The Death and Life of Great Streets
An Amsterdam Case Study

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“History doesn’t repeat itself but it does rhyme.” – Mark Twain

Museumplein 1906, 1987, 2014
Abstract

Quality of life in cities has been linked to an active and vibrant public life. In this thesis I track the evolution of spatial urban patterns and their impact on street life in Amsterdam over the past century. I consider how spatial changes in density, land use and layout impact street activity, which I evaluate based on the number of people in the street and the opportunities for exchange and interaction available. The results of the analysis indicate there is a positive correlation between the three spatial elements analyzed and street activity. Of the three, land use is considered to be the most critical in its impact on an active street life because of its impact on street function. In mixed-use developments prior to Second World War, accessibility was met through proximity, which was compatible with non-motorized transportation and generated an active streetscape. During this period, streets served a variety of uses including space for economic and social exchange. Reorganization of the city along Modernist ideas of separation of function in the 1950s through 1970s resulted in low levels of street activity and vibrancy. This new model restructured streets to serve primarily auto-mobility, which made streets hostile to pedestrians and bicycles. Streets lost their place function and the ability to foster and support human exchange and interaction. In recent decades, street life has regained its vibrancy, which can be at least partially attributed to spatial development patterns that emphasize diversity and mix of functions at the building, street and neighborhood level in a way makes non-motorized transportation feasible again. Some implications for Amsterdam and other cities are discussed.
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1. Introduction

The starting point for this thesis is the question of what can be done to create successful cities in the twenty-first century. I am hardly the first to argue that what will make cities successful in the future is precisely what has made them successful over the past millennium: the opportunity for human interaction and exchange.

Engwicht (1993) reminds us that cities are a recognition that we humans need other people to grow into our fullest potential. He explains that cities were invented to facilitate human exchanges: of information, friendship, material goods, culture, knowledge, skills, insight, as well as emotional, psychological and spiritual support (Engwicht, 1993). Helbrecht (2004) believes that a city’s success is largely dependent on its ability to provide public meeting places for a range of activities – whether recreational, or commercial. Similarly, Hall (1997) reminds us that the new world will largely depend, as the old world did, on the human creativity that emerges when people come together face-to-face.

These statements suggest that successful cities have always been, and will always be about human exchange that occurs during face-to-face interaction. Fundamentally, these viewpoints are rooted in an economic argument of efficiency of cities. Before the sweep of suburbanization that followed the Second World War, cities thrived for centuries based on proximity, diversity and critical mass (Kloosterman 2009). Adam Smith suggested in 1776 that the size, and therefore, the efficiency of the market is a function of the number of people present to trade. This is largely why cities have traditionally developed a compact form – this configuration of dense, mixed activities is what makes cities places of “opportunity”. Just as clustering generates economic surplus, non-economic exchanges benefit from proximity as well (Vreeker et al., 2004). This old forgotten truth that defined cities for century is now being rediscovered – with urbanists recognizing that density and mixed use enable the provision of convenient urban services. The outcome is an emerging focus on “accessibility” as a key way of improving quality of life in cities. Borrowing from economics, accessibility is achieved by reducing transaction costs for individuals to partake in desired activities; many of which represent a form of either material or social exchange.

This is what Lynch (1984) refers to when he says that a “good [urban] environment is a place which affords obvious and easy access to a moderate variety of people, goods, and settings” (p.192). He then goes on to make an important qualification: “while this variety can be expanded if a person wishes to expand further energy—an explorable world, whose vast diversities can be sought out or ignored at will” (1984, p. 192).
Lynch's goal to create an “explorable world” is similar to saying that cities should enable access to a wide range of opportunities and interactions which contribute to a fulfilling life. But it is foolish to suggest that cities should plan for an explorable world if more basic needs have not been addressed. Maslow (1943) tells us that only after meeting physiological and safety needs can we effectively seek to meet higher needs of belonging, esteem and self-actualization. The past century has been an important one in advancing the provision of basic needs for urban residents, such as clean water and improved safety. Where this has been achieved, city leaders are now contemplating the ways in which they might enhance “livability” – an umbrella term that is rarely defined precisely, but usually associated with communities where interpersonal feelings of belonging, esteem and self-actualization are strong.

