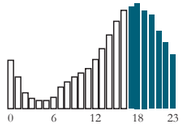
Places

Overtourism in Amsterdam is highly concentrated in specific neighbourhoods and districts, particularly in the city centre, where residents increasingly feel its impact. Municipal zoning plans have attempted to limit tourism-oriented services in affected areas, but these measures often lead to the “waterbed effect,” displacing issues rather than resolving them. In contrast, neighbourhoods like the North, Southeast, and West districts remain less affected.



Moments

The timing of overtourism in Amsterdam is closely tied to peak tourism periods, which include Friday and Saturday evenings. Weekdays like Tuesday and Wednesday tend to be quieter, as noted by residents in heavily visited areas. Seasonal trends also play a role, with summer months and holiday seasons seeing significant spikes in visitors.



Impacts

Overtourism in Amsterdam impacts liveability through nuisance and overcrowding, disruptions to the local economy, and a loss of familiarity. Overcrowded streets, noise disturbances, and public disorder make neighbourhoods less enjoyable for residents. The shops and services in certain areas are aimed at tourism and entertainment, disrupting the local economy. This displacement also erodes social cohesion, as permanent residents are replaced by transient visitors, leaving neighbourhoods feeling impersonal and unstable. Together, these factors significantly strain the city’s liveability.


Nuisance/Overcrowded


Local economy


Familiarity

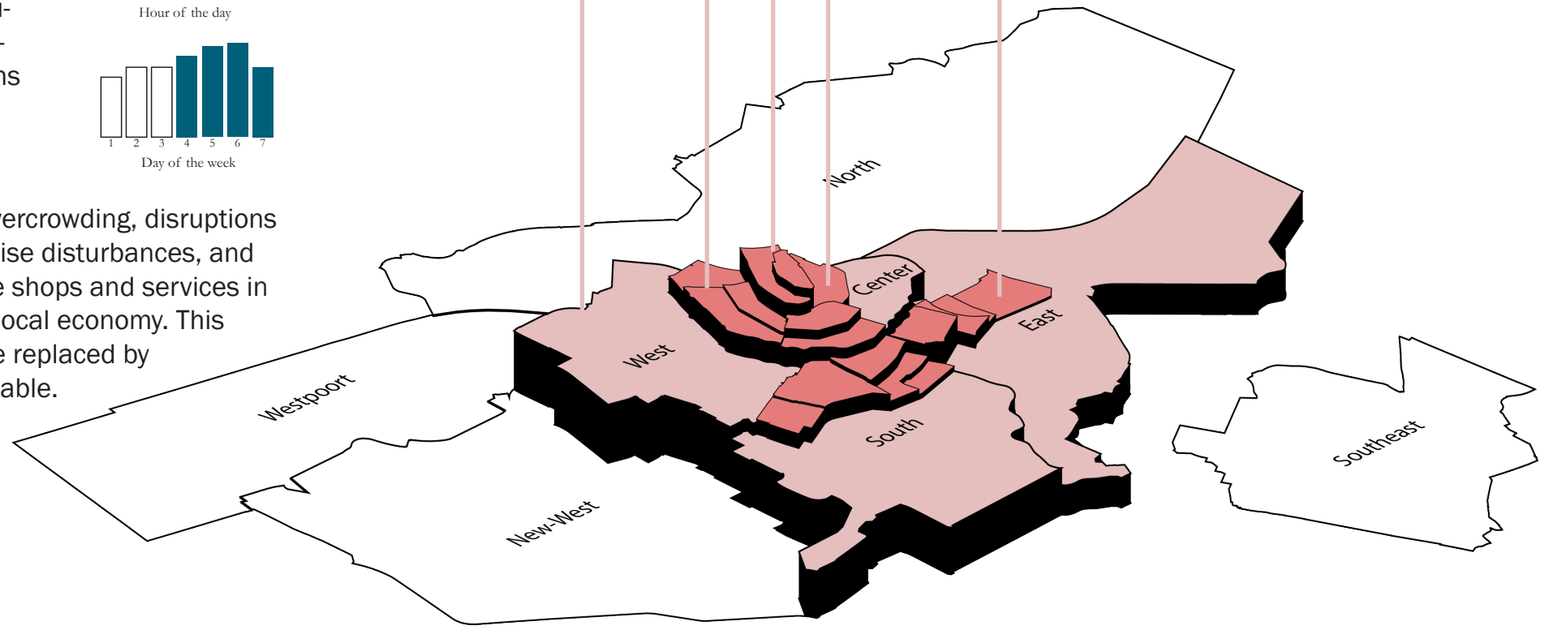
“In zoning plans of Oud-West and De Pijp tourism aimed services are also forbidden”

“Outside its only noise noise and screaming and shouting. You cant relax in your own street”

“ The most vulnerable areas are located in the Centre city district, but also in the East, West and South district crowdedness and nuisance are increasing”

“The Red Light District in particular has been exposed to heavy tourism pressure, especially in the evening.”

“Oosterpark, the Jordaan, De Pijp, the Dapperbuurt and Vondelpark, see more pressure on their liveability”



4.1.2 Statistics on overtourism

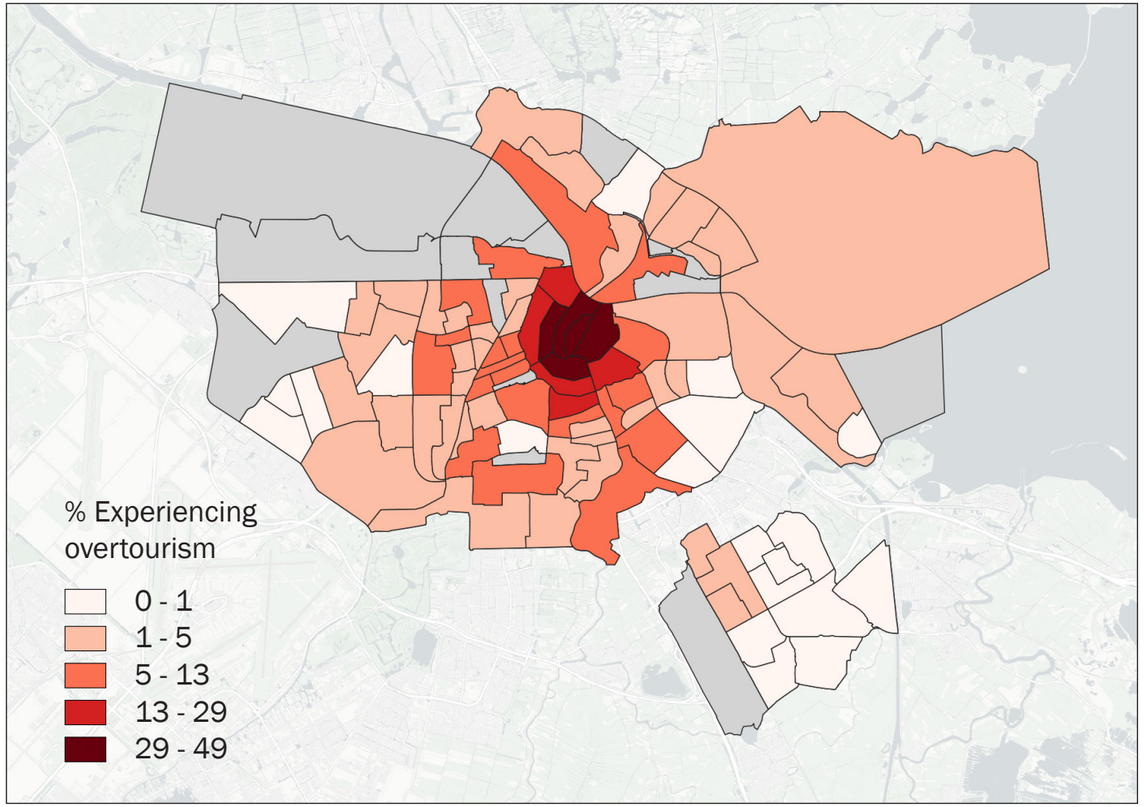
To effectively address overtourism, within a data-driven strategy, it is essential to connect statistical data to specific spaces, such as neighbourhoods within the city. One valuable data source available to the Municipality of Amsterdam is the Veiligheidsindex, a comprehensive survey that includes a question on whether residents experience nuisance caused by tourism.

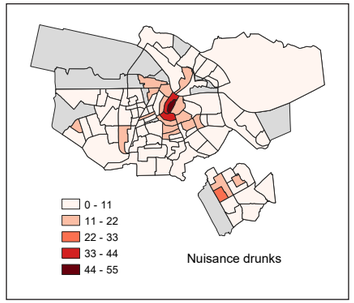
The main map on this page presents the percentage of residents who report nuisance from overtourism. It clearly shows that the highest concentration of reported nuisance is in the city centre. Additionally, some neighbourhoods in Amsterdam-West, -East, and -South also report experiencing nuisance, though to a lesser extent.

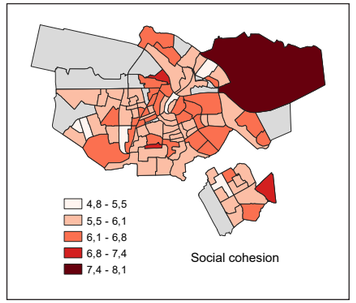
In addition to this primary data, three supplementary maps are included to provide more context. The first map shows the percentage of residents who experience nuisance from drunken individuals. This map closely resembles the overtourism map, particularly with high values in the city centre, suggesting a possible link between tourism and alcohol-related disturbances.

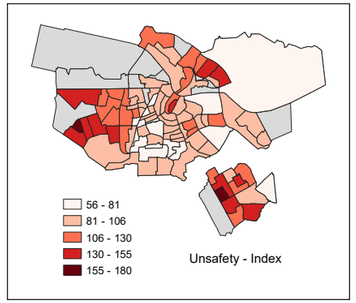
The second map illustrates the average score residents give to social cohesion in their neighbourhoods. While some overtouristic areas score low on social cohesion, this is not a consistent pattern, non-touristic neighbourhoods may also score low, indicating that other social and economic factors also play a role.

The third map presents the unsafety index, reflecting how unsafe people feel in their neighbourhood. Here, the pattern does not align closely with the overtourism map either, again suggesting that perceptions of unsafety are influenced by a broader range of factors beyond tourism alone.









4.1.3 Conclusion

Overtourism is not a future threat but a present reality in Amsterdam. While it was once primarily concentrated in the **historic city centre**, the pressure has spread to **surrounding districts**. These areas are now increasingly experiencing the burden of too much tourism. The impacts are felt in various dimensions of daily life, residents report:

- Rising **nuisance**,
- Erosion of **social familiarity**
- Transformations in the **local economy**.

Amsterdam's social fabric is weakening as long-term inhabitants are replaced by transient visitors, contributing to instability, diminished cohesion, and a growing sense of impersonality in neighbourhoods.

The timing of this pressure is not uniform, it peaks particularly on **Friday and Saturday evenings**, as well as during **holidays and summer months**, while midweek days like Tuesday and Wednesday tend to be calmer. This uneven temporal distribution further strains liveability, concentrating nuisance into specific high-impact windows. Municipal efforts to manage tourism through zoning restrictions, crowd control, and communication campaigns have shown mixed results and sometimes risk displacing the problem elsewhere. Therefore creating a "waterbed effect" rather than a true solution.

Overtourism in Amsterdam is both spatially and temporally concentrated, and it disrupts the liveability of the city. Tackling it requires not only spreading tourist flows more evenly but also rethinking the role of tourism in the urban environment.

When tourists look for their next stop, locals have one clear suggestion: home

4.2 Tourism dynamics

The subquestion being answered in this chapter:
What are the spatiotemporal dynamics of tourism flows in Amsterdam?

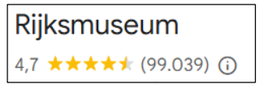
The presence of tourists in Amsterdam has emerged as the primary driver behind the city's overtourism challenges, causing significant nuisance and disrupting daily life in several neighbourhoods. With tourism increasingly becoming digital, the footprints tourists leave behind, such as Google Maps reviews and usage patterns, offer new opportunities to understand and quantify the resulting pressures. Data analysis enables us to capture these patterns in detail, revealing not only spatial concentrations but also temporal dynamics, helping to identify when and where overtourism becomes problematic.

By leveraging these data-driven insights, we can deepen our understanding of how tourist pressure manifests across different parts of the city and throughout various times of the day and week. Crucially, addressing overtourism requires examining it through multiple perspectives: from understanding tourists' starting points and movement patterns to their activity combinations and the specific moments when pressure peaks. This chapter adopts such a multi-dimensional approach, using diverse analyses to provide a comprehensive picture of Amsterdam's tourism dynamics and their implications.

Want to explore the Tourist Dynamics in Amsterdam yourself? Try the Dashboard!
Scan the QR or click on the link:
https://detourism.streamlit.app/

(Dashboard may take a minute start-up)

Google Maps Popular Times

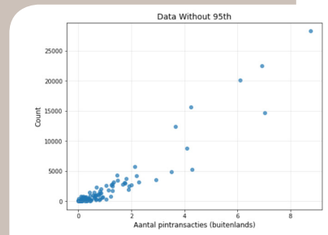


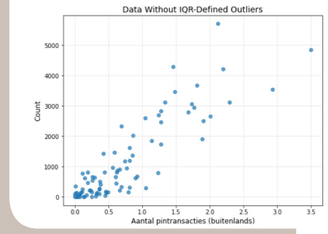
Google Reviews

Explainer: How is tourist pressure calculated?

As stated in the problematization, tourism has become more digital, leading to bigger digital footprints of tourists. By using data from Google Maps, reviews and popular times, this digital footprint can be transformed into the tourist pressure in time and space. The assumption here is that the amount of reviews is connected to the amount of visitors.

Reviews are placed on all kind of places in the city, from parks to restaurant, and from coffeeshops to events. Since there isn't any academic literature on the relationship between the amount of visitors and the amount of reviews, the correlation is tested with different variables. When looking at the amount of visitors per year (measured by the municipality) and the amount of Google Reviews that same year, a very strong correlation can be seen. However, the amount of measurements is very low, not giving a sufficient basis to rely on. Because of the necessity of taking out covid year, the sample size is very small.





Another way is used to test the relation, pin transactions made by foreigners. When looking at the relation between the amount of foreign pin transactions per neighbourhood and the amount of google reviews, we can see a strong correlation, 0.94 without 95th percentile and 0.88 without IQR-Defined Outliers. Eventhough we don't have 100% watertight clear outcome, the test do show that there is really something to work with. Therefore the amount of reviews will be used the find out the tourist pressure on a place. Combining this with Google Popular Times gives an indication on how tourist pressure is distributed throughout the day and week per place. The result of these two sources is data that gives info on the spatiotemporal pressure applied by tourists on the city.

4.2.1 Origin Pressure

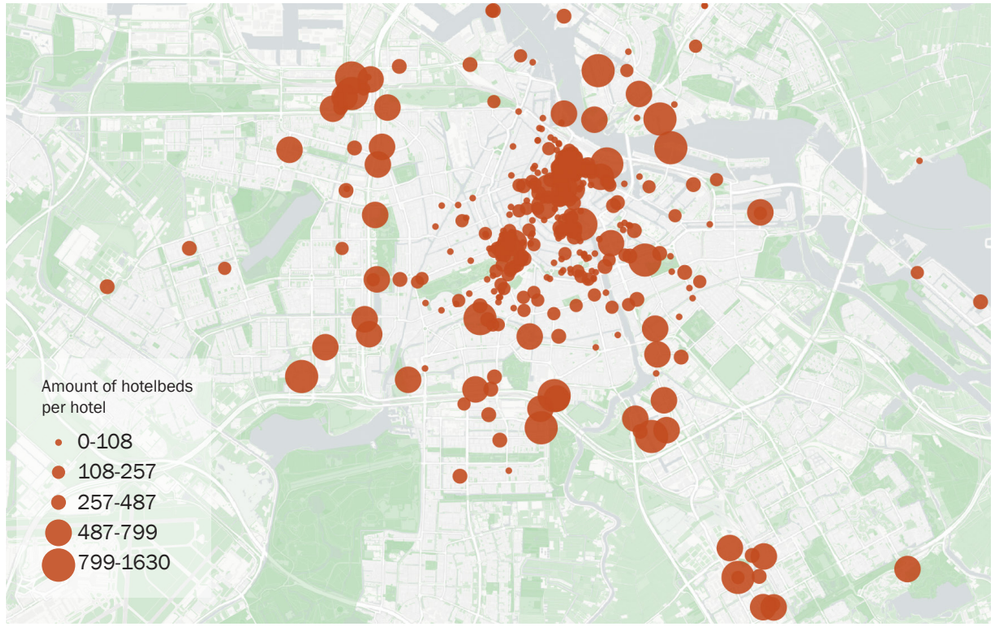
As important it is to know where tourists are going, understanding where tourists begin their journey in the city is crucial to understanding how they move through it. These origin points significantly influence how tourists experience and use Amsterdam. For most visitors, the starting point of their day is clear: their place of accommodation, most commonly a hotel.

Due to Amsterdam's hotel stop policy, which restricts the development of new hotels, the current distribution of hotel locations is unlikely to change significantly in the near future. This reflects a broader position by the municipality to manage overtourism by controlling its spatial sources. While short-term rentals such as Airbnb used to have a big role in accommodating tourists, they too have been tightly regulated. As a result, hotels remain the dominant form of accommodation. In 2023, of the 22.1 million overnight stays recorded in Amsterdam, 20.4 million occurred in hotels and hostels (Amsterdam Municipality, 2024), making hotels a reliable and representative source for mapping tourist origin points.

Since the number of hotel beds per individual hotel is not publicly available, two datasets were combined to approximate this. First, municipality data provides the total number of hotel beds per neighbourhood. Second, the locations and popularity of hotels were extracted from Google Maps, using review counts as a proxy for hotel usage. To allocate the neighbourhood's total hotel beds to individual hotels, the number of reviews for each hotel was divided by the total number of reviews in that neighbourhood. This percentage was then applied to the total number of hotel beds in that neighbourhood to estimate bed distribution per hotel.

The results show that hotel beds are highly concentrated in the city centre. This corresponds logically to the clustering of tourist pressure in central Amsterdam. While there are a lot of hotels in the city centre, they tend to be smaller in size, with relatively few beds per hotel. In contrast, the hotels located outside the city centre tend to be larger, often more affordable, and strategically placed near public transport nodes.

Using previously collected data on tourist movement sequences, it is possible to link each movement to the hotel where the tourist also left a review during the same period. This approach allows for an analysis of how far tourists travel from their accommodation to reach various attractions, helping to identify which parts of the city promote more localized versus more dispersed patterns of tourist movement.

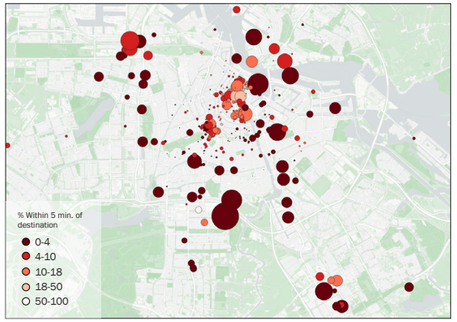


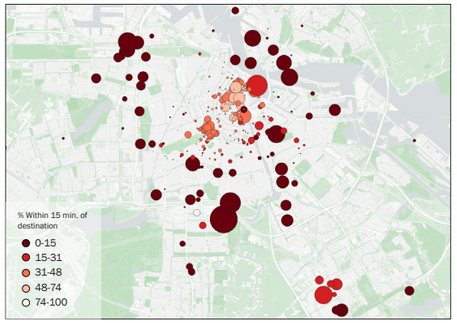
To explore this, the analysis is conducted across three travel ranges: 5, 15, and 25 minutes walking distance. These isochrone intervals help illustrate the spatial reach of tourists on foot.

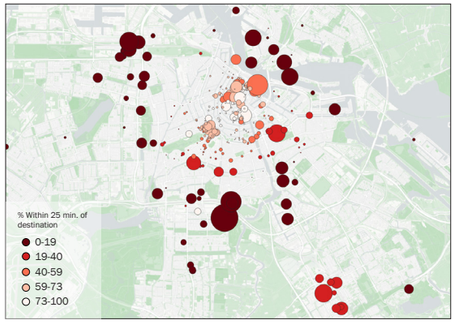
The 5-minute walking range represents a very short radius, typically indicating close proximity to a dense concentration of attractions. In this range, only in the old city centre a high percentage of tourists remain within walking distance, suggesting that tourists staying here are more likely to meet their needs without needing to travel far. Small exceptions exist, such as hotels in Bijlmer ArenA (likely related to nearby event venues) and the Zuidas (associated with business tourism), where some tourists also remain within a 5-minute range.