**Planning for urbanity**

For cities that are now in a position to consider not only the needs at the bottom of Maslow's hierarchy, but also at the top, discussions about livability and human exchange are often linked to “urbanity”. Webber (1964) describes urbanity in terms of ‘openness’ and ‘accessibility’ – two terms, which evoke a diversity of activities and experiences. Urbanity is fundamentally linked to multiple and varied uses of public and semi-public places by a range of groups for different activities (Hajer & Reijndorp, 2001); which by their diverse nature result in lively areas which serve individuals’ needs for belonging, esteem and self-actualization. Urbanity develops in a city’s streets and public spaces, its pubs and restaurants, shops, and places of recreation (Latham, 1999) – and is underpinned by conditions of civility, tolerance and enjoyment of differences (van Diepen & Musterd, 2009). Urbanity is ultimately about plurality and diversity – even complexity and freedom:

“The urbanity of a city is primarily determined by the degree to which the spatial configuration is able to contain a large pluriformity of land use, economic activity, institutions, life forms, cultural life styles and social relations. The more complex and pluriform the city is, the more it will be experienced as urban. (Heeling et al., 2002 p. 101)

Berhauser & Haupt (2010) explain that “urbanity” is largely the reaction to suburbanization and inner-city decay experienced following the Second World War - a way to re-brand urban life to attract the middle class and their tax base back to the city. Urbanity emerged largely out of the postindustrial transition to an economy focused on creative and knowledge-based industries, as well as the boom in financial services, entertainment, leisure and tourism. The focus on these knowledge-based activities has reshaped many cities’ agendas, particularly since Florida's (2002) claim that a city's attractiveness and its ability to attract investment is linked to its cultural diversity, openness and tolerance – all elements of urbanity.

In Europe, the goal of urbanity was institutionalized in 1990, with the European commission Green Paper on the Urban Environment which emphasized the need to create a “sense of place” - achieved by fostering diverse, multifunctional environments where quality of life is an “essential”, not a luxury (Montgomery,
1999). From a spatial development prospective, urbanity is associated with intensity and diversity of uses and compact forms of urban development capable of generating pedestrian activity.

1.1. Research Question

From the introduction above, it follows that developing urbanity – that is livable, healthy and vibrant communities that are able to meet human needs of belonging, esteem and self-actualization is an important and relevant subject of study and application for planners. A key measure and outcome of urbanity is an active and vibrant public life that supports opportunities for human exchange and interaction (Jacobs, 1961 and Montgomery, 1999). The focus of this thesis is on how the built environment can contribute to street activity. Thus, the research question is as follows:

How do urban development patterns impact street activity?

Sub-questions:
1. What are the distinct urban development patterns observed in Amsterdam over the past century?
2. What types of urban street activities do these urban development patterns correspond to?
3. What is the relationship between development patterns and street activity?
Literature Review

2. Public life and street activity

“Think of a city and what comes to mind? It’s streets” Jane Jacobs

Public spaces are important to the wellbeing of a city and its residents. Consisting of all sorts of outdoor environments including parks, squares, plazas and streets, these spaces can generate public life which contributes to individuals’ sense of community and wellbeing. When these spaces are missing or unused, residents become isolated from each and members are less likely to offer each other support (Carr et al. 1992, Avila & Ines 2001). The most abundant and distributed of public spaces in cities are its streets and their vitality mirrors the vitality of the city at large. This is what Jacobs (1961) means when she says that when people don’t feel safe in a city or part of it is because they do not feel safe on its streets. But when a “city’s streets are safe from barbarism and fear, the city is thereby tolerably safe from barbarism and fear (p. 106)”. But livable streets and cities are more than just the absence of danger or fear – they are able to meet a diversity of human needs to contribute to a high quality of life.

Planning for human needs

Urban planning is fundamentally about manipulating the natural environment for the benefit of people. As I already eluded to, I believe a key way of evaluating performance of cities is by evaluating how well individuals’ needs are met. One of the most cited theories on the subject is Maslow’s (1943) hierarchy of needs, which stipulates that there are five levels of needs, starting with physiological, safety, belonging, self-esteem and self actualization.

Maslow grouped the bottom four categories into “deficiency needs” and postulated that lower needs must be met in subsequent order from the bottom-up (Huit, 2007). In this original model, self-actualization was defined as a “growth” need, and stood out compared to the previously mentioned deficiency needs. According to Maslow, even when all preceding needs are satisfied, an individual will not be happy unless he is doing what he is fit to do – the ultimate goal for humans according to Maslow (1943). Later on, Maslow refined this model and further defined growth needs into four categories (Huit, 2007 referring to Maslow, 1971) as follows:

1. Cognitive: to know, to understand, and explore;
2. Aesthetic: symmetry, order, and beauty;
3. Self-actualization: to find self-fulfillment and realize one’s potential;
4. Self-transcendence: to connect to something beyond the ego or to help others find self-fulfillment and realize their potential.

Following Maslow’s theory, I think good city planning must take care of deficiency needs before it is able to provide our growth needs, and as I will discuss later, urban planning has rightly concerned itself with those basic needs over the course of the past century. But when those are met, people will not necessarily be satisfied unless higher order needs are provided for.

Carr et al. (1992) further operationalize human needs with respect to public space into four key categories: comfort, relaxation, passive and active engagement, and mystery and discovery, which overlap completely with Maslow’s hierarchy at different levels of deficiency and growth needs. These are varied needs which invoke very different spaces and activities; from the ability to lay down in a quiet space, to places for children to run and play, and festivals which give people the feeling of excitement and discovery. The more a city’s spaces serve these diverse needs, the more the city becomes “livable”. This is why I believe a livable city is one that continually expands the portion of public spaces which are able to serve human needs.

The discussion of street activity and its contribution to public life presupposes that people’s basic physiological and safety have been addressed, and considers how higher psychological and self-actualization needs can be achieved. Public spaces are particularly relevant for belonging and self-esteem needs which are usually achieved by participating in groups (Lang, 1994). Public life which is ultimately about bringing people together can help meet these needs for interaction and affiliation with others, and can contribute to the growth needs for learning, beauty, self-actualization and transcendence which imply interaction among people. It is important to underline that the mere presence of people in public spaces is necessary, but insufficient for a healthy public life. Public life refers to the levels and characteristics of the sociability among people.
and groups, which implies a diversity of people and a variety of interactions among them, which is not automatically achieved because people frequent public spaces.

**Factors impacting public life**

According to Avila & Ines (2001), the character of public life depends on five key characteristics:

1. Environmental characteristics (climate and topography)
2. Socio-cultural characteristics of the community
3. The functional and physical characterizes of spaces
4. Political and economic systems
5. Recreational and health needs of a society

Environmental characteristics such as climate can help explain why public life is more dynamic in Spain than in Finland, however, it is socio-cultural characteristics that sometimes explain why cities of similar climates have varying levels of public life. In Middle Eastern cities for instance, it is rare to see women in public spaces whereas many Spanish cities are known for their lively street life with families eating together and children playing in plazas late into the night. Similarly, political systems can determine whether people have the right to congregate in public, while economic systems determine how much public space is available and how well it is maintained, all which impact the level of street activity and by extension public life. In this way, public spaces are said to mirror social values, customs and culture, and reflect the interaction between physical, social, political and economic realities of a place (Avila & Ines 2001).

**What makes public spaces successful?**

But what are the elements that contribute to livable and enjoyable public spaces in general, and streets in specific? According to Montgomery (1999), three key categories are identified: spatial form, activities and image.

![Figure 3: Elements of a successful place (Montgomery, 1999)](image-url)
According to PPS (2015), there are four key elements that determine the quality of a public space: sociability, uses & activities, access & linkages, and comfort & image. These two models have a great deal in common, and their complexities indicate that successful public spaces – streets included – can not be achieved through any single measure or intervention. Both models emphasize image and sociability as key characteristics of great places. Montgomery’s “form” category captures elements that PPS further breaks down into “uses & activities” and “access & linkages”. In both models, these categories speak to the spatial and functional organization of the city.

![Image: What Makes a Great Place?](image)

Figure 4: How to turn a place around (PPS, 2015a)

Given that this is an urban planning thesis, my focus will be on the impact of spatial and functional elements on public life (the “form” category in Montgomery’s model, and the “uses & activities” and “access & linkages” in the PPS model). I narrow down my analysis to street life – an important subset of public life. Whereas plazas and parks can be sought out or avoided at will, everyone has to use a city’s streets one way or another. In this way, they are among the most used, diverse, and equalizing spaces in the city – they are “the river of life” in our cities (Whyte, 1980).

**Importance of street activity**

Jacobs (1961) describes at great length and very convincingly the importance of street life. She noted that human activity on streets generated self-governing properties. Among the most important, they facilitate public surveillance, building trust in a community and contributing to the healthy development of
children, suggesting that street life is important in meeting the needs at the bottom of Maslow’s hierarchy, and further up as well.

Although Jacobs’ remarks were not based on academic studies, there is now empirical evidence supporting her observations. Particularly regarding safety concerns, there is now a rich body of literature suggesting that street activity improves safety. Most notably, Newman (1972) developed the theory of Defensible Space to explain that when the built environment is busy with people, crime rates are low.