At the 15-minute walking range, the amount of hotels with tourists that spend time in the range begin to spread across the broader centre. This suggests that tourists staying just outside the very centre are more likely to walk a bit further to reach attractions. It also shows that while they move around more, they still mostly stay within the broader central area of the city. The 15-minute walking range appears to be a comfortable distance for exploring. This highlights how much of the city can be accessed and enjoyed within a relatively short walk, reinforcing the value of walkability in shaping tourist behavior.

In the 25-minute range, this pattern becomes more pronounced. While hotels in the inner city still accommodate tourists who stay in this range to their origin point, hotels located in outer areas continue to show low percentages of short-range movement, again with the Bijlmer ArenA area as a slight outlier. This suggests that guests in peripheral hotels tend to travel greater distances for their activities, or that their nearby environment doesn't provide any attractive activities.





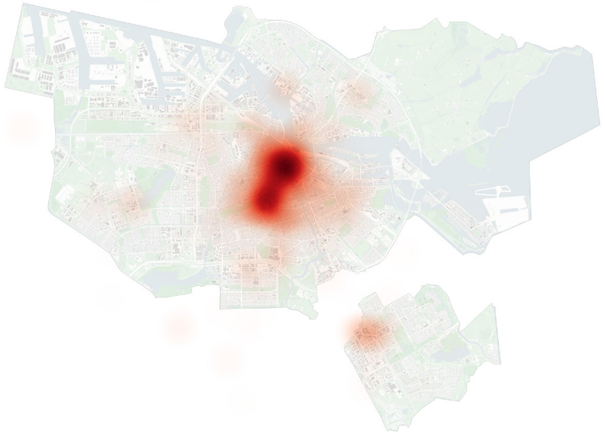


It is important to note that this analysis is limited to pedestrian movement and does not account for public transportation, which plays a key role in how tourists move across longer distances in Amsterdam. Still, the pedestrian travel ranges already reveal important insights: the location of accommodation significantly shapes the spatial behavior of tourists. This analysis can also provide indirect insight into the walkability and experiential quality of different parts of the city. Areas where tourists stay and are willing to walk within a walkable range suggest not only proximity to attractions but also a pleasant walking environment. In contrast, neighbourhoods outside the centre that show little to no short-range tourist activity may lack inviting pedestrian infrastructure or points of interest within walking distance. As such, tourists staying in those areas are more likely to move to parts of the city that are pleasant to walk in, like the city centre. This points to the need to not only manage tourist flows, but also consider how to make more areas of the city walkable and attractive.

4.2.2 Pressure in Space

Tourism in Amsterdam is not evenly distributed across the city. The pressure concentrates in certain areas, creating spatial pressure that can lead to affecting daily life and the functioning of neighbourhoods. This is visualised in that spatial dimension, through a series of heatmaps that reveal where tourist activity is most intense.

The large map displays the overall distribution of tourist pressure across the city, based on aggregated data. It highlights key hotspots where tourism is highly concentrated, with the city centre standing out as the most intensely used area.

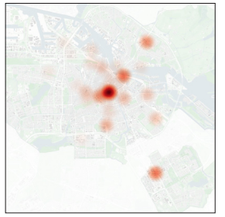


To provide more insight into the nature of this pressure, the maps on the right break down the data into the categories of tourist activity. These maps make it possible to distinguish between different types of tourism and how they impact various areas of the city. While some categories overlap spatially, others show different patterns of concentration, indicating that not all forms of tourism affect the city in the same way.

Pressure per category

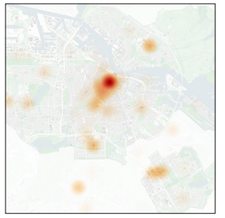
Green Recreation
Despite the abundance of parks in Amsterdam, Vondelpark clearly dominates in terms of tourist visits. Other green spaces such as the Amsterdamse Bos, Hortus Botanicus, Westerpark, and Amstelpark also see consistent recreational use by tourists.

Activities
Tourist activities are primarily concentrated in the city centre and its surrounding neighbourhoods. These attractions are often clustered rather than evenly distributed. Notable exceptions include the Bijlmer ArenA and the Pathé cinema in Amsterdam North, which draw visitors despite being located in otherwise low-pressure districts.



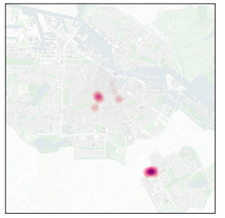
Cannabisshops
Cannabis tourism is highly concentrated in the city centre, where tourists often combine this “typical Amsterdam experience” with visits to other iconic attractions nearby.

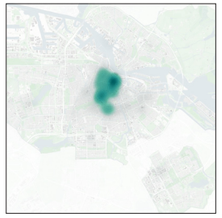
Shopping
While the Kalverstraat remains the most frequented shopping area for tourists, the data shows that shopping is more dispersed throughout the city—particularly around shopping centres. The high tourist pressure in the city centre gradually spreads to the southwest.



Cultural & Historic
Museumplein is the city’s main hub for cultural and historical tourism. The city centre also draws considerable attention, although visits there are more dispersed. The EYE Film Museum across the IJ river successfully attracts tourists to the northern part of the city.

Event venues
The Bijlmer ArenA stands out as a major hotspot for event-based tourism, with high concentrations of visitors. Smaller event venues around Leidseplein also attract significant tourist activity, though to a lesser extent.





Dining & Cafe
Eating and drinking spots show a central focus, with notable pressure in the western city centre. Tourist activity extends southwards toward Vondelpark and into parts of De Pijp, which also registers as a popular area.

Conference
The RAI Convention Centre clearly serves as Amsterdam’s primary node for conference tourism, typically drawing a business-oriented visitor segment.

Entertainment & Nightlife
Nightlife activity is focused mainly around Leidseplein and Rembrandtplein, as well as the connecting area. While other nightlife spots exist throughout the city centre, they attract smaller tourist numbers by comparison.

Combinations

Analysing tourist activities through reviews helps create detailed visitor profiles, highlighting frequent combinations for both general tourists and specific hotel guests. Understanding these combinations reveals tourists preferences and desires.

2 Activities	Combinations	Amount
The top two-activity pairings reveal affinities among tourists. Cultural & Historic + Dining & Cafes towers above all, signaling that visitors like to pair a museum or landmark visit with a meal or coffee break. The next strongest link is Dining & Cafes + Shopping, which underscores food stops as points in a shopping trip. Meanwhile, Cultural & Historic + Shopping shows that retail also often follows heritage experiences. Lesser but still notable are ties between Dining & Cafes and both Green Recreation and Event Venues, suggesting that cafés anchor both leisure in parks and attendance at performances showing the important element of combining food with activities.	1. Cultural & Historic + Dining & Cafes	200884
	2. Dining & Cafes + Shopping	90578
	3. Cultural & Historic + Shopping	66204
	4. Dining & Cafes + Green Recreation	64860
	5. Dining & Cafes + Event venue	63187
	6. Cultural & Historic + Green Recreation	57412
	7. Cultural & Historic + Event venue	45887
	8. Cannabisshop + Dining & Cafes	42714
	9. Green Recreation + Shopping	31923
	10. Event venue + Shopping	31560

3 Activities	Combinations	Amount
When three activities are chained, the Cultural + Dining + Shopping combination dominates. Substituting “shopping” with “green recreation” or “event venue” bring the next most common mixes, indicating that after culture and food play a very important role in the activity pattern of tourists. Other combinations, such as Cannabisshop + Cultural & Historic + Dining & Cafes, reveal again that the café moment remains important, nearly every combination includes Dining & Cafes.	1. Cultural & Historic + Dining & Cafes + Shopping	46587
	2. Cultural & Historic + Dining & Cafes + Green Recreation	40567
	3. Cultural & Historic + Dining & Cafes + Event venue	32407
	4. Dining & Cafes + Green Recreation + Shopping	25792
	5. Dining & Cafes + Event venue + Shopping	24035
	6. Cannabisshop + Cultural & Historic + Dining & Cafes	21243
	7. Cultural & Historic + Green Recreation + Shopping	21109
	8. Dining & Cafes + Event venue + Green Recreation	18574
	9. Cultural & Historic + Event venue + Shopping	18538
	10. Activities + Cultural & Historic + Dining & Cafes	15776

4 Activities	Combinations	Amount
Four-activity combinations extend the core trio by weaving in parks or events. The most frequent quartet Cultural & Historic + Dining & Cafes + Green Recreation + Shopping—shows a full loop of: heritage site + coffee + park stroll + boutique browsing. The next two top-ranked swap in event venues. Other common patterns introduce “Activities” as an extra activity to the culture-food-shopping core.	1. Cultural & Historic + Dining & Cafes + Green Recreation + Shopping	18273
	2. Cultural & Historic + Dining & Cafes + Event venue + Shopping	15945
	3. Cultural & Historic + Dining & Cafes + Event venue + Green Recreation	13507
	4. Dining & Cafes + Event venue + Green Recreation + Shopping	11811
	5. Cultural & Historic + Event venue + Green Recreation + Shopping	9864
	6. Activities + Cultural & Historic + Dining & Cafes + Shopping	9861
	7. Activities + Cultural & Historic + Dining & Cafes + Event venue	8755
	8. Activities + Dining & Cafes + Event venue + Shopping	8459
	9. Activities + Cultural & Historic + Dining & Cafes + Green Recreation	8412
	10. Activities + Dining & Cafes + Green Recreation + Shopping	8265

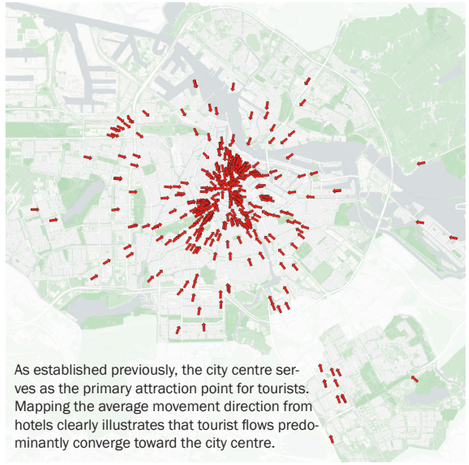
Across all combination sizes, Dining & Cafes is part of virtually every multi-activity sequence, while Cultural & Historic experiences also consistently are part of it. Shopping, Green Recreation, and Event Venues alternate as extensions of the core duo of culture + food. This shows patterns that suggest that to create more attractive areas the ability to experience culture and food is important, while at the same time giving the possibility of combining it with access to shops, green and events. Its important to create pedestrian friendly areas that give the tourist the ability to flow between these different activities and keep the experience going.

4.2.3 Dynamics of Pressure in Space

Tourists visiting a city seek varied experiences, resulting in dynamic movements throughout urban spaces. Understanding these dynamics is crucial for analysing tourism patterns and managing visitor flows effectively. Google Maps data provides a digital footprint through reviews left by tourists at various locations. These “breadcrumbs” offer valuable insights into tourist mobility within the city.

The data allows us to link tourists’ accommodations to the places they visit. Specifically, tourists leaving reviews at their hotels are tracked to other locations where they leave reviews within the same month. This method reveals prominent movements of visitors across different city areas and highlights which activities are particularly popular among tourists based on their accommodations or areas of stay.

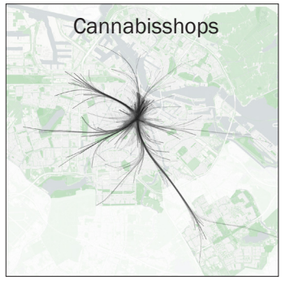
It is essential to recognize both the potential and limitations of this dataset. While it accurately indicates locations visited by tourists and their areas of origin, it does not provide precise routes taken or the sequence of activities during their visit. Rather the data offers a general sense of tourist flows, the broader movements tourists typically follow, based on their presence at specific sites. Additionally it highlights clusters or combinations of activities, demonstrating the experiences that tourists frequently choose together. Thus, while the data reveals patterns in tourist directionality and activity preferences, it cannot pinpoint exact timing or detailed movement paths.



As established previously, the city centre serves as the primary attraction point for tourists. Mapping the average movement direction from hotels clearly illustrates that tourist flows predominantly converge toward the city centre.

Insights emerge when analysing these movements through an edge bundling visualization, categorized by activity type. Although the dense concentration of attractions naturally draws tourists to the city centre, the edge bundling technique uniquely identifies significant directional trends of visitors originating outside this core area.

A clear pattern emerges, showing substantial tourist flows approaching from the southeast, south, west, and northwest directions. While these visualisations do not depict exact travel routes, they effectively indicate the broader corridors or pathways tourists typically use when heading toward central attractions. Recognizing these patterns offers opportunities to strategically enhance or utilise the spaces along these paths, potentially enriching tourist experiences and better distributing visitor pressure across the city.

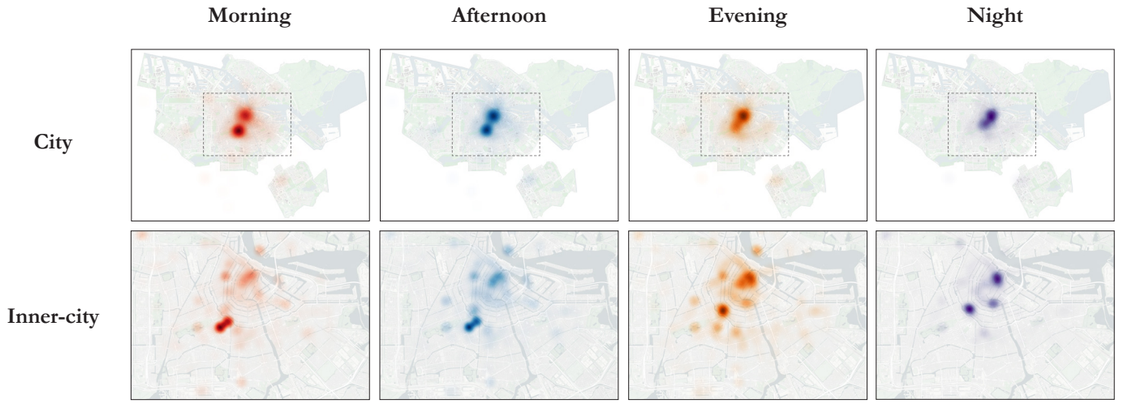


4.2.4 Pressure in Time

Tourist pressure in Amsterdam is not only unevenly distributed in space but also varies significantly over time. This dynamic nature is visualized through a series of heatmaps that illustrate how pressure flows across the city during different moments. The visualizations include both a city-wide view and a zoomed-in focus on the inner city, allowing for a more nuanced understanding of current pressure patterns.

When comparing weekdays to weekends, the differences appear to be relatively minor at the city scale. In both cases, the city centre consistently experiences the highest levels of tourist pressure, reinforcing the notion that tourists predominantly spend their time in these central areas.

Zooming into the inner city provides a more detailed perspective. Here, the pressure is most concentrated in the historic core. Surrounding this core, a ring of heightened activity follows the canal belt from the south, through the west and north, and back toward the centre. Another major hotspot is the area around Leidseplein and Museumplein. Due to the concentration of cultural and recreational amenities in this area, it attracts a steady flow of tourists throughout both weekdays and weekends.



Looking at variations across different times of the day reveals more pronounced changes than those between weekdays and weekends. In the morning and afternoon, the overall pattern remains similar: the central areas receive the most pressure. However, a closer look at the inner city shows a subtle shift. Tourist pressure is already high around Museumplein in the morning, as museums open early and begin attracting visitors. In contrast, the old city centre,characterized by shops, cafés, restaurants, and monuments, gains momentum later in the day. This suggests that different services/areas attract different flows of tourists at different times.

In the evening, the pattern changes significantly. Pressure around Museumplein diminishes, while activity around Leidseplein intensifies, making it a dominant hotspot during these hours. The old city centre also sees a notable increase in tourist presence, corresponding with the popularity of evening dining and entertainment services. Moving into the night, overall city usage declines, but pressure remains concentrated in three key areas: Leidseplein, Rembrandtplein, and the old city centre. These are Amsterdam's most prominent nightlife zones and continue to draw tourists well into the night.

4.2.5 The effect of Time on Pressure

Overtourism is not solely a function of where tourists go, it is also influenced by when they are there. This chapter explores how the time of day affects the experience of tourist pressure, revealing that some hours are more prone to generating nuisance than others.

To examine this, data from the Veiligheidsindex survey (showed on the map in chapter 4.1.2.) that capture the percentage of residents who report experiencing tourism-related nuisance in each neighbourhood, was combined with spatial data on tourist pressure. By calculating the correlation between perceived nuisance and measured pressure for each hour of the day, a clearer picture emerges of when overtourism is most strongly felt.

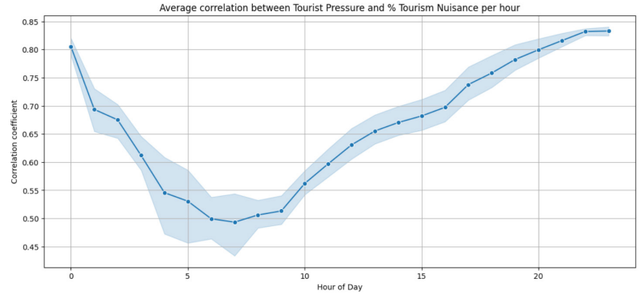
The resulting graph shows that correlation levels vary over time, with notably higher correlations in the evening and nighttime hours, often exceeding 0.80. This suggests that these hours are particularly sensitive to the effects of overtourism. In contrast, correlations are lower during the morning and daytime. One explanation lies in residents' routines, evenings are typically when people return home and are more likely to encounter disruptions caused by tourism. These hours are also dominated by activities such as dining and nightlife, which are more likely to create noise, crowding, and other forms of disturbance.

Interestingly, while the absolute tourist pressure is often highest during the afternoon, these periods do not show the strongest link to nuisance. This highlights a key insight: **the experience of overtourism is not only tied to the volume of tourists, but also to the capacity or sensitivity of specific moments in time**. Certain hours may be more vulnerable simply because the threshold for disturbance is lower.

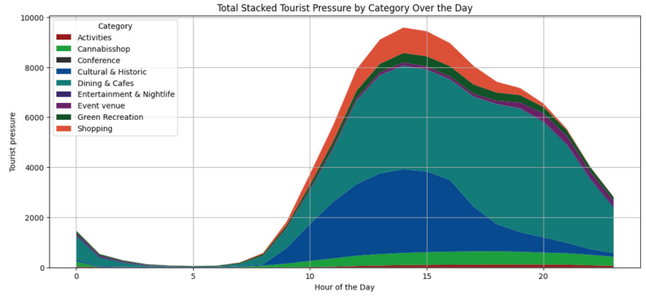
To support this interpretation, a second graph is provided that displays the overall tourist pressure for each hour of the day, using the same scale as the correlation graph. It also breaks down the pressure by category, offering insights into which types of tourist activities dominate at each time.

Together, these analyses reveal that the perception of overtourism cannot be fully understood by looking at spatial data alone. Temporal dynamics play a crucial role, and strategies aimed at mitigating pressure should take into account not only where and how much pressure occurs, but also when. At the same time, it is important to recognize that correlation does not imply causation. Other factors, such as resident tolerance, urban design, or the spatial configuration of amenities, may also influence perceptions of nuisance.

The upper graph shows the correlation between pressure and nuisance for every hour of the day.



The graph show the amount of tourist pressure and the composition of it for every hour of the day.



4.2.6 Conclusion

This chapter's analyses have showed several key insights into the complex dynamics of tourist pressure in Amsterdam. Firstly, tourist origin points heavily influence their movement patterns within the city. **Tourists staying in central hotels tend to remain within short walking distances**, reflecting the dense availability of attractions nearby, whereas **tourists staying in peripheral hotels frequently travel greater distances**, highlighting **imbalances in the city's spatial distribution of appealingness**.

The spatial analysis of tourist pressure has underscored the uneven distribution across Amsterdam, revealing **concentrated hotspots such as the city centre, Vondelpark, Museumplein, and activity districts like Leidseplein**. These areas consistently attract high levels of tourist activity across various categories including cultural experiences, nightlife, shopping, and green recreation. The analysis of activity combinations further demonstrated that **tourists predominantly pair cultural with dining, and combine this aswell with shopping, green, and events.**

Temporal analysis further nuanced the understanding of tourist pressure, revealing significant variations throughout the day. **Mornings and afternoons see steady visitor presence around cultural and shopping areas**, while **evenings and nighttime witness intensified activity around dining and nightlife hotspots.** Notably, the experience of overtourism-related nuisance is **most pronounced during evening and night hours,** aligning with resident routines and increased sensitivity to disturbances at these times.

Collectively, these insights offer a detailed snapshot of Amsterdam's current tourism system. It is characterized by a **strong centralization of activity**, predictable yet dynamic tourist flows, and a clear **need for better spatial and temporal distribution** to mitigate overtourism. The integration of spatial, temporal, and behavioral data reveals opportunities to alleviate overtourism by **enhancing attractiveness, accessibility, and walkability in underutilized city areas**. Besides this do these findings also suggest that a comprehensive, data-informed approach is essential to effectively understand and address the challenges posed by a city's tourism system.