Another area rich in empirical evidence concerns the relationship between street activity and community trust and levels of cohesion. Many of the Jacob’s theories were explored further by Whyte (1980) and Gehl (2006) who found that people attract more people, and that this attraction is beneficial for quality of life. Appleyard (1981) coined the term “livable streets”, and showed that increased levels of vehicular traffic on residential streets have a negative impact on peoples’ quality of life – expressed in neighboring friendships and levels of trust. Lund (2003) found that trust, community cohesiveness and resilience increase in communities where members have opportunities to meet each other. Rogers et al. (2010) found that social capital - measured in individuals’ or groups’ connections and interactions with others - is an important component of quality of life, and has a positive correlation with walkability. Similar positive correlations between walkable, mixed-use neighborhoods and increased sense of community were made by Oldenburg (1999).

Jacobs (1961) also suggested that an active street life is good for economic activity. Studies of transformation of city centers such as Melbourne found that increased levels in tourism are at least partially associated with improvements to public spaces and streets which increase people activity (Gehl & Gemzoe 2001). Other studies now link increased property value and economic dynamism to increased opportunities for walking (see for example Cortright, 2009). Whereas the dominant paradigm of the past few decades is that mobility-centric infrastructure contributed to economic growth, emerging evidence suggests reducing car-dependence is not only beneficial for quality of life, but also for local economies.

Today street activity, walkable cities, and livable streets are used by a diversity of groups to evoke urban development based on one or more of the following principles: transportation choices, place making, social justice, and environmental sustainability (Henderson, 2011) – and increasingly – happiness (Montgomery, 2013). Proponents are generally concerned with the negative impact of car-dependent communities, and endorse instead non-motorized transport as a healthier, more environmentally friendly more socially equitable form of development. The convergence of all these disciplines pointing to the benefits of walkable communities begs the question why development policies do not reflect these priorities.
**How to generate an active and healthy street life?**

Jacobs (1961), Whyte (1980) and Gehl (1987) all emphasize that successful places are well trafficked by people, and that presence of people is the key attraction for more people. Whyte (2012) finds that successful places are also correlated with a high proportion of women and groups of people using the space. Therefore, the number of people, the proportion of women, and the presence of groups can be used to evaluate the vibrancy of street activity.

These authors also stress that the presence of other people although important, is not sufficient for a vibrant public life. They emphasize that the type and diversity of activities people partake in should be considered. One of the key indicators of great public spaces is the opportunity to engage “passively” - for example by people watching. Simple design improvements can increase use and quality of space - for example through the provision of places to sit - benches, movable chairs and grass, and opportunities to buy and consume food (Whyte, 1980). Ultimately, a vibrant street life that contributes to public life is infused with opportunities for social exchange and interaction. One of the most important elements to influence the quality of public spaces, identified by Whyte (1980), is the presence of “triangulation” elements – “external stimuli” that provide strangers the opportunity to interact. These elements can be physical - such as a monument or piece of art, or they can be an activity / performance. These opportunities for interaction among strangers are a key contributor to a community’s wellbeing and quality of life.

**2.1. Evolution of street activity**

In evaluating the evolution of street activity over the past century, I will make use of the model described by Gehl et al (2006).

![Figure 5: Evolution of street activity over the past century. (Gehl et al. 2006)](image-url)
The authors explain that a century ago streets served three key functions: movement, access to buildings and as public space where necessary activities such as merchandizing and socializing took place. For many people the streets were places of work – bustling with vendors and merchandizing activity. These activities helped meet individuals’ needs for survival whose living depended on these merchandizing activities. Streets were also public spaces where people would meet to share information and socialize, as merchandizing and socializing were complementary activities. The reorganization of cities along the principles of modernism changed the function of streets to serve primarily cars. Many of the activities that previously took place in the streets were moved indoors or to parks and the functional role of streets as public spaces was largely degraded.

In Gehl’s model, the “car invasion” that unfolded between the 1910s and 1980s is largely responsible for the gradual degradation of streets as public spaces. Gehl attributes the revival of street activity to research and a new emphasis on public spaces, and notes that streets are now dominated by “optional” activities of culture and recreation. A large portion of these activities is “passive” - recognized by a proliferation in sitting space.

Gehl (1987) also provides a framework for understanding the relationship between the quality of the physical environment and level of street activity. As illustrate in Figure 6, necessary activities – such as working or commuting to work will occur regardless of the quality of the space. In the case of optional activities – such as leisure and recreation, the quality of environment is decisive. This indicates that the presence of optional activities such as leisure can be an indicator of high quality spaces. Gehl (1987) further defines a third category of social activities, which he explains occurs spontaneously as the result of interaction between people using a space for necessary and optional activities. The model illustrates how the total amount of activities in public space are much larger for good environments compared to poor ones.