When the tourists won't move, the sign will.

4.3 Carrying Capacity

The subquestion being answered in this chapter:
How does the urban environment influence overtourism pressure on liveability?

Overtourism occurs when tourist pressure exceeds what an area can handle, resulting in nuisance for residents. The threshold at which this pressure becomes problematic is known as the carrying capacity. Importantly, this threshold is not fixed, it is shaped by a variety of factors. As discussed earlier, time plays a role in how nuisance is perceived. In this chapter, the focus shifts to the urban environment and how its characteristics influence this threshold.

To better understand the carrying capacity of urban areas, we analyse several elements related to spatial and structural capacity. First, we use a Space Syntax Angular Choice analysis, which reveals how well-connected and accessible an area is within the pedestrian network, a key indicator of a space's ability to absorb flows of movement.

A second approach examines the physical makeup of the urban fabric through three key indicators: Floor Space Index (FSI), Ground Space Index (GSI), and the Mixed-use Index (MXI). These metrics provide insight into the intensity of development, ground coverage, and functional diversity of an area, all of which contribute to its capacity to accommodate tourist activity.

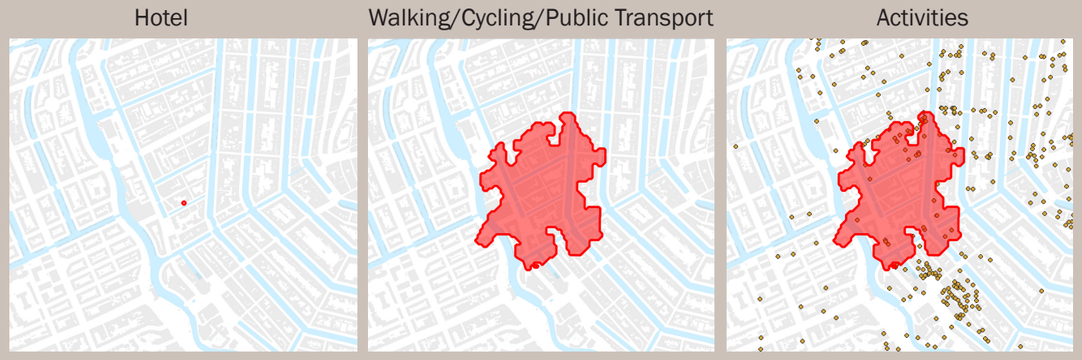
Finally, we bring together multiple datasets, overtourism scores per district, tourist pressure per district, and the availability of pedestrian, built, and private space, to explore their combined influence. Using a moderation analysis through multiple linear regression, we assess how these morphological features affect the relationship between tourist pressure and overtourism.

The insights from this chapter aim to clarify which elements of urban form contribute to higher resilience or vulnerability to overtourism, helping to inform better spatial planning and management strategies.

Explainer: How are areas of accessibility defined?

Knowing where tourists are staying reveals where they begin their interaction with the city. Hotels are used as origin points from which tourists start their daily activities. Using the TravelTime app, travel-time isochrones were generated for each hotel, showing areas accessible within specific time intervals by walking, cycling, or public transport.

These isochrones form the foundation for the spatial analysis. Within each isochrone, the potential capacity of the urban environment and the pressure of tourist activity are assessed. Network capacity is measured through an Angular Choice analysis, where the isochrones are used to define the network of the area. Additionally, urban form indicators, such as FSI, GSI, and MXI, are used to describe the built environment within the reachable area. The moderation analysis itself does not make use of the isochrones, but the results are used to than calculate the morphological features, within the isochrones.



4.3.1 Network capacity

To evaluate how well different areas of Amsterdam can accommodate tourist flows, both the capacity of the street network and the level of tourist pressure in those areas are assessed. This analysis helps identify where tourism is sustainable, where it can grow, and where it may already be overwhelming.

With the pedestrian street network, using Angular Choice analysis, a method from space syntax theory, it is assessed how likely each street segment is to be chosen as part of a route. The higher the Angular Choice score, the more central and accessible the street is within the network. After calculating these scores, the top 25% of segments with the highest Angular Choice values are selected. These represent the most “high-capacity” streets, those best suited to handle movement and potential tourist flows. The isochrones representing the different ranges are used to calculate the total length of the street network and the length of streets that fall in the top 25% of Angular Choice scores. The ratio of high-capacity streets to the total network length gives a network capacity score for that area. The scores are than grouped into Low, Medium, or High capacity using data quantiles, dividing the values into three equal-sized groups.

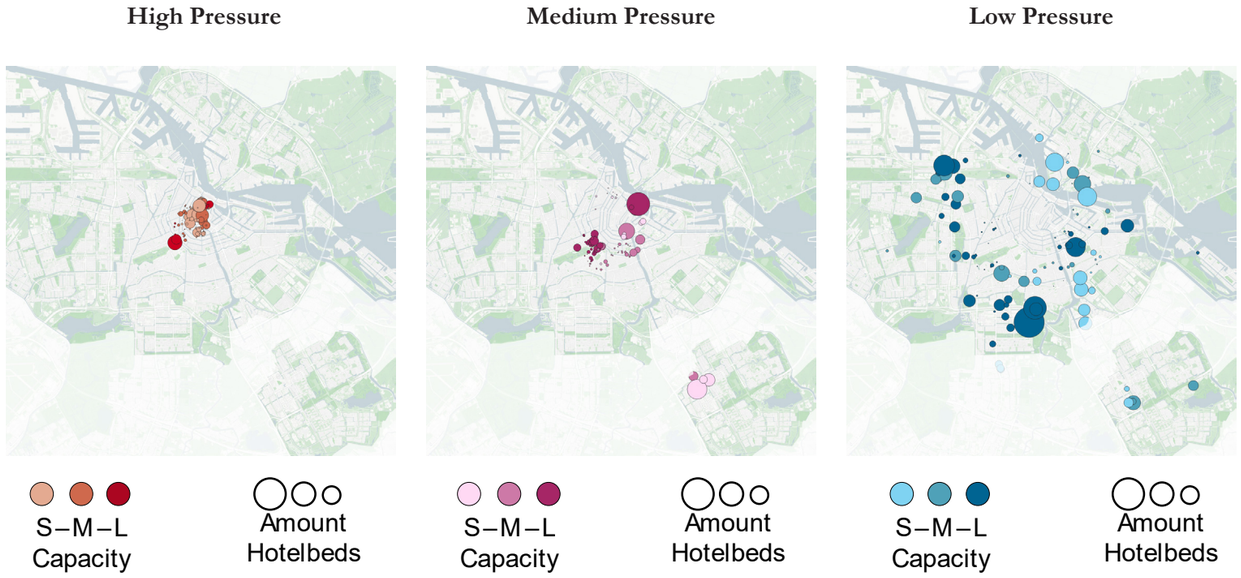
Using the same isochrones, the tourist pressure is calculated by summing the busyness of all tourist categories located within each area. These scores represent how intensively the area is used by tourists. As with network capacity, these values were classified into Low, Medium, or High pressure using the same quantile method. The network capacity and tourist pressure are combined into a single typology. Each area was categorized based on how its capacity compares with its pressure. This resulted in nine combined categories, as shown in the legend.

The maps show how the Angular Choice analysis is performed

Areas categorised as low capacity with high pressure are predominantly found in the historic city centre. These zones are the most vulnerable to overtourism, as the street network lacks the capacity to absorb the intense tourist flows. Alleviating pressure in these areas is difficult through physical spatial interventions, given the dense urban fabric. Therefore, the most viable approach is to adjust the function and composition of tourist amenities to better suit the area's limited capacity. In contrast, low capacity areas with low or medium pressure are mostly located outside the city centre and are not currently under significant stress.

Medium capacity with high pressure areas are also situated largely within the old city centre. While these areas show a more robust network compared to low-capacity zones, they still suffer from high tourist pressure, and interventions remain challenging due to the limited space for structural changes. On the other hand, areas with medium capacity and low or medium pressure are generally found just south of the centre and scattered across peripheral neighbourhoods.

The high capacity category shows the most promise. Areas with high capacity and high pressure are located around Central Station, Vondelpark, and Museumplein. The places already absorb substantial tourist flows but still are structurally equipped to handle them. Adjacent areas with high capacity and medium pressure lie just outside this zone, indicating strong network potential with moderate existing use. The most strategic opportunity lies in the high capacity and low pressure areas. These are found in a strip from the northwest to the southwest of the city, as well as in parts of the inner east. These neighbourhoods combine a strong pedestrian network with relatively low levels of tourism and could be leveraged to host more tourist-oriented amenities and redirect flows.



4.3.2 Space capacity

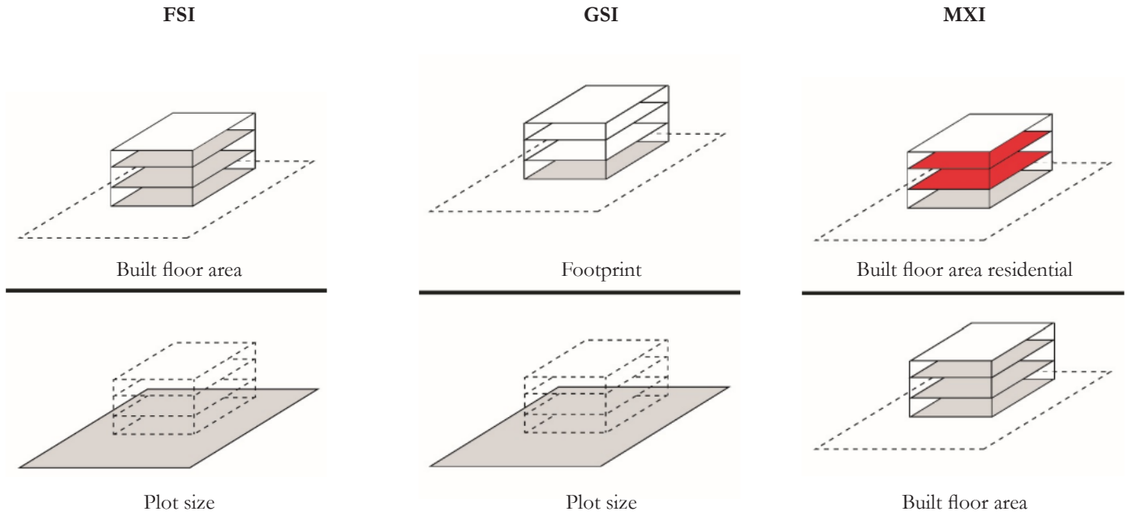
While the previous chapter examined capacity through the lens of the street network using Angular Choice analysis, this chapter shifts focus toward the spatial characteristics of the urban environment. It investigates how the physical composition and land-use intensity of an area may influence its ability to accommodate tourist pressure.

To do this, three key indicators are used: the Floor Space Index (FSI), the Ground Space Index (GSI), and the Mixed-use Index (MXI).

- FSI represents the total built floor area relative to the plot size and indicates the vertical intensity of development.
- GSI reflects the percentage of land covered by buildings and relates to how densely space is occupied on the ground level.
- MXI measures the diversity of land uses within an area and points to the potential for multifunctionality and adaptability of urban space.

These indicators offer insight into how much built space exists, how intensely it is used, and how adaptable the area might be for different activities.

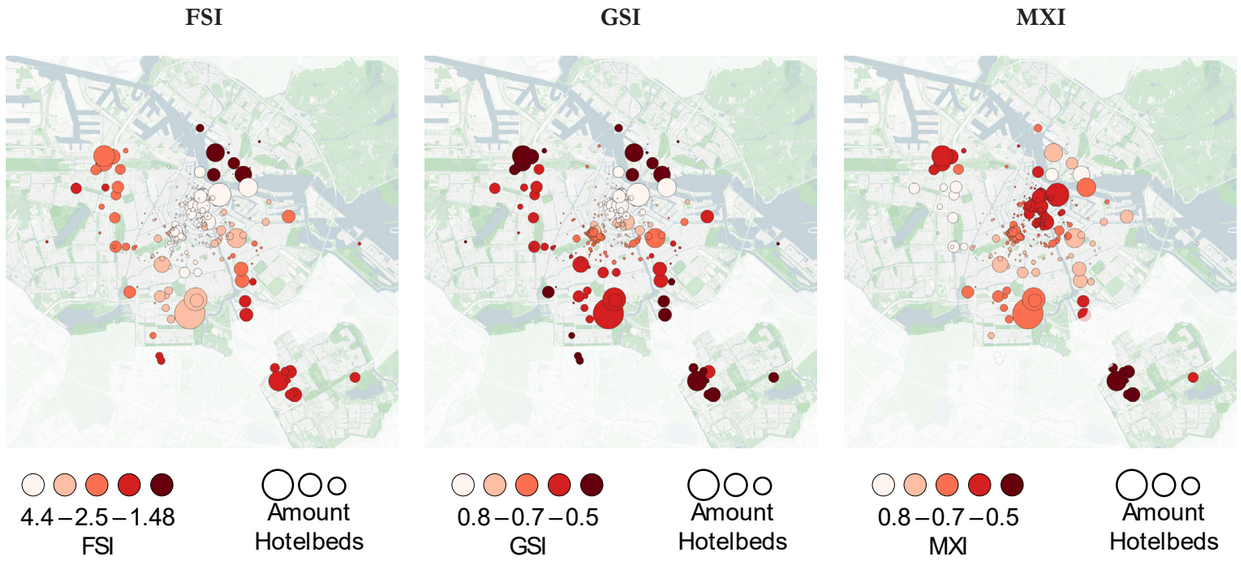
To measure these values, data from the RUDIFUN dataset is used at the netto bouwblok (net building block) level. For each hotel, the 15-minute walking isochrone is used, representing the spatial catchment area accessible to tourists on foot. All building blocks within this range are then selected, and the mean value of each indicator (FSI, GSI, MXI) is calculated. This results in a spatial capacity score for each hotel area, allowing comparison between zones based on their physical ability to absorb or facilitate tourist activity.



[Fig. 4.3.2] Calculation of FSI, GSI and MXI (PBL, 2024)

FSI and GSI display similar spatial distributions. The inner city shows the highest values for both indicators. Its figures reflect a dense urban fabric, both vertically and horizontally, which means there is little open space and a high concentration of built volume. Such characteristics limit the capacity for additional use or flexibility and are associated with the high levels of tourism pressure and nuisance found in this area. Moving toward the outer districts, particularly in the north, both FSI and GSI values drop significantly, indicating a lower density urban form with more open space and less built-up intensity. These areas may have a higher capacity to absorb additional activity without causing immediate nuisance, now they currently experience less tourist pressure.

The MXI (Mixed-use Index) reveals a different pattern. The Bijlmer ArenA area shows the lowest level of functional mix, indicating strong single-use zoning. Despite the area's large spatial capacity, this lack of mix may limit its appeal to a wider variety of tourists and reduce its ability to function as a resilient urban environment. The inner city, while dense, also has relatively low MXI values, suggesting a concentration of mono-functional spaces (mostly oriented toward tourism or retail) that might exacerbate tourism pressure and reduce adaptability. The highest levels of MXI are found in West Amsterdam, pointing to a more diverse and flexible urban environment. This mix of functions may enhance the neighbourhood's capacity to accommodate tourists without disturbing local life. The older South areas also perform well, while the Zuidas scores somewhat lower, likely due to its dominance by office and business functions, which may limit its potential as a tourism destination despite its physical capacity.



4.3.3 Urban Environment

Looking back at the Media Content Analysis, several points made by residents reveal potential connections to the physical characteristics of the urban environment. For example, quotes such as:

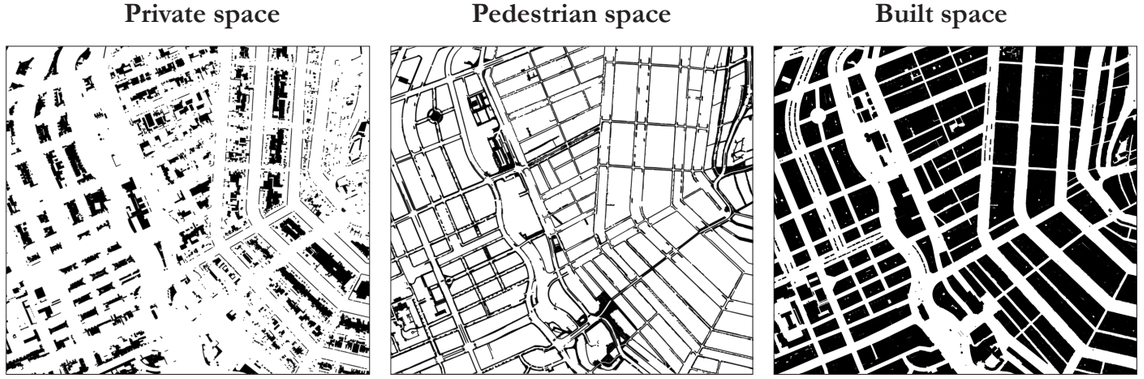
“I don’t want to sit outside because it’s way too busy, way too much noise.”
“People just walk past each other and don’t recognize each other, that’s the ugly thing.”
“Outside it’s only noise, noise, and screaming and shouting. You can’t relax in your own street.”

These statements suggest that aspects of the built environment may influence the experience of nuisance. When a resident says they don’t want to sit outside, this could be due to a lack of private outdoor space that offers peace and separation. When someone mentions that “people just walk past each other and don’t recognise each other,” this might relate to the amount of pedestrian space available in the neighbourhood, when sidewalks or public walkways are narrow or overcrowded, social interactions may become more transactional or distant. When a resident says they “can’t relax in their own street,” this could reflect the amount of built space in the area. A dense concentration of built-up surfaces might leave little room for calming, open areas that typically offer visual and acoustic relief from urban stressors.

To investigate these potential relationships, spatial data from the Basisregistratie Grootschalige Topografie (BGT) is used to quantify three key aspects of the built environment in each neighbourhood:
- Private space (e.g., gardens or (semi-)private outdoor areas)
- Pedestrian space (e.g., sidewalks, squares, and pathways)
- Built space (total built-up surface)

For each neighbourhood, the total surface area of these categories is calculated. These values are then combined with two other datasets, the percentage of residents who report experiencing nuisance from tourism and the tourist pressure in each neighbourhood, calculated using the tourist pressure data.

While earlier analysis focused on direct correlations between tourist pressure and perceived nuisance, this chapter goes a step further. Through a moderation analysis, it is examined how the built environment influences the relationship between tourist pressure and experienced nuisance. In particular, does private, pedestrian, or built spaces strengthen or weaken the effects of tourism pressure on residents’ well-being?



An example of what the 3 datasets look like spatially

To answer this question, a moderation analysis was performed. A moderation analysis is a statistical method that tests whether the effect of one variable on another depends on a third variable, known as the moderator. In this case it comes down to:

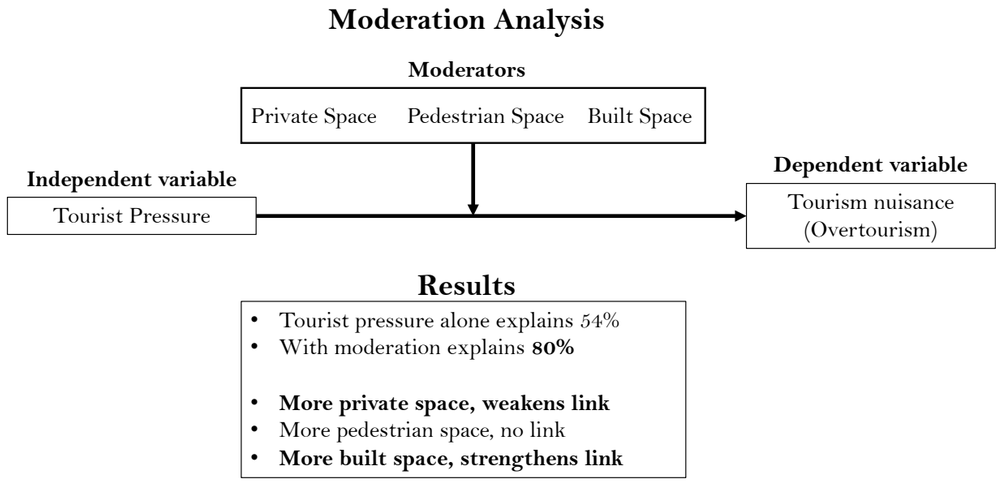
- Tourist pressure is the independent variable, the factor that may cause nuisance
- Perceived nuisance (the percentage of residents who report nuisance from tourism) is the dependent variable, the outcome we're trying to understand.
- Built environment characteristics (the amount of private space, pedestrian space, and built space) are the moderators, they may change how strongly tourist pressure leads to nuisance.