Figure 6: Relationship between quality of the physical environment and activity (Gehl, 1987)
The study of urban life as pioneered by Gehl (2006) and Whyte (2012) is rooted in on observations of how people interact in public spaces. Gehl and his coauthor provide tools for how to do this in *How to Study Public Life* (Gehl & Svarre, 2013). Because this is a temporal study, I make use of photographs from different time periods which I analyze based in the elements laid out by Gehl and Whyte, which I will described further in my Research Methods section. For now I turn to the literature reviewing the impact of spatial elements on street activity.
2.2. Impact of spatial form on street activity

So far I have introduced a wide range of theoretical elements that impact the quality of public life and street activity. From here on I narrow my research on the influence of spatial and functional elements which most relevant for street activity. A starting point is provided by Jacobs' (1961, p.150-151) description of spatial conditions necessary for the generation of diversity and activity in the street:

1. The district, and indeed as many of its internal parts as possible, must serve more than one primary function; preferably more than two...
2. Most blocks must be short; that is, streets and opportunities to turn corners must be frequent.
3. The district must mingle buildings that vary in age and condition, including a good proportion of old ones so that they vary in the economic yield they must produce. This mingling must be fairly close-grained.
4. There must be a sufficiently dense concentration of people, for whatever purposes they may be there.

These four criteria can be described in terms of three key spatial qualities: density, land use and layout of urban activities and streets, or sometimes referred to as the 3Ds: density, diversity and design (Cervero & Kockelman 1997).

Since Jacobs first introduced these conditions in 1961, empirical research has furthered her theory. Literature suggests that among the three, the most critical spatial element for walkability and an active street life is mixed-use by generating shorter trips which can be achieved on foot (Ewing et al., 2003, Frank & Pivo, 1994). Segregating places into where individuals live, work, shop, or recreate results in long walking distances, and sometimes the automobile becomes the only feasible mode of transport. In the following sections, I described these elements in further detail after providing a high-level description of the evolution of spatial development patterns over the past century.
3. Evolution of spatial planning

3.1. Before urban planning

Urban planning as a profession is a relatively new concept that emerged during the Industrial Revolution. Before the 20th century, cities developed organically, the result of the complex process of urban growth that depended on a vast range of factors: economic considerations, the natural environment and its constraints, available building techniques and technologies, traditions, etc. This process is better described as “city building” rather than “city planning” and it denotes development lacking a coordinated (master) plan. Even when parts of the city were planned, as was the case with Amsterdam’s Canal Belt in the 17th century as will be discussed later, development was phased and dependent on input from a variety of players, and usually, their economic motivations.

With the Industrial Revolution, migration to urban areas rapidly increased, creating stress on medieval cities which could not cope with the growing densities. As cities became increasingly crowded and polluted, visionaries imagined development that could prevent outbreaks of communicable diseases such as cholera and tuberculosis. The domain of urban planning was invented to manage the built environment to improve living conditions in a more systematic way. In this sense, urban planning emerged to address similar concerns as the medical profession – but from a spatial perspective.

A new and influential set of values emerged, based on the principles of light, air and space, which promised to deliver a better life for people. This was the rise of the modernist movement established by Ebenezer Howard and the Garden City in 1989. The concept was developed further and popularized by the French architect, Charles-Edouard Jeanneret, better known as Le Corbusier in the 1930s. His ideas were formally adopted in the “Athens Charter” of 1933, an influential document that guided much of the development of the past half century from Brasilia to Bijlmermeer in Amsterdam’s southeast.

![Figure 7: Howard’s Garden City (left) and Le Corbusier’s Radiant City (Right)](image-url)
3.2. The Modernist movement and its impact on street function

The Athens’ Charter has defined so much of the practice of urbanism that it is worthwhile taking the time to lay out the goal of this 95-point document (Corbusier, 1933): “The first obligation of urbanism is to come into accord with the fundamental needs of men. The health of every person depends to a great extent on his submission to the “conditions of nature.” The sun, which governs all growth, should penetrate the interior of every dwelling, there to diffuse its rays, without which life withers and fades. The air, whose quality is assured by the presence of vegetation, should be pure and free from both inert dust particles and noxious gases. Lastly, space should be generously dispensed.”

These observations speak to the concerns of the day. Le Corbusier thought that the need for space was a psycho-physiological nature, and that narrow streets and enclosed courtyards created an unhealthy atmosphere. This was the fashion of the time and very different from the dominant view today which presupposes that narrow streets appeal to our needs for ‘enclosure’ and ‘human scale’. For all his failures, Le Corbusier at least started off with an attempt to define the “needs of men”, although the failed to validate his assumptions by engaging with physiologists and sociologists such as Maslow who possessed these tools.