With these elements quantified for every neighbourhood, they can be standardised. This is done to ensure all variables could be compared fairly, since they were measured in different units. This means that each variable is converted to a common scale, where the average is 0 and the spread is measured in standard deviations. This step also helps reduce problems with mathematical overlap between the variables.

For each spatial variable, we created an interaction term by multiplying it with tourist pressure:
- Tourist Pressure × Private Space
- Tourist Pressure × Pedestrian Space
- Tourist Pressure × Built Space

These terms allow the model to detect whether tourist pressure has a different impact depending on the amount of each spatial feature.

Two statistical models were ran, A base model which only included tourist pressure, and a moderation model, which added the spatial variables and the interaction terms. The base model showed that tourist pressure alone explains 54% of the differences in how much nuisance is reported between neighbourhoods. The moderation model improved the explanation to almost 80%, meaning that the built environment clearly helps explain how tourism is experienced.



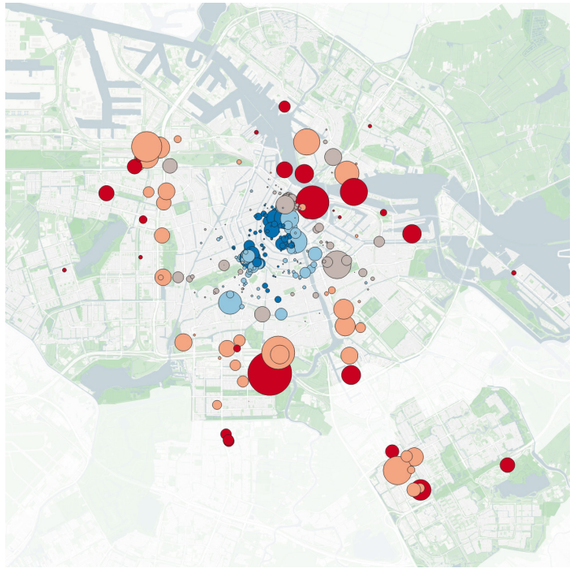
The results showed that in neighbourhoods with more private space, the link between tourist pressure and nuisance becomes weaker. These areas seem better at absorbing the effects of tourism, perhaps because residents have space to withdraw. More pedestrian space only slightly reduces the impact of tourism on nuisance, showing not such a strong link. More built space makes the relationship stronger, these neighbourhoods become more sensitive to tourist pressure, likely because the built-up environment leaves little room to spread out or escape the crowds.

The moderation analysis shows that the built environment doesn't just affect the physical shape of a neighbourhood, it also affects how tourism is felt by the people living there. Even with the same number of tourists, some areas will feel more overwhelmed than others, depending on how the space is structured. This helps shift the discussion about overtourism from just managing tourist numbers to also thinking about how urban design can reduce the impact of tourism on residents' daily lives.

Translation to Case

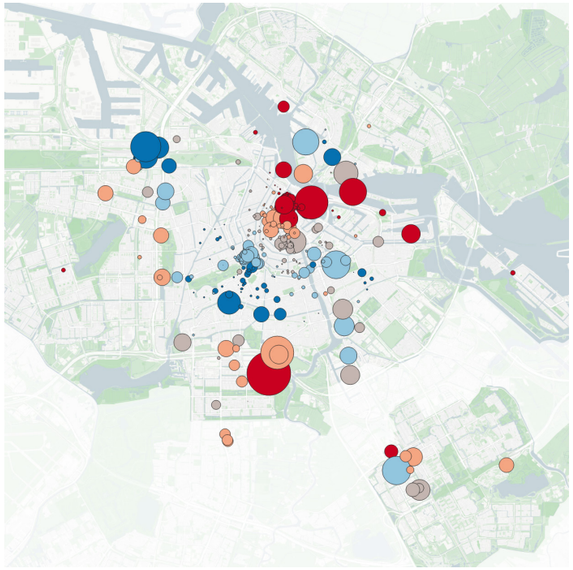
With the knowledge on the effect of Built space and Private space, this is calculated for every 15 minute walking isochrone of a hotel. The built space clearly shows a more densely built, and therefore little room for spreading, centre. The areas outside the city centre have less built space. The private space shows a more interesting and mixed result. Although the old centre again doesn't have a lot of space, the same is the case in some areas outside the centre. Also, the areas with a high amount of private space can be found in the densely built south of Amsterdam and some areas outside the centre

Built space



Amount of built space

Private space



Amount of private space

4.3.4 Conclusion

The analysis conducted in this chapter provides critical insights into how the urban environment shapes Amsterdam's carrying capacity regarding overtourism. By combining network analysis, spatial form indicators, and a moderation analysis of urban features, it becomes clear that **not all urban spaces are equally equipped to handle tourist pressure**.

The Space Syntax Angular Choice analysis illustrates distinct variations in network capacity across Amsterdam. Areas in the **inner city show low network capacity** but experience high tourist pressure, highlighting their vulnerability to overtourism. In contrast, **zones outside the city centre exhibit moderate to high network capacities** coupled with lower tourist pressure, presenting opportunities to strategically redirect or distribute tourism flows to these underutilised spaces.

Spatial capacity indicators—Floor Space Index (FSI), Ground Space Index (GSI), and Mixed-use Index (MXI)—further reveal how physical and functional urban characteristics influence an area's resilience to overtourism. **The densely built-up inner city, characterized by high FSI and GSI values, offers limited spatial flexibility** and contributes to intensified tourist nuisance. On the other hand, **peripheral areas with lower density suggest higher adaptability to tourist activities**. Importantly, areas like West Amsterdam, with **higher MXI scores, reflect enhanced adaptability and resilience due to functional diversity,** underscoring the potential of mixed-use development as a tool for managing tourism pressures.

The moderation analysis significantly deepens our understanding by connecting the built environment directly to residents' experience of nuisance from tourism. **Private space emerges as an important mitigating factor**, weakening the impact of tourist pressure on resident wellbeing by providing spaces for withdrawal and relaxation. In contrast, **increased built space intensifies sensitivity to overtourism**, with limited possibilities for residents to escape or spread out, exacerbating nuisance levels. Pedestrian space has only a minor mitigating effect.

Collectively, these findings emphasize that **managing overtourism effectively requires more than controlling tourist numbers**, it necessitates thoughtful spatial and urban planning strategies. **Prioritising mixed-use development, ensuring adequate private spaces, and leveraging high-capacity network areas** can greatly enhance urban resilience in the city. The built environment does not merely shape the physical contours of Amsterdam but profoundly influences how tourist pressures translate into lived experiences for residents. Consequently, **strategic urban design can reduce overtourism impacts and enhance overall urban liveability.**

The sidewalk for standing, the street for walking

5. Finding a DeTour

5 Finding a DeTour

The subquestion being answered in this chapter:
How can the development of a new tourism strategy contribute to adressing overtourism in Amsterdam?

Analysing tourism gives valuable insights, but to mitigate overtourism a plan is needed. Such a plan must be grounded in analysis, yet forward-looking in its intentions. The first step is identifying an area with the potential to take on a new role within the urban tourism system. This potential is shaped not only by static features, such as morphology and zoning, but also by existing dynamics within the city.

Like any system, a tourism system cannot simply be rebuilt from scratch. Cities are living structures, layered and evolving. To change a system interventions should be made while working with its current flows and rhythms. Change begins by nudging what already exists, redirecting movement and use, rather than erasing and replacing.

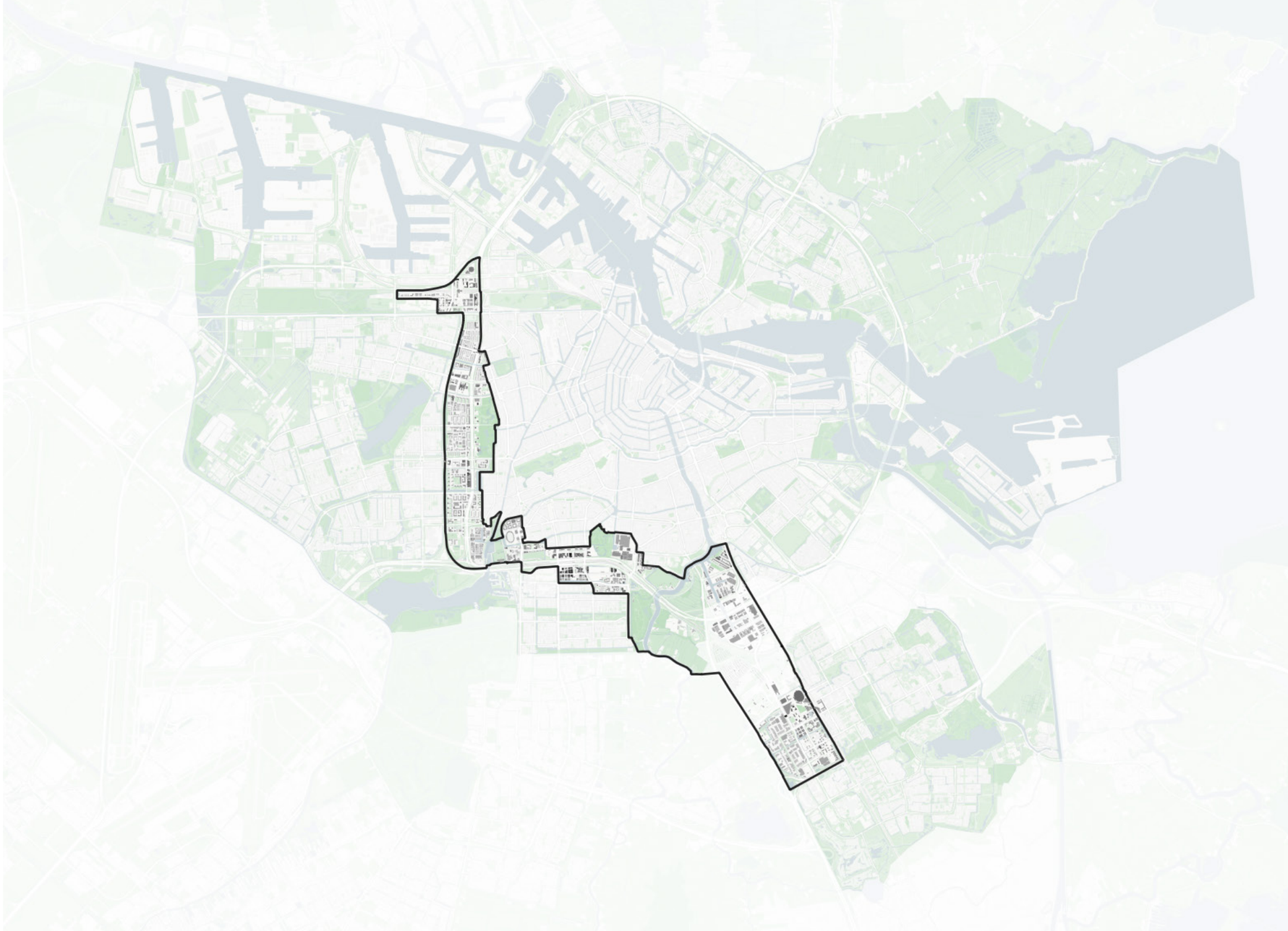
This chapter presents how, in the case of Amsterdam, a new area is selected to form the mitigation strategy. It explains both the rationale behind the choice and the process through which this strategic ‘DeTour’ is found.

5.1 The Detour

To mitigate tourist pressure, a new strategy will be proposed. This strategy aims to redirect tourists toward alternative locations, thereby relieving nuisance and increasing liveability. Central to this approach is the creation of a DeTour, a corridor of interconnected areas spanning the Southeast, South, West, and Nieuw-West districts of the city. This corridor offers diverse and tailored experiences designed not only to enhance the city's appeal to tourists but also to enrich urban life for local residents.

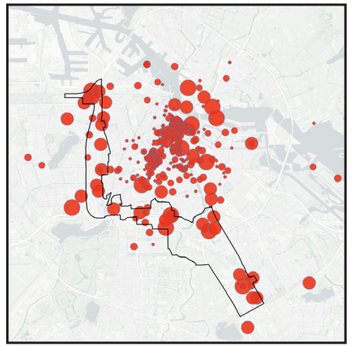
DeTour has been developed based not only on insights from the analyses but also on the ambition to introduce a new type of urbanism that effectively responds to contemporary tourism trends. Recognizing the evolving nature of tourism, DeTour offers tailored urban experiences that address key trends:

- Experiential Tourism: Focusing on immersive activities rather than passive sightseeing.
- Proximity and Variety: Offering a wide range of diverse experiences and services within short travel distances.
- Sustainability: Promoting sustainable urban mobility through public transport connections.
- Nature Integration: Creating attractive natural spaces as peaceful retreats.



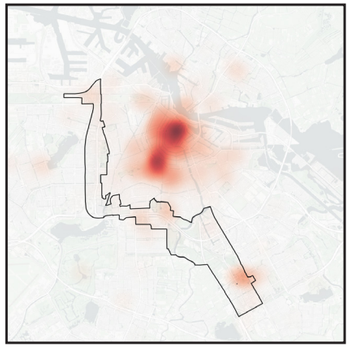
5.2 Shaping a DeTour

The composition of the DeTour is based on multiple findings from the analyses. Using these findings a strategic area is identified that has a lot of potential on city level aswell as neighbourhood level. It is not only based on the potentials, but also on the current system. It is important when working with such a complex system as tourism to make use of current dynamics of the system and hook on to it. With that changing the system becomes more feasible than instead just proposing something totally new. The maps each show how the positioning of the DeTour makes sense.

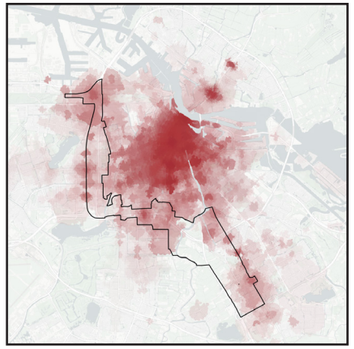


33% of the hotelbeds in Amsterdam are located within the corridor, creating a well positioned area in the current system

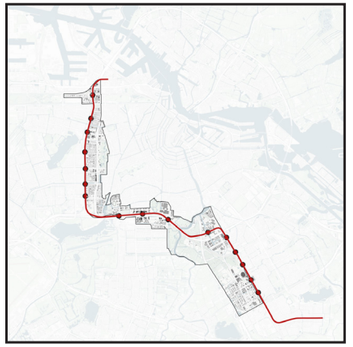
Multiple tourist flows from the current system cross or flow along the region



Some areas already take part in the current system, creating anchor points

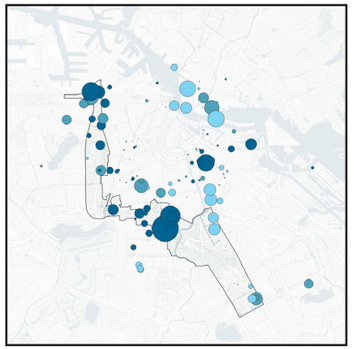


It is well reachable by public transport from inside the city

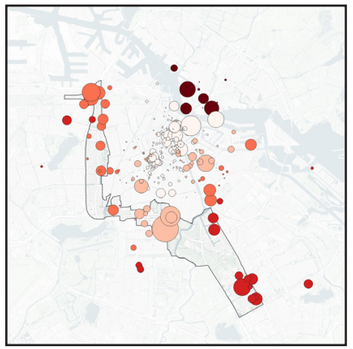


The metroline 50 is the backbone of the corridor that connects the areas

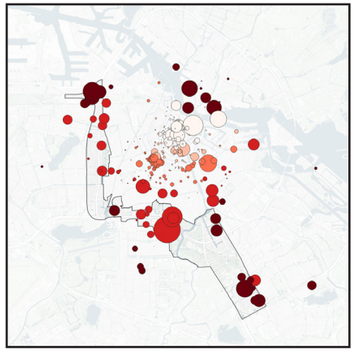
Most areas in the corridor are covered within 15 minutes walking from every station



The corridor area falls under the area with a large network capacity



The lower FSI gives more capacity for pressure and/or vertical development



The lower GSI gives more capacity for pressure on ground level, also giving the opportunity to possible development

Zones

The delineation of the proposed zones is shaped by a combination of existing municipal zoning plans, spatial morphology, and the current dynamics of the tourism system. The corridor consists of three main cores and the intercore zones between them, each with distinctive characteristics.

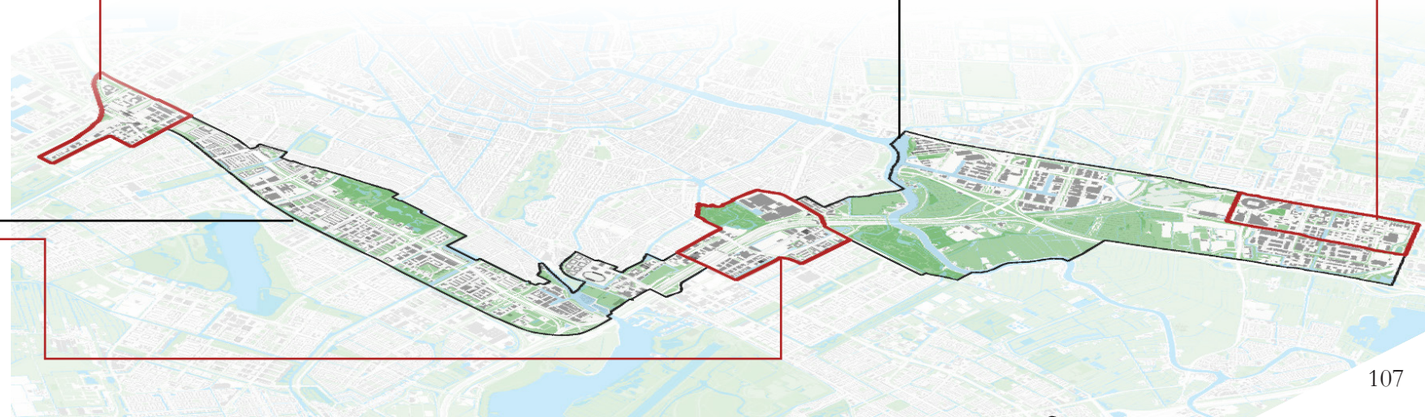
Sloterdijk is characterised by its role as a major transport node. The concentration of rail and road infrastructure defines its physical edges. Despite this “cut-up” morphology, the area is highly connected and accessible, especially due to its role in hosting a significant number of hotel beds. The delineation respects this infrastructural edge, while acknowledging Sloterdijk’s strategic role in the tourist accommodation system.

The Intercore West zone, directly adjacent to Sloterdijk, inherits much of its spatial structure from the surrounding infrastructure. While one might assume the metro line and stations would anchor this zone on both sides, only the east side of the line is included. This is because tourist movement patterns currently orient more toward the east, aligning this area more naturally with existing flows. The east side is also less residential oriented, allowing for potential transformation with less nuisance. Rembrandtpark, although situated just beyond the highway, is integrated into the corridor due to its potential to provide a green leisure experience within this highly urbanized context.

The Zuidas core displays a different morphological logic. Unlike the intercore West, where infrastructure marks the edge, here the highway runs through the middle of the zone, acting more as a spine than a border. The area’s definition centres around the station and the adjoining World Trade Centre and RAI districts. Future infrastructural changes, such as the Zuidasdok project, will further strengthen the connection between the two sides. The adjacent Beatrixpark is included in the delineation for its ability to contribute green and recreational value within an area otherwise dominated by office and conference uses.

The intercore zone connecting Zuidas and Bijlmer Arena runs through the Amstelpark and opens into a broader open-space zone. The southern boundary of this zone follows the municipal border, aligning with the Amstelscheg green wedge, while the Amstel River provides a natural northern edge. As with the west side, the metro line again defines the boundary, with only the west side being included. This decision is informed by land use: the west side hosts industrial and office functions rather than residential areas, reducing the risk of nuisance and providing opportunities for functional transformation.

Bijlmer ArenA is delineated by the convergence of highways and railway lines, which clearly frame the zone. Within this core lies the boulevard area and adjacent industrial/office zones, parts of which are already undergoing transformation. The zone is anchored by ArenA Boulevard, a major node for event-driven tourism, and offers large-scale urban blocks that can absorb pressure while accommodating further tourism-oriented development without immediate conflict with residential life.



From Multi-core to Corridor

The corridor strategy is a reinterpretation of Amsterdam's official multi-core vision. Rather than distributing attention equally across five separate urban cores, it focuses on three strategic cores and the vital intercore areas that link them. This approach builds directly on the findings of this research, which highlight the importance of spatial continuity, infrastructural connections, and existing tourist dynamics.