The two most critical points addressed in the Athens’ Charter speak to density and land-use. First, on density: “The population is too dense within the historic nuclei of cities, as it is in certain belts of nineteenth-century industrial expansion — reaching as many as four hundred and even six hundred inhabitants per acre.”

And on land use: “Zoning is an operation carried out on the city map with the object of assigning every function and every individual to its rightful place. It is based on necessary differentiations between the various human activities, each of which requires its own specific space: residential quarters, industrial or commercial centers, halls or grounds intended for leisure hours.”

A key impact of modernism was to turn streets from multifunctional spaces to single use. Where streets had traditionally met three key functions: movement, public spaces and for access to buildings, modernism reduced streets to mono-functional mobility corridors designed primarily for the movement of automobiles. What were previously places of “centrality” – intensely used and efficient because of their intensity, were reduced to channels for moving from A to B and low-use parking space.

Le Corbusier didn’t speak much to the advantages of walkable spaces but focused on traffic and the car as the emerging technological representation of a modern and progressive society. He claimed that existing transportation routes
“originally conceived in terms of pedestrian and wagon traffic, no longer meet the requirements of today’s mechanized means of transportation”. Le Corbusier, who was a fan of cars and speed, thought the dimensioning of streets was inappropriate for future use and impeded “orderly process of the city”. The solution would be to separate slow moving pedestrians via a network of footpaths and let streets (now converted to roads) serve the automobile. These networks would “fulfill their function” for mobility, and would come in contact with housing only when necessary - that is, not very often. The justification is that streets would not be safe for pedestrians, so decks, flyovers and promenades, would be reserved for pedestrian use. This was expected to created safe environments and improve the efficiency of the city although “efficiency” in this case was defined based on the narrow indicator of speed. Additionally, no longer would streets be the place for social interaction – these activities would be moved off to an “ordered” space. Neither would buildings open to the street, but instead be placed in open space. Whereas in traditional developments transportation enhanced land uses, in the modernist model, transportation dominated them.

The change in function of streets from multifunctional public spaces to a monofunctional traffic network is arguably one of the most consequential changes to cities and central to this thesis. It goes hand in hand with the separation of functions of land uses, and as Marshall (2005) explains, this new planning approach based on separation fundamentally changed the DNA of cities.

By the 1960s, a number of observers began expressing concern with the modernist approach. Among them, Jacobs (1961) noted that while cities had achieved the goal of providing more “light, air and space”, the result was ‘inhumane’ cities which lacked public life. Jacobs blamed this on the modern movement’s failure to acknowledge and work with “layered complexity and seeming chaos” characteristic to urban life (Jacobs, 1961, p. 228). Similarly, Gehl & Svarre (2013) suggest that a vibrant urban life was such a natural part of the traditional urban form that Modernists failed to appreciate it does not thrive under any conditions. Indeed, the terms “public life” and “street life” are not captured in the Athens’ Charter – perhaps because they were so ubiquitous to daily life, only a keen social scientist could discern what it means to destroy this fabric.
Today, the modernist ideals continue to be criticized for their contribution to sprawl through the promotion of low density, low diversity areas, resulting in developments that are not only environmentally and economically unsustainable, but result in communities correlated with low social cohesion, cultural diversity, and attachment. In response to these developments, the ideas of the compact city (in Europe) and new urbanism (in North America) have emerged.

**3.3. Reactionary Movements**

Salingaros (2006 p.2) provides one of the sharpest contemporary critiques of the impacts of modernism:

“There is nothing wrong with either high density or low density per se, as long as it is well integrated with other densities and is in the right place (not too much of the same thing). People in the past several decades seem to have bought into the false notion of geometrical uniformity, which goes back to the now discredited 1933 Charter of Athens. That document introduced notions that turned out to be catastrophic for cities, such as separating functions into single-use zoning, the false “economy of scale”, and also seductive but toxic images of ultra-high-density skyscrapers, vast open plazas, and uniform housing developments. It gave planners the idea of disintegrating the city into non-interacting components, or at best, ones that interact with each other only at tremendous cost and inconvenience; the opposite of a geometrically integrated city.”