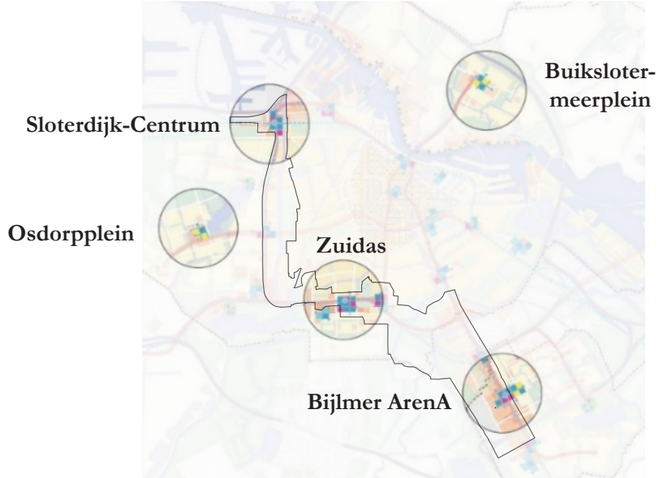
In the municipality's multi-core strategy, five urban nodes were envisioned as distinct metropolitan centres. While this concept promotes spatial decentralization, the analysis conducted here reveals that only three of these cores align with the actual functioning of the tourism system today. These three—Sloterdijk, Zuidas, and Bijlmer ArenA—already host a substantial number of hotels and are well-connected by high-capacity public transport infrastructure. Given the city's restrictions on new hotel developments, these existing facilities are especially valuable.

The remaining two cores from the municipal strategy do not currently exhibit the necessary conditions to function as tourism hubs. They lack sufficient hotel infrastructure, are more distant from metro access, and fall outside the dominant flows of tourist activity. Integrating them into a tourism-focused strategy would risk inefficiency and weaker impact.

The corridor concept differs not only in core selection but in spatial composition. Whereas the municipality's strategy consists of distinct, stand-alone urban "islands," the corridor emphasizes interconnectedness. This connectivity amplifies the strength of each location, creating a system where overlapping proximities and shared functions reinforce one another. The result is a networked structure that enables a multidimensional, seamless experience for tourists. Rather than competing individually, the cores and intercore areas function collectively as a vibrant and cohesive whole.

The intermediary zones play a critical role in this. They are not just transit spaces but active components that support and enrich the corridor. The western intercore zone forms a dense urban fabric nestled between the A10 and the metro line, while the eastern intercore area spans larger open spaces, punctuated by urban clusters with varying intensities. Together, these transitions create a rhythm of experiences and services that contribute to the corridor's overall attractiveness and spatial logic.

In conclusion, while building upon the city's foundational vision, the corridor strategy offers a more grounded and adaptive interpretation. By concentrating on real-world tourism patterns, existing capacities, and spatial synergies, it proposes a system that is not only more feasible but also more compelling for both visitors and the city.



The multi-core strategy creates 5 new tourist hotspots, 3 of them also are part of the DeTour

Corridor Complexity

The corridor strategy is not just a spatial alternative to Amsterdam's multi-core strategy, it is also conceptually rooted in the principles of complex systems theory. By understanding the city as a complex adaptive system, we can better comprehend how spatial interventions like the corridor can lead to more sustainable, legible, and resilient urban outcomes.

Network Thinking & Synergetics

In complex systems, systems composed of interconnected nodes are more robust and adaptable than those built on isolated units. Interconnected systems benefit from redundancy, flexibility, and load distribution, ensuring that no single element becomes overwhelmed. This principle is foundational to the corridor strategy.

Rather than positioning each area as a standalone tourism node the corridor connects areas like Sloterdijk, Zuidas, and Bijlmer ArenA into a networked system. Each contributes unique experiences while supporting one another through proximity and transit accessibility. This interdependence creates a structure in which tourist flows can be dynamically absorbed and redistributed, mitigating pressure at any one point. It reflects how synergetic relationships, common in ecosystems and transportation systems, enhance systemic resilience (Holling, 1973; Batty, 2007; Portugali, 2000). Systems composed of interconnected nodes are more robust and adaptable than those built on isolated units. Interconnected systems benefit from redundancy, flexibility, and load distribution, ensuring that no single element becomes overwhelmed. This principle is foundational to the corridor strategy.

Emergence & Path Dependency

Another core concept in complexity theory is emergence: the idea that system-level behaviors arise from the interactions between parts rather than from the properties of the parts themselves. By spatially linking experiences and enhancing transitions between them, the corridor invites new behavioral patterns, such as more diverse visit sequences, and greater exploration beyond the current behaviour.

This approach also respects path dependency, a concept in complexity theory which recognizes that historical trajectories shape current and future possibilities (Arthur, 1989). The DeTour does not seek to erase or overwrite existing tourism flows but rather builds on them. The corridor uses current assets like, hotel locations, destinations and existing flows. It shows emphasis on existing urban dynamics and the infeasibility of rebuilding cities from scratch (Portugali, 2011).

Modularity with Interdependence

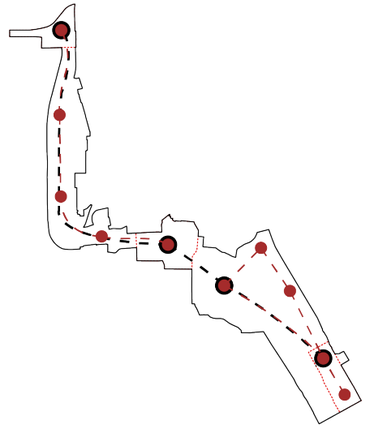
Complex systems often exhibit modular structures, clusters of components that are strongly connected internally but also maintain links to other modules. The three main cores in the corridor can be seen as such modules. Each functions as a distinct node with its own character, but none are fully self-sufficient. Instead, the intercore zones play a vital role in stitching the system together. They are not empty gaps or transition spaces but active parts of the strategy that enhance the continuity of experiences. This mirrors how feedback loops in complex systems create interdependencies between modules, strengthening the system as a whole (Portugali, 2000).

Resilience through Distribution

Resilience theory shows that distributed systems can better withstand shocks than centralized ones. In the urban context, this means that if one area becomes overcrowded or disrupted, others can adapt and absorb the overflow. The corridor strategy embodies this thinking. It does not rely on one place to meet all the needs of tourism but creates distributed capacity across a connected spatial system. This makes it possible to respond more flexibly to tourism peaks. As seen in studies on polycentric urban development, distributed spatial strategies offer stronger resilience to urban stressors (Meijers, 2008; Davoudi, 2003).An important aspect of complexity theory is how urban systems are experienced and understood by their users. Cities must be cognitively coherent, structured in ways that make them legible and navigable. Even within a dynamic environment, individuals need to be able to understand and move through the city intuitively.

The corridor strategy supports this by providing a linear, connected structure that offers clarity. Instead of isolated tourism islands, the corridor presents a continuous sequence of spaces, making the city easier to navigate and experience. This not only improves wayfinding but also helps distribute tourist flows more effectively.

This idea is reinforced by scholars like Portugali, who views the city as a cognitive system. He emphasizes that complex urban forms should remain comprehensible to users (Portugali, 2011) and that bottom-up interactions between people and places generate meaningful, persistent patterns in urban space (Portugali, 2000). In this light, the corridor functions not as a rigid plan, but as a framework that supports emergent, self-organizing behavior, allowing tourist flows to adjust organically within a clear and coherent spatial logic.



5.3.1.1 Sloterdijk Context

Location and Infrastructure
Located in northwest Amsterdam along the A10 ring road, Sloterdijk is a major multimodal hub with strong regional and international connections. Amsterdam Sloterdijk Station serves trains, metro, trams, and buses, offering direct links to Schiphol and the city centre. However, heavy infrastructure like rail lines, elevated tracks, and major roads have historically fragmented the area into isolated sections. Originally designed as a 1980s office park, the layout prioritized movement over place-making. Recent plans aim to reconnect these divided spaces by building over tracks and creating new public areas, signaling a shift toward a more integrated, human-scaled urban fabric.

Land Use and Built Form
Sloterdijk was long a mono-functional office zone, dominated by government and commercial buildings with little urban life. After the 2000s office market slump, the city introduced flexible zoning to allow housing, hotels, and mixed-use development. Today, around nine hotels and several new apartment complexes have emerged around the station, marking its gradual transformation into a mixed-use district. The urban form is evolving from isolated office blocks to a denser and more diverse environment, integrating work, living, and leisure.

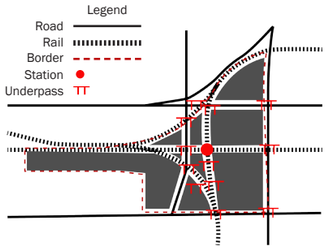
Public Space and Pedestrian Experience
The public realm, once car-dominated and sober, is being gradually improved. Interventions such as the redesign of Orlyplein into a green, pedestrian-friendly square, the addition of benches and crossings, and creative uses of vacant plots (like the Bret bar and a shipping container garden) have begun to humanize the area. While wide roads and infrastructure still pose barriers, the city's Haven-Stad, for which Sloterdijk will be the main public transport station, vision prioritizes high-quality pedestrian and cycling networks. As ground-floor amenities and housing increase, the area is trying to become more walkable and inviting.


[Fig. 5.3.1.1] Sloterdijk Area
(Amsterdam Municipality, 2025)


[Fig. 5.3.1.2] Sloterdijk Station
(tuinenstruinen.org, 2025)

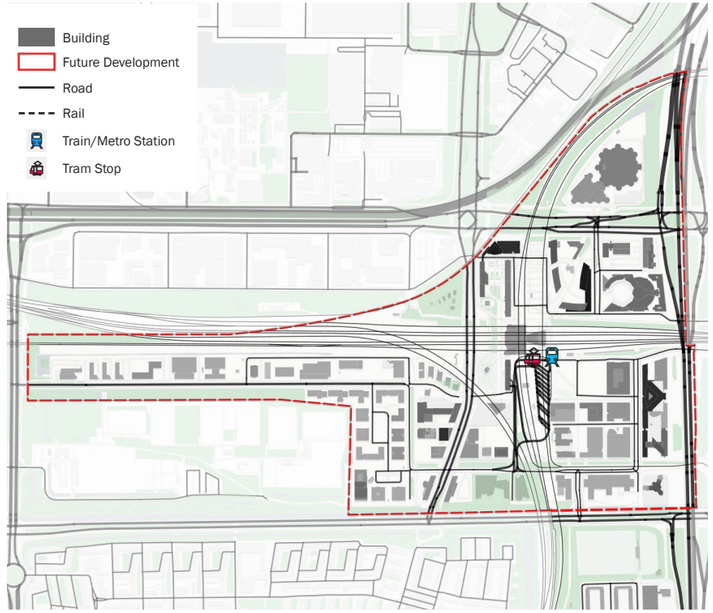

[Fig. 5.3.1.3] Sloterdijk Underpasses
(Google Streetview, 2025)

Ongoing Developments
Guided by the Haven-Stad masterplan, Sloterdijk is set to become a vibrant urban node within a broader harbor redevelopment. Key projects include building over infrastructure, expanding housing, and enhancing sustainable transport. The goal is to turn Sloterdijk into a lively, livable district that also appeals to visitors. Its success depends on creating an active street life, integrating amenities, and maintaining a human scale. Early developments—particularly the influx of hotels and public space upgrades—suggest a motivated start, positioning Sloterdijk as a potential secondary tourism and residential centre.



Sloterdijk station is split up by rails and roads

Sloterdijk

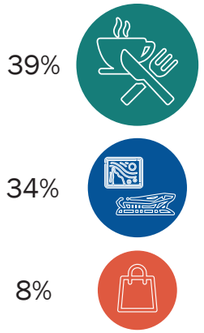


5.3.1.2 Sloterdijk Tourism

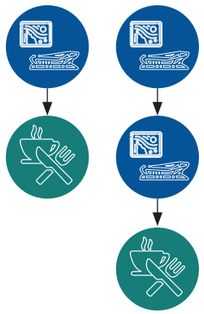
Sloterdijk attracts tourists with a calmer, culture-focused behavior. The most frequent tourist patterns revolve around cultural and historic site visits, often combined with dining experiences.Tourists here often engage in several cultural activities in a row, suggesting they are dedicated cultural explorers rather than casual visitors.However, the proximity data tells an interesting story: while some dining and shopping happen within 15 minutes, cultural visits often require traveling beyond 15 or even 25 minutes.

This suggests that Sloterdijk is more of a sleeping base for tourists who then move outward to engage with cultural sites elsewhere in the city.
Strengthening local cultural attractions or creating more localized experiences, could enhance Sloterdijk's attractiveness as a standalone destination rather than merely a hotel hub. Sloterdijk tourists can be described as culture seekers, but ones who are currently pulled away from the area to satisfy their interests.

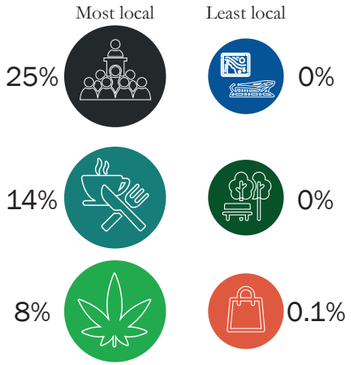
Percentage of Total Tourist Visits



Most Frequent combinations of activities

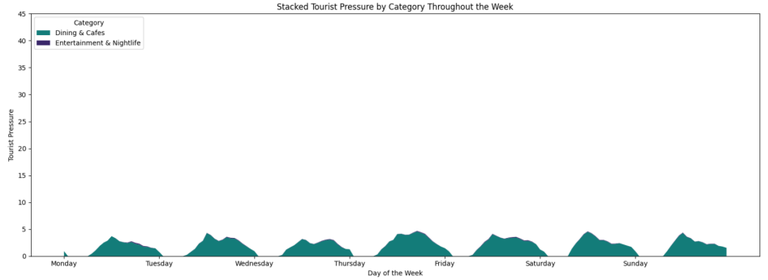


Percentage of activity in local area



Current tourist system in Sloterdijk

Tourist pressure in time in Sloterdijk



5.3.2.1 Bijlmer ArenA Context

Location and Infrastructure
Bijlmer ArenA, in Amsterdam's southeast, is a major transportation and event node. Anchored by the Amsterdam Bijlmer ArenA station, it connects to train, metro, and bus lines, with strong regional and national accessibility. The area's urban form is shaped by large-scale infrastructure and event venues on the west, and shopping and civic functions on the east, now better connected via an upgraded station and improved pedestrian routes. While still car-oriented in parts, recent public space upgrades aim to soften this legacy and improve walkability.

[Fig. 5.3.2.1] Bijlmer ArenA
(Johan Cruijff Arena, 2025)

Land Use and Built Form
The western side of the station is defined by large entertainment and retail structures: the Johan Cruijff ArenA stadium, Ziggo Dome, AFAS Live, a cinema, and shopping centres. Hotels and office buildings cluster nearby, serving event visitors. The eastern side, Amsterdamse Poort, is a local shopping and service hub surrounded by residential areas. While the area once lacked cohesion, redevelopment efforts are introducing more mixed-use functions, mid-rise housing, and active ground floors to create a more continuous urban fabric. These changes aim to balance the area's dual identity as a regional entertainment centre and local urban district.

[Fig. 5.3.2.2] Bijlmer boulevard
(Google Streetview, 2021)

Public Space and Pedestrian Experience
Public spaces have been significantly improved to accommodate both daily life and large event crowds. The

[Fig. 5.3.2.3] Bijlmer station
(Het Parool, 2022)

ArenA Boulevard was redesigned with seating, greenery, and dynamic lighting to support flexible use and encourage people to stay before and after events. Efforts to reduce the scale of the boulevard and enhance cross-connections have made the area more pedestrian-friendly. East of the station, upgrades to shopping streets and plazas aim to improve safety and attractiveness for both locals and visitors. However, challenges remain in areas where infrastructure and oversized buildings still dominate.

Ongoing Developments
The ArenAPoort masterplan envisions Bijlmer ArenA as a vibrant, mixed-use urban centre by 2030. Plans include new housing, modernization of Amsterdamse Poort, more cultural facilities, and better integration of public spaces. These changes aim to shift the area from an event-only zone to a full urban district with day-to-day activity. For tourism, this means moving beyond episodic visitation to a more sustained, place-based experience, one that combines entertainment, culture, and local life in a distinct urban setting.

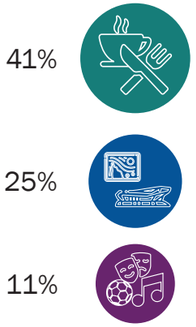
Bijlmer ArenA

5.3.2.2 Bijlmer ArenA Tourism

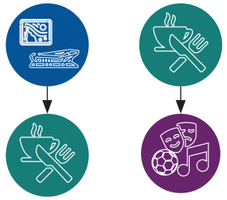
Tourists in Bijlmer ArenA exhibit a dynamic and event-driven behaviour. The area stands out with a large number of event-goers, visiting concerts, sports games, and event venues after enjoying meals at cafes and restaurants. A typical tourist journey often includes dining followed by attending an event, showing a clear connection between social leisure activities and event participation.

Proximity data shows that events are strongly concentrated nearby, with over 80% of event visits happening within 5 minutes. Dining activities often take place further than 5 minutes away, indicating that while events are well-covered, restaurants and cafes around Bijlmer may not fully meet tourist expectations. This reveals an opportunity to improve or diversify/strengthen the local food scene around Bijlmer to better capture and extend tourist stays. The tourists also go to cultural and historical places. They travel outside of the local area for these visits, aswell for the dining and nightlife activities that often follow after the visit.

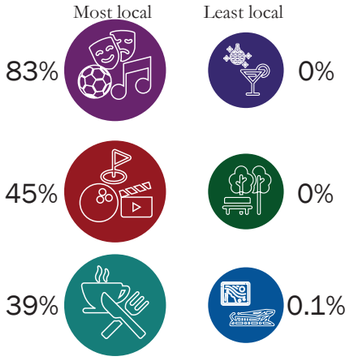
Percentage of Total Tourist Visits



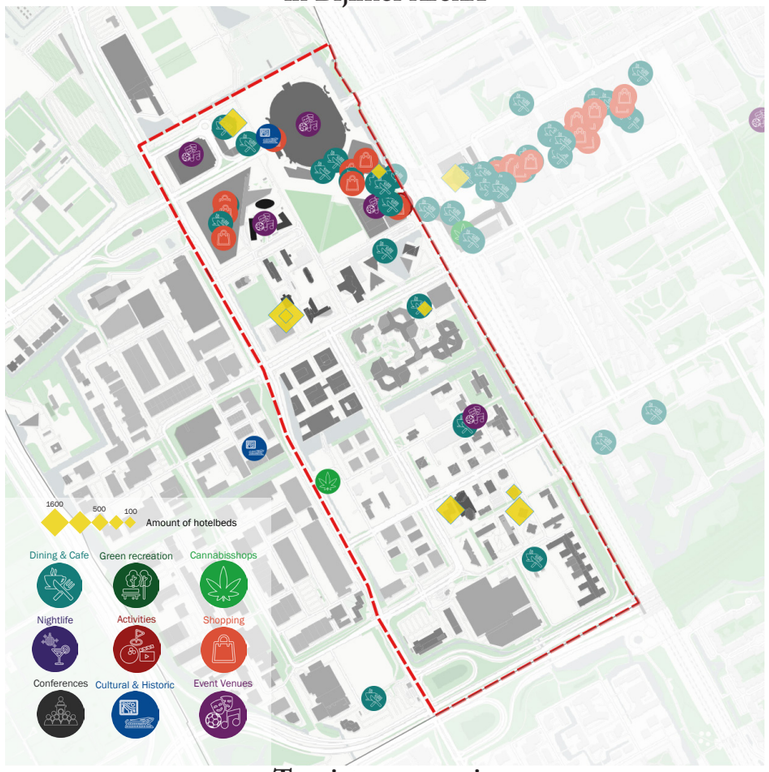
Most Frequent combinations of activities



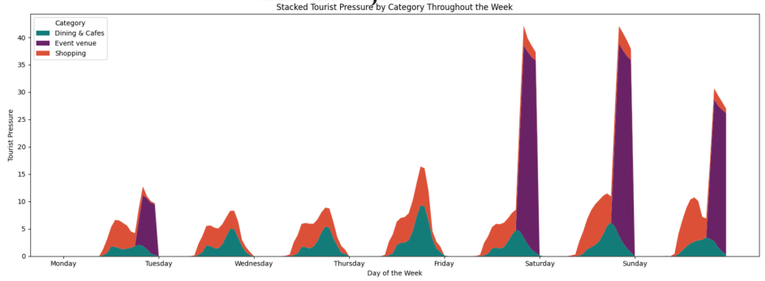
Percentage of activity in local area



Current tourist system in Bijlmer ArenA



Tourist pressure in time in Bijlmer ArenA



5.3.3.1 Zuidas Context

Location and Infrastructure
Zuidas, located in the south of Amsterdam along the A10 ring road, is a major international business district and transport hub. Anchored by Amsterdam Zuid station, it offers direct rail and metro links to Schiphol and the city centre, and is being further expanded through the Zuidasdok project, which will tunnel the highway and redevelop the station to improve connectivity. While the area was historically divided by rail lines and the A10, these upgrades aim to enhance pedestrian permeability and reduce car dominance, reinforcing Zuidas as a strategic urban node.