The concepts of compact city, new urbanism and other similar typologies are closely interlinked, sharing a common foundation that urban form should use space efficiently through dense and diverse mixing of activities that can support and prioritize pedestrians (Fainstein, 2003). The common denominators to these movements align with the spatial qualities described by Jacobs (1961):

- Mixed land uses
- Compact building – vertical development placing activities within short distance of residential areas
- Diversity of housing options
- Investment in existing communities
- Variety of transportation choices with emphasis on walkability

New urbanism shifts the modernist focus on the city scale to the neighborhood level, which is of limited size and has a well defined center that is within walking distance of residences and makes daily needs accessible within a five minute-walk (Fainstein, 2003). In this way individuals’ desire to access activities is met without the high cost of congestion – with co-benefits of a vibrant street life that can support human exchange and interaction because walking is the preferred method of transport. Central to these planning paradigms is the reinstatement of diversity in planning – from building types to diversifying the use of streets as places. The following sections explore each spatial element further before considering their interaction within typologies and their impact on the function of streets.
4. Elements of spatial planning

4.1. Density

Density is one of the most important spatial dimensions of urban planning and determinants of street activity. Generally, it refers to the relationship between a given area and the number of people or dwellings within it. Before the 20\textsuperscript{th} century, densities in cities were the outcome of the complex and organic process of urban growth – within those constraints, there was no set prescription of density – it was an emergent characteristic (Berghauser Pont & Haupt, 2010). During the second half of the 19th century, when high densities in industrializing cities were a leading cause of fire, disease, and social disorder, regulations emerged in the form of prescribed maximum building heights and minimal street widths (Berghauser Pont & Haupt, 2010). These negative associations of densities made way for two dominant approaches in reducing densities: either through the implementation of low-density developments (sprawl), as is widely popular in North America and Australia, or through the construction of “high-rises in the park”, as proposed by Le Corbusier.

From the perspective of street activity, it seems intuitive that higher densities lead to more intense use of streets, and this is generally true. However, using density to study impact on street activity is difficult for a number of reasons. First, consider the way very different special configurations will result in the same dwelling’s density, as in the case of Figure 9. These different layouts can result in very different street activity depending on land use and whether people have places to walk to.

![Figure 9: Three spatial configuration result in 75 dwellings per hectare (Berghauser Pont & Haupt, 2010)](image)

When densities are used in the planning process, it is common to speak of dwelling densities and assume an occupancy rate to yield an expected residential density. However, this means that for the same dwelling density, very different population densities will emerge depending on the size of the dwellings and the expected and actual occupancy. Consider the following configurations of very similar dwelling densities resulting in very different population densities.
Jacobs (1961) laid out her own recommendation for minimum necessary densities of 100 dwellings per acre (250 dwellings per hectare), but she recognized that densities are a poor way to predict vitality of street life. Jacobs was not interested in the density per se but only in the necessary threshold for generating vibrant street activity.

Because of the different spatial arrangements resulting in the same population or dwelling density, Berghauser Pont & Haupt (2010) found that floor space ratio (FSI), indicating the ratio of built floor space to land are is a better spatial tool for evaluating neighborhood characteristics. Similarly, in his study of three distinct areas of Melbourne, Pafka (2013) found that dwelling per hectare provides no indication of the density of people on the street. Instead, Pakfa (2013) suggests that job density, number of visitors and small grain networks representative of creative clusters are better predictors and indicators of street activity. He concludes that dwelling density is unreliable and has the potential to mislead as far as street activity is concerned.

In conclusion, literature indicates that when concerned with a vibrant street activity, a threshold density of people is necessary - but that density itself is not a good predictor of street activity. Instead, indicators that speak to functional use and layout are essential.

4.2. Land use

Land use refers to the arrangements of functional units of a city, which depend on the historical layout of the city and zoning ordinances that dictate the extent to which different functions can be integrated. Whereas Jacobs (1961) believed diversity was the most important element for a healthy urban environment, many cities embraced the notion that “incompatible activities” must be separated; adopting policies of separation along the four functions described by CIAM: housing, employment, recreation and transport. While this might have been justifiable during the Industrial Revolution, the legacy today is the separation of what are often compatible functions, particularly housing and services, with negative impact in terms of time and energy required to reach activities.
Benefits of mixed-use

The benefits of mixing are explained in terms of two key arguments which are important to this study. The first is that mixing increases accessibility through proximity – reducing the need for transportation. This in turn increases the environmental quality, as car dependency decreases when more activities are within walking distance. In correlation, the second argument is that when people are able to reach activities within walking distance – they are brought out into the streets and help contribute to the “vitality” and “diversity” of street life. Mixed-use is thought to complement high densities and extend activity by diversifying and enhancing the ‘ebbs and tides’ of people coming and going into an area to participate in the activities provided throughout the day (Talen, 2006).