[Fig. 5.3.3.1] Zuidas
(Cie, 2025)

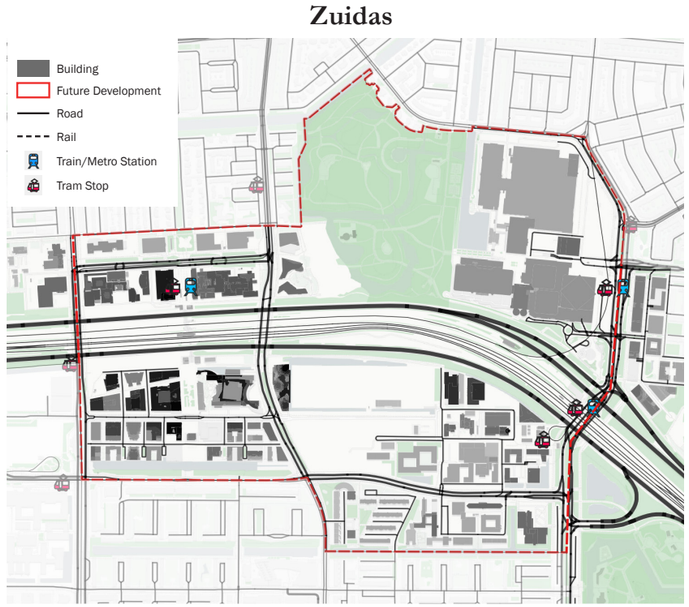
Land Use and Built Form
Initially designed as a high-end office district, Zuidas houses the headquarters of major corporations and the World Trade Centre. Over time, the area has shifted toward mixed-use development, integrating residential buildings, hotels, restaurants, and cultural facilities. New neighbourhoods like Gershwin and Mahler add housing, schools, and retail at ground level, while institutions like VU University and the RAI Convention Centre anchor the area's knowledge and event economies. Despite its modern skyline and dense development, large buildings and wide boulevards can still limit the human scale.

[Fig. 5.3.3.2] Station Zuid
(NRC, 2019)

Public Space and Pedestrian Experience
Public space in Zuidas has improved in recent years. Streets like Gustav Mahlerlaan feature wide sidewalks, bike lanes, and green elements. Temporary uses, such as gardens and art installations on undeveloped plots, help activate the area during development phases. A focus on sustainable mobility has led to pedestrian-friendly design and car-lite streets. Yet, the district retains a formal, corporate character, and its challenge remains in fostering the kind of organic, vibrant street life seen in other parts of the city.

[Fig. 5.3.3.3] Gustav Mahlerlaan
(Perry Tak, 2021)

Ongoing Developments
The Zuidasdok project and ongoing mixed-use developments aim to further transform Zuidas into a developed urban district. As more housing, cultural venues, and public spaces are introduced, the area may attract a broader spectrum of visitors. Its strong infrastructure, international orientation, and evolving urban amenities make it a key node in Amsterdam's polycentric strategy, serving not only economic goals but also offering an alternative urban experience to traditional tourist zones.

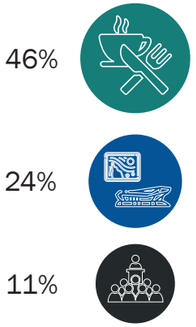


5.3.3.2 Zuidas Tourism

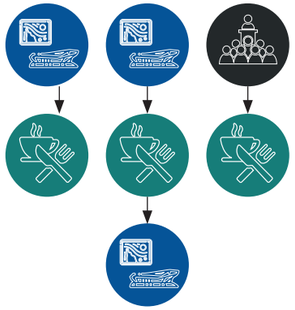
Tourists staying in Zuidas are characterized by a strong blend of cultural exploration and business activities. The most popular combinations include visits to cultural and historic sites followed by dining experiences, reflecting a balanced interest in both leisure and urban culture. While culture and food dominate the visit sequences, Zuidas stands out from the other cores with a relatively higher share of business visitors attending conferences before enjoying the city's dining options.

Analysing proximity, we see that conference activities are highly localized, with 100% of conference visits happening within 15 minutes. However, dining and shopping activities often require traveling beyond 15 minutes, indicating that tourists may need to leave the immediate surroundings to access a broader selection of restaurants or shops. This suggests that while Zuidas serves business needs very well, its leisure offer could be expanded to better retain tourists after business hours. Overall, Zuidas tourists can be seen as a business-leisure blend, seeking culture and dining, but currently relying on areas further away for some of their leisure needs.

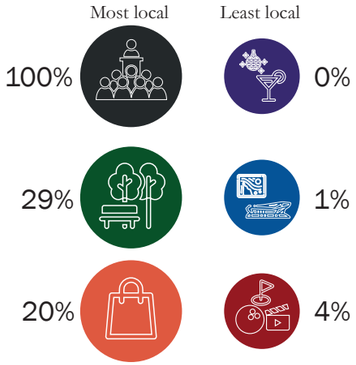
Percentage of Total Tourist Visits



Most Frequent combinations of activities

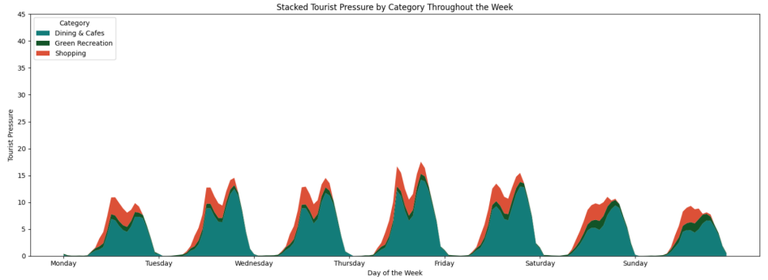


Percentage of activity in local area



Current tourist system in Zuidas

Tourist pressure in time in Zuidas

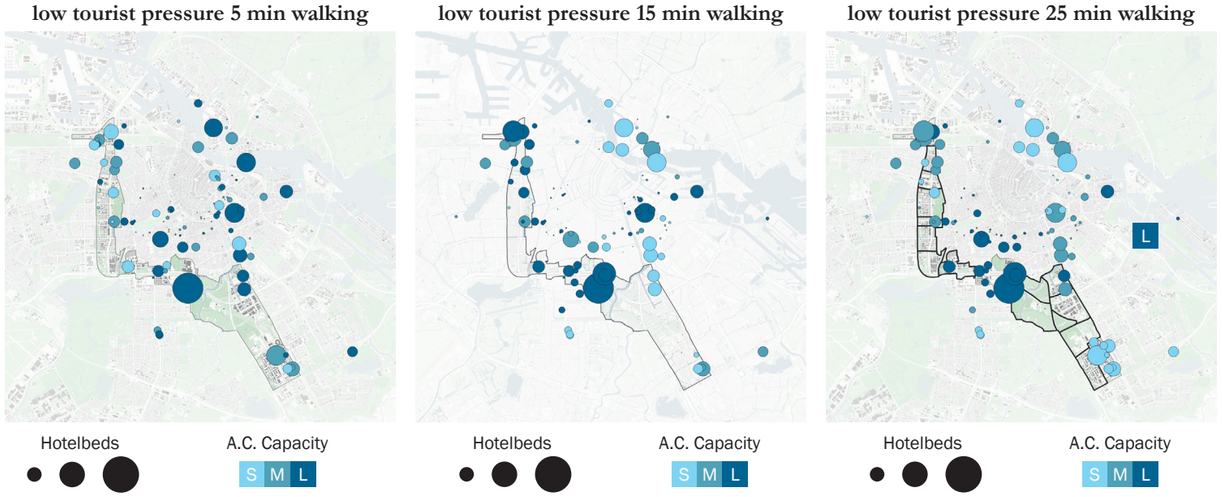


5.4 Relieving pressure in space

The analysis performed in previous chapters showed the tourist pressure across the city. It helped identifying key areas that currently experience low tourist pressure, especially in zones near hotel clusters. This played a roll in creating the DeTour and the zoning within it.

To further assess the suitability of the areas in the Detour, it is needed to zoomin to the cores. This will give better understanding on the core-scale. Like in the previous analysis an Angular Choice (A.C.) analysis using space syntax was performed within walking-distance isochrones of 5, 15, and 25 minutes. Angular Choice analysis measures how well-connected different urban areas are by evaluating their accessibility and potential for pedestrian movement.

Zuidas emerged as an area with consistently high capacity across all distances, indicating a robust network capable of accommodating increased tourist flows without significant infrastructural adjustments. Sloterdijk also exhibits strong network capacity at the 15- and 25-minute scales, yet demonstrates limited capacity at the more immediate 5-minute scale, implying that targeted improvements at this local scale may be necessary to effectively handle future tourist increases. Bijlmer ArenA displays mixed results, while it has moderate local capacity within a 5-minute radius, the capacities at 15- and 25-minute scales are relatively low, this while Bijlmer ArenA is known for taking in large amounts of people. This shows that this analysis should be taken into account with other elements that give information on capacity. The large spaces that characterize Bijlmer ArenA are not acknowledged in the network analysis.

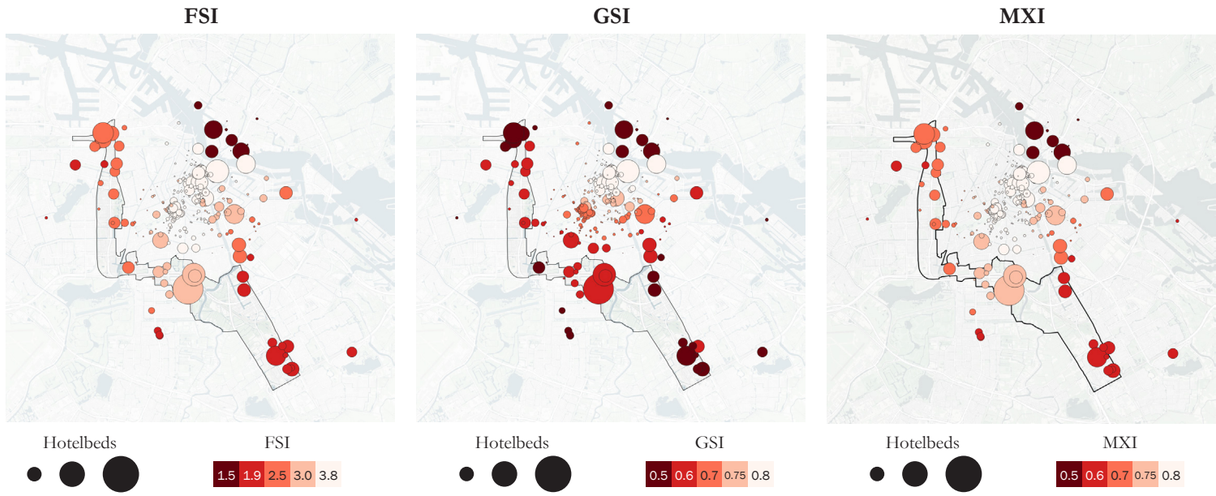


Therefore the capacity is also assessed through three morphological indices that were used before: Floor Space Index (FSI), Ground Space Index (GSI), and Mixed-use Index (MXI). These indicators offer insight into the built environment's density, ground coverage, and functional diversity, respectively. The FSI values reflect the intensity of built density, with Sloterdijk (FSI 2.31–2.77) and Zuidas (FSI 2.78–3.21) displaying moderately high densities meaning tourist developments should be found more in the current urban structure. Bijlmer ArenA, with an FSI of 1.64–2.31, indicates a comparatively lower density and thus suggests more room for densification. The city centre, with the highest FSI values (3.21–4.44), already demonstrates significant density, underscoring the necessity of a high density to attract visitors.

Regarding ground coverage (GSI), Sloterdijk (0.51–0.61) and Bijlmer ArenA (similar values) suggest moderate building footprints, offering flexibility for further development or intensification. Zuidas shows slightly higher ground coverage (0.61–0.67), reflecting more compact urban forms. Ground coverage increases further towards the city centre, implying more limited opportunities for additional development there, and the more logical for it to happen in the DeTour.

The MXI, which represents functional diversity, indicates that Zuidas (0.67–0.70) has relatively high land-use diversity, potentially appealing to varied tourist interests. Sloterdijk's MXI (0.53–0.67) points to moderate diversity, indicating potential for enhancing mixed-use offerings. Bijlmer ArenA, with the lowest MXI (0.45–0.53), suggests considerable opportunities to enhance functional diversity, thereby attracting a broader tourist demographic.

Together, these analyses underscore that the proposed corridor holds significant potential to alleviate tourist pressure through strategic enhancements of the urban morphology, particularly in Sloterdijk and Bijlmer ArenA, aligning capacity with anticipated increases in tourist flows.



5.5 Relieving pressure in time

In the analysis it was revealed that tourist pressure in Amsterdam fluctuates significantly throughout the day and week. Importantly, the timing of this pressure as a substantial impact on how it is experienced. With spatial opportunities already identified, it becomes essential to also make use of temporal capacity.

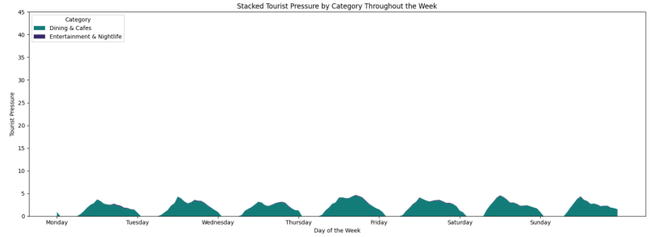
Different areas within the corridor show varied temporal dynamics. For instance, Sloterdijk experiences very little tourist pressure throughout the day, whereas Bijlmer ArenA sees sharp peaks in activity, especially during events. These patterns do not solely reflect demand, but also the physical and functional capacity of the locations. Sloterdijk's low pressure may stem not from lack of interest, but from morphological limitations that prevent it from comfortably hosting intense or diverse tourist activity. Its fragmented layout and mono-functionality make it less suitable for large-scale pressure without significant spatial transformation.

Currently, Sloterdijk primarily attracts visitors to a few dining and café spots, such as around BRET. As the area continues to develop and welcome new residents, local demand for amenities like shopping and dining will increase. However, the kind of high-volume, experience-driven tourism associated with museums or lively inner-city atmospheres is unlikely to flourish here without major redesign. The area's infrastructure and identity are oriented away from the tourist expectations of charm, scale, and variety.

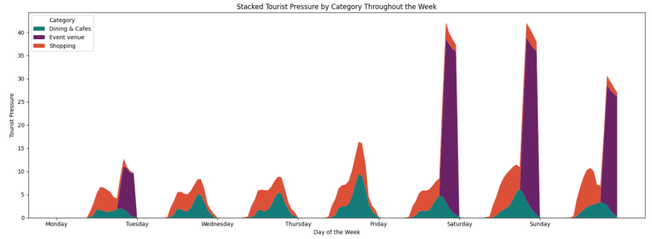
By contrast Zuidas presents a more dynamic pattern of use. It accommodates a constant flow of workers throughout the week, creating overlapping rhythms between residents, professionals, and potential visitors. This overlap can be leveraged to create services and attractions that serve both locals and tourists at different times of day. While daytime hours may be dominated by office life, evenings and weekends open up possibilities for more visitor-oriented functions like cultural venues or dining which can absorb tourist pressure without clashing with everyday use.

These examples highlight that relieving pressure is not only about where tourists go, but also when they go. By strategically shifting activities to areas and timeframes that can accommodate them, such as encouraging nightlife or late dining in Bijlmer ArenA, or cultural programming during off-peak hours in Zuidas.

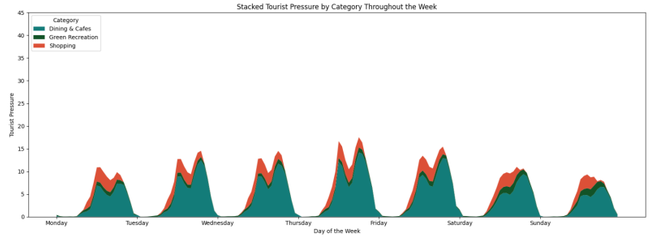
Sloterdijk



Bijlmer Arena



Zuidas



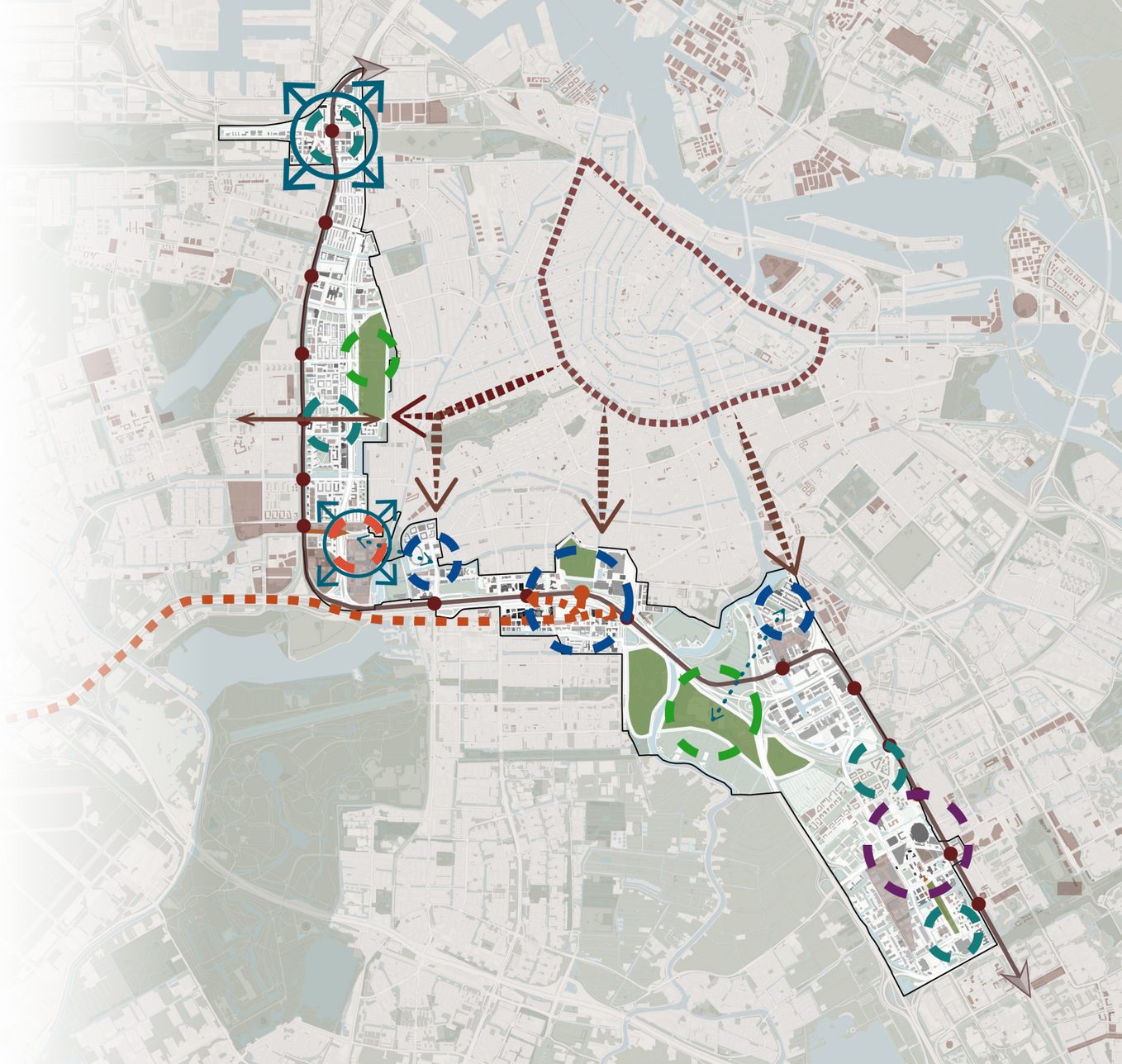
6. Strategizing a DeTour

6.1 Strategizing a DeTour

Creating a strategy from the findings of the multi-layered analysis requires an integrative and systemic approach. The resulting corridor-based strategy synthesizes current tourism dynamics, spatial and morphological characteristics, and Amsterdam's future needs and ambitions. The strategy involves targeted interventions across three key cores, Sloterdijk, Zuidas, and Bijlmer ArenA, and their connecting zones, each responding uniquely to local conditions and potentials.

Sloterdijk presently functions mainly as a residential base rather than a tourist destination, prompting visitors to seek cultural experiences elsewhere in the city. The dominance of office spaces restricts immediate opportunities for cultural activities without substantial transformations. Although its network capacity is high, the area's current urban design limits its effectiveness. Potential development spaces within Sloterdijk should enhance Mixed-use Index (MXI), thereby increasing local capacity. The area will strategically connect southward to a leisure cluster around Rembrandtpark, enriched with dining options and linked to emerging clusters near the Olympic Stadium. Sloterdijk's role will thus evolve from being a mere node into a gateway, offering easy access to diverse attractions within a few metro stops.

Zuidas, already recognized as a mixed-use district with strong business appeal, will be reinforced as a significant urban hub. Tourists currently combine business activities with cultural visits and dining, though many amenities lie beyond comfortable walking distances. Introducing a new museum will anchor a cultural cluster, integrated with nearby facilities at the Olympic Stadium. Expanding dining, shopping, and nightlife in less residential zones will avoid nuisances while enhancing visitor experiences. As the



“new city port,” Zuidas will serve both as a central entry point to the corridor and a vibrant residential area, accommodating distinct spaces oriented towards local inhabitants.

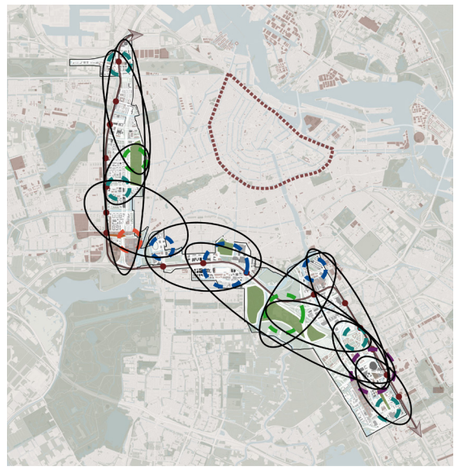
Bijlmer ArenA is integrated within Amsterdam’s existing tourism system but holds untapped potential as an independent cluster beyond its event-driven role. The area’s spatial characteristics offer ideal conditions for diversifying functions. Cultural amenities, nightlife, and dining opportunities appealing to both visitors and residents will be developed, deliberately avoiding a solely visitor-oriented atmosphere. Late-hour services will absorb activities causing disturbances elsewhere. Crucially, large open areas will be preserved to host major events and accommodate visitor surges. Retail spaces catering to diverse crowds will further enrich the area’s vibrancy.

Looking at the intercore East area, between Zuidas and Bijlmer, the currently underused agricultural and industrial spaces beneath the A10 highway, part of the Amstelscheg, will transform into a landscape park integrating recreation and cultural heritage. Drawing on Dutch landscape history and famous artistic representations, the park will complement Amstelpark, creating a continuous green corridor of city-wide significance. The scale of this landscape park allows multiple activities, increasing its prominence within the corridor system. Its connectivity to smaller nearby nodes, Amstelkwartier and De Nieuwe Kern, further strengthens overall integration. Amstelkwartier, benefiting from substantial hotel infrastructure and good connectivity, is ideal for a daytime cultural institution like a museum, minimizing disruption to its predominantly residential surroundings. The Amstelkwartier is well positioned in the flows of the present tourist system, enabling a good anchor point between the corridor and the city center. Between the Amstelkwartier and the landscape park lies a large infrastructual junction, which will have to become more permeable to be well connected with the Amstelkwartier.

De Nieuwe Kern, distinct in character from the Bijlmer ArenA area, will host dining and café facilities with local rather than exclusively tourist-oriented appeal. These amenities will concentrate near Duivendrecht station, limiting intrusion into residential areas. Adjacent on the south of Bijlmer ArenA, Hondrugspark core will predominantly cater to new residents, offering leisure amenities in a linear park featuring local-oriented dining and cafes, thus providing a calm, green counterpart to the vibrant events area nearby.

The intercore west zone, comprising Stadionbuurt, Schinkelkwartier, Lelylaan, and Rembrandtpark, hosts several smaller, interconnected cores vital for creating rich, integrated experiences in the corridor. Stadionbuurt, historically significant and well-positioned within existing visitor flows, will feature cultural attractions that form a compelling museum, creating a museum-cluster with Zuidas. Schinkelkwartier, currently industrial, will undergo significant transformation, improving network connectivity and developing a distinct shopping character, unique within the corridor. Its harbour and industrial heritage present unique opportunities for creating a vibrant urban atmosphere.

Lelylaan, currently peripheral in tourism, has significant potential due to strong connectivity with the city center and east-west movement flows. Its development will emphasize enhancing these connections, reinforcing its role as a crucial intersection within the corridor. Rembrandtpark will serve as the area's green recreational heart, activating its edges with cafes and shops and thus connecting effectively with nearby cores and the broader city network, particularly Sloterdijk and the city center.



A extensive amount of clusters and combinations can be formed because of the diverse cores and interconnectedness

6.2 Phasing

Getting to the current state of overtourism was not an overnight occurrence but rather the result of long-term cumulative developments shaped by infrastructural investments, global travel patterns, and the evolution of urban tourism. Similarly, changing this dynamic requires strategic interventions that unfold gradually over time. The DeTour strategy, rooted in a systems-based understanding of tourism flows, must align with Amsterdam's existing master plan running through 2050. This chapter outlines a phased implementation approach that connects municipal development timelines with strategic interventions proposed in this thesis. While future developments are inherently unpredictable, phasing provides direction, priority, and the flexibility to adapt when conditions shift.

Phase 1: 2025–2030

The first phase focuses on leveraging existing infrastructural strengths and already-integrated components of the current tourism system. These areas act as anchor points, providing a foundation for early-stage interventions that can redirect pressure away from the city center:

1. Initiating the Zuidasdok project to tunnel the A10 and upgrade Station Zuid. This is one of the most significant infrastructural developments in the city and positions Zuidas as a principal entry point from Schiphol, setting the stage for a more business-culture-oriented tourism profile.

2. Investing in station area improvements around key nodes such as Lelylaan, Amstel, Sloterdijk, Zuid, and Bijlmer ArenA. These upgrades will improve accessibility and flow distribution and support their development as independent cores.

3. Prioritizing the Amstelkwartier for early development of a cultural anchor, such as a museum. This area is already embedded within tourist movement flows and can relieve pressure from central districts.

4. Commencing transformation at Sloterdijk Centrum and Sloterdijk 1, turning mono-functional office districts into mixed-use urban hubs. While current morphological limitations constrain tourism attractiveness, early spatial restructuring enhances MXI and supports gradual densification.

5. Launching redevelopment of Schinkelkwartier, particularly relevant for creating a distinct shopping core within the corridor. The area's industrial heritage and proximity to key flows make it a natural complement to adjacent clusters like Stadionbuurt.

Phase 2: 2030–2040

This phase consolidates and deepens interventions initiated earlier, building on their momentum while expanding the network of cores and intercore areas.

1. Finalizing Zuidasdok and constructing the new urban park over the sunken A10, creating a green metropolitan spine that enhances the area's spatial quality and offers relief space for tourism spillover.

2. Developing the Ruysdael Landscape Park within the Amstelscheg, combining cultural programming, Dutch landscape design, and recreational green space. This node adds a distinct identity to the corridor while relieving pressure on central parks like Vondelpark.

3. Extending the North-South metro line towards Hoofddorp and Schiphol, which will reinforce Zuidas as key arrival point from the airport.

4. Beginning transformation of the Lelylaan area, which is pivotal to providing an east-west axis intersecting the corridor. Lelylaan's proximity to city center flows makes it a strategic connector deserving of earlier inclusion in the municipal plan.

5. Completing De Nieuwe Kern and reinforcing its identity as a local-serving node adjacent to Bijlmer ArenA. Here, emphasis should be placed on balancing local and visitor needs, especially around Duivendrecht station.

6. Enhancing metro connectivity at Sloterdijk and strengthening urban continuity to the center. With development of Rembrandtpark, the connection between Sloterdijk and Rembrandtpark will shift from an isolated transit point to a more vibrant node within the corridor.

7. Starting construction in Haven-Stad, embedding Sloterdijk more deeply into a broader urban development vision and increasing the livability and attractiveness of the area.

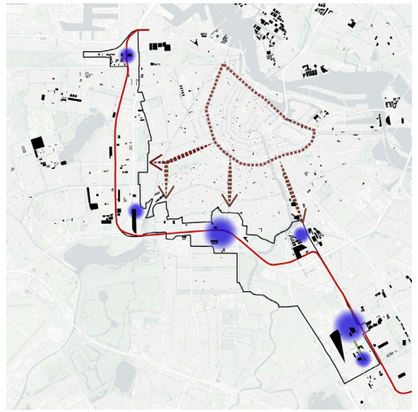
See next page for maps of phases

Phase 3: 2040–2050
In the final phase, the system reaches maturity. This stage focuses on reinforcing diversity and resilience, completing urban continuities, and embedding spatial quality throughout the corridor.
1. Executing the “Autoluwe Stad” (Car-lite City) plan in Nieuw-West, enhancing walkability and liveability in Lelylaan’s surrounding neighborhoods. This supports the development of Lelylaan as a high-capacity, mixed-use node within the corridor.
2. Constructing the new Oost-West metro line, which will intersect Lelylaan, significantly enhancing its connectivity and strengthening its role in the corridor’s east-west dynamics.
3. Creating overlapping experiences across smaller intercore nodes, ensuring that each segment of the corridor has a distinct identity while contributing to the broader system logic.
4. Continuing the expansion of Bijlmer West, especially around the A2, strategically integrating with the adjacent landscape park and reducing spatial and functional fragmentation.

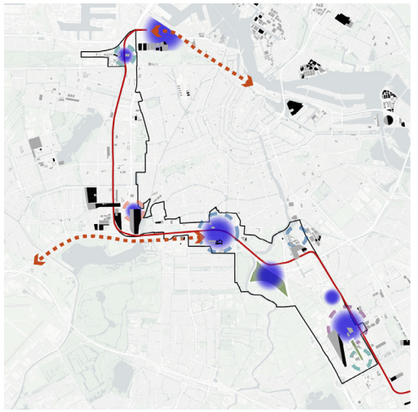
Recommendations for Phasing Adjustments:
- West Intercore Zone Prioritization: Current municipal plans largely overlook Stadionbuurt and Rembrandtpark, despite their location within current tourist flows. These areas should be elevated in priority, offering opportunities for cultural elements and green leisure that complement Zuidas and especially Sloterdijk.
- Lelylaan Acceleration: Lelylaan’s late introduction into the city’s development phasing conflicts with its strategic location. Earlier development is essential, given its network capacity and potential to redistribute pressure from the central city. Improvements in walkability, local amenities, and cultural features should be initiated no later than Phase 2.
- Early Anchoring of Transition Zones: Strategic development should begin with areas already embedded in the tourist system and capable of absorbing pressure early on. These include Sloterdijk, Zuidas, Bijlmer ArenA, Amstelkwartier, Stadionbuurt, and Lelylaan. Prioritizing these will create a backbone for the corridor and demonstrate visible change in relatively short term.

This phased approach ensures that the DeTour strategy not only aligns with long-term municipal visions but also reshapes the tourism system from the inside out, gradually but decisively distributing flows, relieving vulnerable areas, and creating attractive alternatives across time and space.

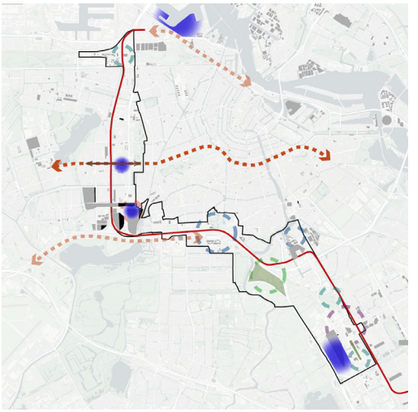
Phase 1: 2025-2030



Phase 2: 2030-2040



Phase 2: 2040-2050



The phasing maps show the development of the tourist system. Buildings shown in black are developments in that phase.

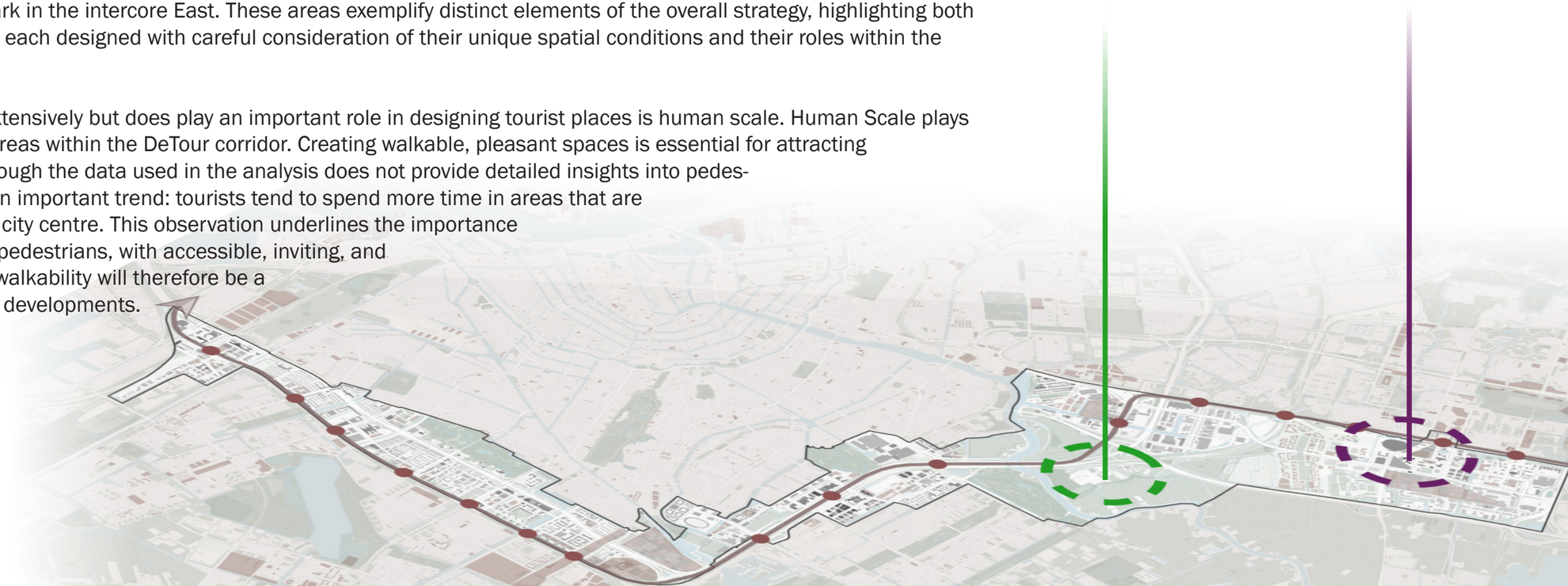
6.3 Designing a DeTour

To truly connect with the tourist perspective, it is essential to translate the strategy into a tangible and experiential design. This chapter explores how the DeTour strategy for Amsterdam takes shape on the ground, illustrating how different areas of the city will look, feel, and function as a result. By moving from strategic vision to spatial realization, specific interventions are detailed to guide tourist flows effectively, enriching visitor experiences and enhancing local quality of life.

The spatial interpretations in this chapter are developed through the lens of the earlier analysis. The understanding of tourist dynamics, spatial capacities, and local sensitivities directly informs the design interventions, ensuring that each proposal is both responsive and grounded in real conditions.

To clearly demonstrate how this strategic vision translates into practical outcomes, the chapter is structured around two representative areas: the Bijlmer ArenA core and the Landscape Park in the intercore East. These areas exemplify distinct elements of the overall strategy, highlighting both urban vibrancy and green leisure spaces, each designed with careful consideration of their unique spatial conditions and their roles within the broader corridor.

Something that has not been analysed extensively but does play an important role in designing tourist places is human scale. Human Scale plays a crucial role in shaping the new tourist areas within the DeTour corridor. Creating walkable, pleasant spaces is essential for attracting and retaining visitors in these areas. Although the data used in the analysis does not provide detailed insights into pedestrian movement patterns, it does reveal an important trend: tourists tend to spend more time in areas that are walkable and human-scaled, such as the city centre. This observation underlines the importance of designing environments that prioritize pedestrians, with accessible, inviting, and comfortable public spaces. Encouraging walkability will therefore be a central design guideline for the proposed developments.



Bijlmer ArenA

Contextualizing the Potential:
Bijlmer ArenA currently functions prominently within Amsterdam's tourism landscape, primarily driven by its role as a major event destination. The analytical findings highlight several key spatial and temporal characteristics that underscore its unique position: the abundance of open space, the low residential density, and the high tolerance for evening and nighttime activities. These qualities are explicitly favorable for the area's further evolution into a dynamic, multifunctional tourism cluster.

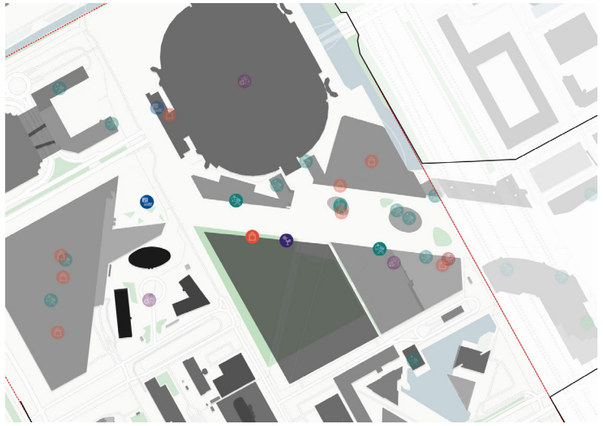
Linking Capacity and Functional Diversity:
The morphological analysis revealed Bijlmer ArenA's substantial physical capacity, with lower Floor Space Index (FSI) and Ground Space Index (GSI) values compared to central Amsterdam, indicating significant room for densification and ground-level development. However, the Mixed-use Index (MXI) demonstrated a distinct limitation: the area's single-use, event-focused programming restricts its appeal beyond event-related visits. Therefore, introducing diverse cultural facilities, such as museums, is analytically justified to enhance attractiveness and resilience, promoting richer visitor experiences akin to central tourist clusters.

Enhancing Local and Tourist Experiences:
Tourist behavior analysis revealed a gap in local dining and shopping facilities, with tourists frequently traveling beyond the immediate area to fulfill these needs. Therefore, developing more balanced amenities that equally serve locals and tourists is critical. This approach aligns with the analytical insight that mono-functional entertainment zones increase the risk of nuisance and reduce overall appeal. Strategic design should foster inclusive spaces catering simultaneously to daily residents and event visitors, thus reinforcing social sustainability.

Leveraging the Temporal Capacity:
Analysis of temporal dynamics indicated that Bijlmer ArenA could comfortably absorb evening and late-hour activities without significant negative impacts on residents due to the area's limited residential presence. This supports developing robust nightlife and late-night dining offerings to fully utilize temporal capacity, boosting local attractiveness and retaining visitor spend within the area.

Optimizing Network and Spatial Structure:
Although Angular Choice network analysis indicated limited current network capacity, the analytical findings recognize the area's large urban blocks and extensive open spaces as significant strengths. By strategically redesigning these spaces for flexible, multi-purpose usage—such as event-related services, adaptable markets, and community-driven activities—the network limitations can be offset effectively, creating high-capacity, resilient public spaces.

New Activities are placed around the boulevard. The Villa Arena building, the large building on the left, will be transformed into a museum.



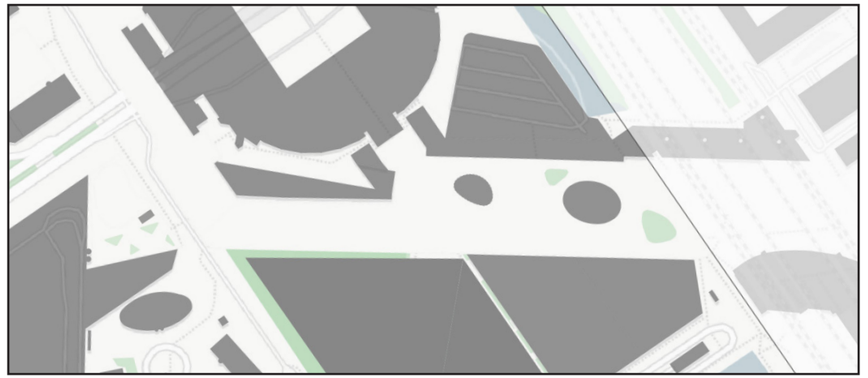
Transforming the Boulevard:
Currently, ArenA Boulevard is characterized by oversized, underutilized spaces and inactive facades, creating a hostile pedestrian environment outside event hours. This issue is directly supported by the analytical findings showing tourist dissatisfaction with local amenities and public space experiences. The Boulevard, linking major venues like Ziggo Dome (17,000 capacity), Johan Cruijff Arena (56,000 capacity), AFAS Live (6,000 capacity), and a future theater, currently serves primarily interior-focused activities, neglecting the outdoor realm. As residential developments such as those in Amstel III and Hondsrugpark rapidly increase local population densities, the Boulevard must evolve into a vibrant, human-scaled public space that accommodates both everyday urban life and periodic large events. Proposed interventions include façade redesign to introduce visual variation and transparency, creating inviting street life and restoring a human scale.

Dynamic and Flexible Space Creation:
The analytical emphasis on spatial and functional adaptability underscores the proposal to remove obstructive central buildings along the Boulevard, generating large, flexible open spaces. These can serve multiple purposes:

- During events, hosting food trucks and mobile kiosks to cater to large visitor numbers.
- Outside event hours, transforming into a dynamic rotating market, showcasing food, crafts, and local goods appealing to residents, tourists, and visitors.
- Facilitating community-driven activities such as outdoor workshops, cooking classes, and arts and crafts events, fostering an accessible and lively atmosphere.

In doing so, the Boulevard can shift from an underused, mono-functional event corridor to a diverse, flexible, and welcoming public space that significantly enhances the quality of life and strengthens the urban identity of Amsterdam Southeast.

In conclusion, Bijlmer ArenA's transformation leverages specific analytical insights into spatial, functional, temporal, and network capacities, shaping an urban environment that simultaneously enhances tourist attractiveness and resident well-being, ensuring the area's role as a vibrant and inclusive node within Amsterdam's tourism corridor.



The ArenA Boulevard will transform from a event oriented space to a lively multifunctional area

Landscape park: Ruysdael Landscape park

Identifying the Need:
The analysis clearly indicates that tourists overwhelmingly favor Vondelpark, even when alternative parks are conveniently located nearby. This trend is especially pronounced among visitors staying within the designated corridor. Such findings highlight a critical need to establish attractive, alternative green spaces to help distribute visitor flow more evenly throughout the city.

Creating a Cultural and Natural Destination:
The proposed Ruysdael Landscape Park addresses this analytical insight by providing not only additional green space but also a distinctive cultural attraction. Inspired by the Dutch landscape painting tradition, particularly the works of Rembrandt and Jacob van Ruisdael, the park integrates historical and artistic elements into its design. By incorporating the Amstel River—a central feature in these artists' works—as a key landscape element, the park offers an immersive experience where visitors can step into views reminiscent of classic Dutch masterpieces.

Enhancing Visitor Experience:
In response to contemporary tourism trends emphasizing experiential authenticity, the park's design features gentle hills and elevated viewpoints, offering panoramic vistas of expansive meadows and waterways. These deliberate perspectives recreate the grandeur and tranquility captured in historic Dutch landscape paintings, thereby fulfilling tourists' increasing desire for meaningful and memorable experiences.

Functional Role and Connectivity:
Analytically, the park serves a critical role as a functional green corridor, mirroring Vondelpark's success as a key cycling and walking route. It strategically connects the southeastern districts with southern Amsterdam, integrating seamlessly with Amstelpark on its western boundary. The gradual transformation of adjacent allotment gardens into community spaces further enhances its role as a cohesive and accessible green space, collectively forming a green area approximately three times the size of Vondelpark.

Diverse and Inclusive Typologies:
Analysis underlines the importance of diversified green spaces to cater to varying user preferences. Ruysdael Landscape Park will offer distinct typologies and atmospheres, ranging from tranquil zones ideal for quiet relaxation to more vibrant areas encouraging active exploration. This intentional variety addresses the analytical insight into the necessity for diverse experiences within urban green spaces, making the park appealing to both tourists seeking respite and local residents looking for accessible leisure spaces.

Strategic Accessibility:
Entrances strategically positioned near vibrant urban developments such as the RAI district and the Nieuwe Kern project ensure high accessibility. This connectivity aligns with analytical findings highlighting the importance of proximity to complementary services, efficient public transport, and robust hospitality infrastructure, thereby maximizing the park's attractiveness and utilization.

In conclusion, Ruysdael Landscape Park leverages insights from spatial, cultural, and functional analyses to deliver an essential new destination, effectively balancing visitor distribution, enriching visitor experiences, and elevating local quality of life.

The park is located in the Amstelscheg, giving sights of, typical Dutch, pasture landscapes.

The view towards the Amstel river and Ouderkerk reassembles “View on the Amstel from Amsteldijk”by Jacob van Ruisdael

The view towards a pasture reassambles “De Omval”by Rembrandt

Conclusion

The research conducted in this thesis contributes to the ongoing discussion about overtourism, particularly by offering a novel, data-driven perspective that integrates spatial, temporal, and urban morphological analyses. The following sections summarise the key insights, implications, and contributions of the project.

Overtourism: A Multifaceted Urban Challenge

Overtourism in Amsterdam is a present-day reality, significantly impacting the liveability and social fabric of the city. The research clearly showed how overtourism extends beyond mere congestion to profoundly influence social interactions, the local economy, and urban life quality. Areas historically attractive to tourists, such as the city centre, face compounded pressures due to concentrated tourist flows, while the surrounding neighbourhoods increasingly experience spillover effects. Overtourism thus emerged not only as an issue of visitor numbers but as a systemic problem tied to urban structure, social expectations, and municipal governance. This realisation underscores the need for integrated, systemic solutions rather than symptomatic interventions.

Measuring Tourist Pressure: A Critical Methodological Advancement

A significant contribution of this project is the development of a method for measuring tourist pressure, leveraging Google Maps data to capture the spatiotemporal dynamics of tourism. Creating this metric was methodologically complex, involving data scraping, manipulation, and correlation analysis to ensure accuracy. This measure of tourist pressure proved essential, revealing detailed spatial patterns and temporal variations of visitor activity. Understanding these dynamics was pivotal for identifying when and where overtourism is most problematic, thus laying a foundation for targeted, strategic interventions.

Defining and Understanding Carrying Capacity

The concept of carrying capacity was examined through multiple lenses, resulting in a nuanced approach that integrated spatial form and urban network analyses. The findings underscored that carrying capacity is not a fixed threshold but varies dynamically with urban characteristics such as network accessibility, spatial intensity (FSI and GSI), and functional diversity (MXI). A moderation analysis further revealed that the built environment, specifically, the availability of private and pedestrian spaces, significantly affects how tourist pressure translates into perceived nuisance. This methodological approach highlights the importance of urban design in managing tourism sustainably, shifting the discussion beyond mere tourist numbers towards spatial quality and resilience.

DeTour Strategy: Proposing a Resilient Solution

Building upon the comprehensive analysis, the thesis proposes the “DeTour” strategy, a corridor-based approach that strategically redirects tourist flows to less pressured but highly capable urban areas. Unlike Amsterdam’s traditional multi-core strategy, DeTour prioritizes three key cores, Sloterdijk, Zuidas, and Bijlmer ArenA, and their intercore zones. This approach recognizes existing tourist dynamics and leverages spatial and temporal capacities identified through the analyses. The corridor strategy promotes balanced spatial distribution, enhances urban connectivity, and creates diverse, appealing destinations that cater to contemporary tourist trends, such as experiential tourism and sustainability.

Urban Design Interventions: From Vision to Reality

Translating strategic vision into concrete spatial interventions was an essential final step. Detailed proposals for Bijlmer ArenA and Ruysdael Landscape Park exemplify how targeted urban design can effectively mitigate overtourism impacts and enhance local quality of life. Bijlmer ArenA transforms from an event-focused area to a vibrant, multifunctional urban space, integrating diverse amenities and flexible public realms that accommodate both residents and visitors. Conversely, the Ruysdael Landscape Park introduces a culturally significant and experientially rich green space, relieving pressure from popular parks and enriching the visitor experience through historical and artistic contexts.

Broader Implications and Recommendations

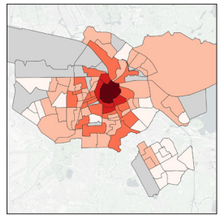
The insights generated by this research can have significant implications for urban planning and policy-making in Amsterdam and comparable cities facing overtourism. It strongly suggests that effective tourism management requires integrated, data-driven strategies that understand visitor behaviour, leverage urban morphology, and exploit temporal dynamics. The developed methodological framework, combining big data, spatial analysis, and urban design, offers a replicable model for other urban contexts.

Discussion

The research presented in this thesis offers several significant contributions to understanding and addressing overtourism through data-driven analysis and urban design strategies. Nonetheless, critical reflections reveal limitations and areas for further development, providing avenues for future research and methodological improvements:

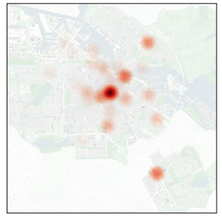
Limitations in Overtourism Data

The overtourism data utilized in this research was relatively sparse, particularly given the project's ambition for a comprehensive, data-driven approach. While the media content analysis provided valuable insights, it was limited in scope and depth. Future research could enhance this by conducting a more extensive and systematic media content analysis, possibly incorporating automated text analysis tools or machine learning to identify and quantify overtourism mentions comprehensively. Such an approach could significantly enrich the understanding of public perceptions and media portrayals of overtourism.



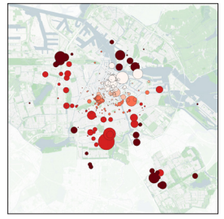
Challenges in Measuring Tourist Pressure

The methodology for calculating tourist pressure, though innovative and valuable, relies heavily on Google Maps reviews, introducing potential biases. Initially, the intention was to use mobile network data due to its precision in tracking visitor flows. However, accessing this type of data proved challenging because of privacy and cost considerations, prompting the shift to publicly available Google Maps reviews. Reviews vary significantly across different activities; for instance, restaurants are reviewed more frequently than parks, potentially skewing perceived tourist activity levels. Although a correlation between reviews and tourist activity was identified, future studies could validate this metric using supplementary data sources, such as visitor counts from sensors or anonymized mobile network data, to ensure greater reliability and comprehensiveness while maintaining the reproducibility achieved through publicly accessible data. Moreover, the reliance on publicly available data ensures high reproducibility of this approach, making it particularly valuable and easily adaptable for other cities experiencing similar overtourism challenges.



Broader Urban Dynamics

While the thesis successfully focuses on tourism dynamics, its relative isolation from broader urban dynamics, such as housing affordability, residential displacement, and local economic impacts, is notable. Future research could enrich the analysis by examining how tourism strategies interact with broader urban challenges, ensuring solutions do not inadvertently exacerbate existing inequalities or urban problems.

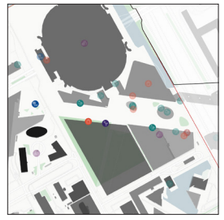


Defining Carrying Capacity

A notable methodological shortcoming was the inability to conclusively define carrying capacity as a precise numerical threshold. Instead, the project integrated various spatial and morphological measures, which, although insightful, did not fully capture the complexity of carrying capacity. Future research could focus on developing a more robust, quantifiable carrying capacity model, potentially incorporating real-time sensor data, visitor feedback, and dynamic urban system simulations to better define and predict urban tourist capacities.

Simplified Moderation Analysis

The moderation analysis conducted in the study was relatively simplistic, constrained by coarse spatial resolution (neighbourhood-level data) and straightforward variables (square meters of space). This simplicity limits the depth of understanding regarding how spatial characteristics moderate tourist pressure impacts. Subsequent studies could enhance this analysis by employing finer-grained spatial data, such as block-level information, and incorporating additional moderating variables, like urban design quality or visitor demographic factors, to yield deeper insights into the urban-tourism relationship.



Limited Scope of Design Interventions

The design interventions presented focused explicitly on two representative areas within the proposed DeTour strategy. While these examples effectively illustrated potential interventions, other significant corridor locations remained relatively unexplored due to time constraints. Further research and urban design projects could expand upon this foundation, providing detailed interventions for additional corridor zones to ensure comprehensive coverage and enhance the strategy's overall effectiveness.

Categorization of Activities

The categorization of tourist activities, although beneficial, was somewhat broad. The nine categories provided useful insights but lacked detail regarding the varying impacts of specific activity types within broader categories. For example, within the dining and café category, the diverse range of establishments, from quick-service cafés to fine dining, have distinct spatial and temporal footprints. Future research could delve deeper into activity categorization, employing more nuanced sub-categories to refine analysis and enable more targeted urban planning and policy interventions.

Stakeholder Perspectives and Community Engagement

The thesis primarily relies on spatial and quantitative analyses, but limited attention was given to qualitative insights from stakeholder perspectives—particularly local communities, businesses, and municipal authorities. Integrating structured stakeholder engagement through interviews, workshops, or surveys could validate and contextualize quantitative findings, ensuring proposed interventions align with local needs and expectations.

Future Directions and Methodological Improvements

Beyond these explicit limitations, the project also opens opportunities for methodological innovation. Incorporating advanced technologies such as artificial intelligence for visitor behavior prediction, real-time monitoring of tourist flows, and dynamic scenario modeling could substantially improve tourism management strategies. Additionally, future research should explore the interplay between tourism and other urban dynamics like residential gentrification, environmental sustainability, and economic impacts to develop a more holistic approach.

In conclusion, while this project successfully offers significant advancements in understanding and addressing overtourism, its limitations and identified opportunities provide a robust foundation for future research, methodological refinement, and practical urban design and planning improvements.

Personal Reflection

1. What is the relationship between your graduation project topic, the Urbanism track and the master programme?

Overtourism, much like many emerging urban challenges, is a relatively new topic within the field of urbanism. While it has gained more attention in recent years, it still lacks extensive academic exploration, especially from a spatial planning perspective. This is concerning, as overtourism is increasingly affecting cities around the world, leading to declining liveability, resident dissatisfaction, and even public protests.

My project directly responds to this gap by approaching overtourism as a spatial and systemic problem, rather than treating it as an isolated issue. I explore how the urban environment influences the experience of tourist pressure and nuisance, and what spatial interventions can mitigate these effects. This aligns with the Urbanism track's core objectives, to understand and design urban systems by integrating spatial, social, and infrastructural dimensions. The project bridges spatial analysis, systems thinking, and design and offers a novel approach to one of the most pressing urban issues of today.

2. How did your research influence your design/recommendations and how did the design/recommendations influence your research?

My project placed strong emphasis on research, particularly through a data-driven approach. The use of digital traces such as Google Maps reviews and Popular Times enabled me to analyse tourist behaviour in both time and space. This not only provided insights into where and when overtourism occurs, but also revealed deeper patterns, such as tourist activity combinations and movement dynamics.

These insights directly shaped the design phase. Understanding the spatiotemporal logic of the tourism system allowed me to identify zones with capacity, leading to the formulation of the DeTour corridor strategy. The analytical foundation ensured that the design was not arbitrary, but rooted in actual usage patterns and urban conditions.

While the influence flowed mostly from research to design, the reverse occurred as well. Once the intervention area was identified, I revisited and refined my analysis at a more local scale, studying network capacity, morphology, and functional diversity to tailor the strategy more precisely. In that sense, the design pushed the research into greater detail and specificity.

3. How do you assess the value of your way of working (your approach, your used methods, used methodology)?

The data-driven approach formed the backbone of my project. The decision to work with digital behavioural data was both a response to the growing availability of such data and a methodological opportunity. This new opportunity, large-scale tourist behaviour could be analysed in spatial and temporal detail. Without this approach, the level of insight achieved in this project would not have been possible.

I developed a tailored methodology by combining different techniques: space syntax (Angular Choice), urban morphological indicators (FSI, GSI, MXI), movement analysis based on hotel origins, and moderation analysis to connect spatial form to lived experience.

This hybrid methodology allowed me to analyse complexity without oversimplifying it, and to quantify concepts that are often considered too abstract for spatial analysis, such as liveability and nuisance.

While the approach was successful in generating actionable insights, the overtourism dimension was more difficult to quantify. I addressed this by incorporating municipal nuisance data, which helped link pressure to perception. Overall, the methods proved both scalable and transferable, and offer a valuable framework for addressing urban issues that involve complex human-environment interactions.

4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

From a societal perspective, the project contributes to a deeper understanding of overtourism and offers a practical, design-informed strategy to address it. As the issue continues to grow in cities worldwide, there is a clear demand for strategies that go beyond reactive policies and crowd control. My project demonstrates how spatial planning and urban design can play an active role in mitigating overtourism, using existing urban structure and system dynamics.

Academically, the project addresses a gap in urbanism research by offering both an analytical and design-based response to overtourism. It showcases how spatial, temporal, and behavioural data can be meaningfully integrated into urban planning, while also introducing novel methods like moderation analysis to connect built form with social outcomes. This adds value not only to tourism research, but to the broader field of evidence-based urbanism.

Given the use of data linked to human behaviour, ethical considerations were essential.

The data used, Google Maps reviews and Popular Times, was anonymised and aggregated. The project was approved by the HREC committee, ensuring that all data use adhered to ethical standards. This reinforces the importance of responsible data use when dealing with people-focused topics, especially in the public realm.

5. How do you assess the value of the transferability of your project results?
One of the strengths of my project lies in its high level of transferability. The data sources I used are either public or replicable in many cities. This makes it possible to apply the same methods to other urban contexts facing overtourism. The methodology, particularly the way I quantified tourist pressure and linked it to spatial and temporal dynamics, is generalisable and adaptable. The use of Python scripts for spatial analysis, network capacity, and morphological assessment makes the workflow reproducible for other cities or research contexts.
Also the core insights, such as identifying latent capacity, redirecting flows through spatial strategies, and the role of urban form in absorbing pressure, are not specific to Amsterdam. These findings can inform tourism and liveability strategies in any city facing similar challenges.

1. Own Reflection question: How has the thesis process influenced my identity as a future urbanist, particularly at the intersection of urbanism and data science?
Ever since completing my bachelor's in Urban design and planning, I envisioned working at the intersection of urbanism and data science, combining analytical thinking with spatial insight. Initially, I saw data science mostly as a tool to support analysis. But throughout this thesis, I transitioned from simply using data to actively integrating it into the way I approach and think about urbanism.
My thesis marked this shift, I did not just use data to describe urban conditions, I used it to shape how I see urban questions, strategies, and potential interventions. For example, in how I approached the issue of tourist pressure in Amsterdam: instead of focusing only on overcrowded areas, I identified underused yet accessible zones with latent capacity through spatial-temporal data, network analysis, and urban morphology. This allowed me to propose the DeTour corridor, a strategy rooted in urbanist thinking, but driven by data-informed reasoning.
This evolution reflects an in my eyes broader change happening in the field. With AI tools and data platforms becoming more accessible, the real challenge is no longer processing data, but knowing what questions to ask and how to extract meaning. I believe that's where my thesis contributes most, not through technical execution alone, but by proposing new ways of using data to address complex urban challenges. It shows how urbanism and data science can evolve together, and how I can play a role in that.

2. Own reflection question: What did I learn from the experimental nature of my thesis process, and how did that impact the final outcome?
Taking on the topic of overtourism, still relatively unexplored in urbanism, was already a bold choice. Doing so with a largely self-invented and experimental data-driven approach made it even riskier. There were moments of doubts, especially when I was deep in the complexity of the data and its interpretation. At times, it felt unclear whether I would return to a more traditional "urbanism" focus, as the analytical work demanded more time and energy than expected.
Still, this phase was crucial. The insights I gained from the deep dive into spatiotemporal data and system dynamics gave the project its unique strength. However, I also recognize that this came at the cost of time and depth in the spatial design part of the project. I came close to the synthesis I was aiming for, but just short of the full integration and detail I had envisioned.
Despite this, I don't regret the path I took. A more conventional or less data-intensive approach might have resulted in a more complete product in the short term, but it wouldn't have led to the personal and professional growth I experienced. It was a decision I made at the beginning of my project to deliberately dive deep in the data analysis, where in previous projects in my studies I had to stick to the opportunities I had to involve data. It taught me what it means to truly innovate within a field that traditionally works with slower processes, and how to navigate ambiguity without losing direction. At the same time it also showed me the importance of balancing these worlds of urbanism and data science in a good way during the process, to come to insightful urbanism outcomes.
This project was never meant to be an endpoint, I see it as a foundation. I want others to build on this work, improve it, and take the methodology further. My goal has always been to keep the approach open, adaptable, and grounded in real-world complexity. As a previous professor once said to me, urbanism is becoming a field of specialisations. I don't know yet if this exact topic is my future specialisation, but I do know I've demonstrated the kind of thinking and adaptability that I think the future of urbanism will require: not predicting the future with uncertainty, but seeing the present clearly, and acting on it.

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Appendix

To explore the project more thoroughly and interactively, scan the first QR code to access the online dashboard. This tool allows you to engage with the data, maps, and insights yourself, tailoring the experience to your interests. For those curious about the technical foundation, the second QR code links to the GitHub repository containing all the code used throughout the project. Together, these resources make the project not only transparent, but also reproducible and adaptable for similar challenges in other cities.

Dashboard

https://detourism.streamlit.app/

Github Repository

https://github.com/isamuu/Thesis