In a recent study using cell phone GIS data to analyze urban activity in Amsterdam, Jacobs-Crisioni et al. (2014) found that as presupposed by Jacobs (1961), mixed land uses were correlated with more diverse activity dynamics. The authors confirmed that mixing shops and businesses with meeting places has an additive effect on area activity levels; in particular during times that shops and businesses per se do not cause much activity. The author concluded that local provisions for leisure opportunities are vital for any effort to increase activity intensities.

![Diagram showing the benefits of mixed-use development](Image)

Figure 11: Benefits of mixed-use development (Hoppenbrower & Louw, 2005)
Two types of mixing

Jacobs (1961) distinguishes between two types of mixing: mixed primary uses and mixed secondary uses. The first refers to major land uses that attract a large number of people to an area – for instance residential, employment and service functions. Secondary uses are those that are supported by the traffic generated by primary uses: bars and restaurants, shops and other small-scale amenities. The interaction among primary and secondary uses results in a vibrant street scape throughout the day and is responsible for what authors describe as a “multiplier” or “synergistic” effect of mixed land uses – people might be attracted to an area for a certain reason, but continue to experience it because of the additional opportunities it offers.

Diversity

Another element related to land uses and the degree of functional mixing is diversity. Jacob’s third criteria for successful urban places distinguishes between an area which might be zoned for multiple uses – for example housing and commercial spaces – but offers only limited variety among each functional use. Jacobs explains that a mix of uses is not sufficient – and that successful places require diversity among functions. This means that within a residential area, there should be a variety of dwellings of different sizes and types. The same can be said about employment and other land uses. Therefore, it can be said that land use consists of two dimensions: the number of activities or land uses within the spaces of interest – and the diversity within each class of use.

Modeling mixed-use

Although a highly complex concept, mixed-land use models are now emerging. Hoppenbrower & Louw (2005) build on an existing model of functional mix to take into account four key elements: urban functions, dimension, scale, and urban texture. Urban function refers to the land uses dictated through zoning documents: living, working, recreation, etc. The dimension element indicates where the mixing takes place: within the same unit, the same building, across buildings, or across time. Scale refers to whether mixing occurs at the building, block, district or city level. This is important to consider because it can be argued that all cities are “mixed” at the city level – however that is not useful for the intended goal of generating walkable neighborhoods which implies that people should be able to reach a certain number of activities within approximately 500 meters.
The final element of the model - urban texture - is operationalized in terms of grain, density and interweaving. This means that leading land use models integrate density and layout elements.

### 4.3. Layout

Permeability, or interweaving and grain are the two most important elements used to describe layout - the spatial organization and configuration of streets, blocks and buildings. Permeability is typically a function of street design, resulting in two extreme types of layout: the grid, where buildings generally open to the streets, and tree-like (cul-de-sac), where buildings are set in free space.

![Figure 12: Components of mixed land use: urban functions and dimensions (Hoppenbrower & Louw, 2005)](image)

An important metric used to describe permeability is lot coverage – relating the proportion of built space and non-built space. Jacobs (1961) believed a high lot coverage (60 to 80 per cent) was a condition for urban vitality to help concentrate people into streets and public spaces.

Two other important metrics defining layouts are the density of intersections and the length of blocks. Jacobs (1961) illustrates how shorter blocks, and hence
higher proportion of intersections provide a “porous” fabric that provides pedestrians options and activate streets.

Grain generally describes the types of buildings and their relation to each other and the street. According to Hoppenbrower & Louw (2005):

“A fine or close grain refers to a settlement where like elements are widely dispersed among unlike elements and a grain is coarse when extensive areas of one element are separated from extensive areas of another element.”

Here again it is possible to see the interlinked nature between layout and land use – as grain is defined in terms of mixing. Grain and permeability are illustrated by Montgomery (1999) using two different scenarios to show the relationship between buildings and their relationship to the street. The traditional layout links buildings to the street generally around a courtyard, helping define the space – while the modernist approach places buildings in the middle of the plot, and fails to create a permeable network. While these configurations can yield similar densities, they can have very different impacts on street activity. Higher permeability, resulting from shorter blocks and more intersections is a key predictor of pedestrian movements (Hillier & Hanson, 1984; Hillier, 1996).
4.4. Interlink between spatial elements & street function

What is most striking about the literature review on density, land use and layout as the three key spatial elements impacting street activity is the interrelation among the three. As illustrated, those who focus on density indicate that elements of layout should be considered (for example through the use of FSI). Similarly, the more comprehensive of models analyzed, consider the levels of functional mix while also taking into account both density and layout (Hoppenbrower & Louw, 2005). It seems that it is difficult to evaluate the three elements in a meaningful way without relating them to each other. For instance, in a study of Rotterdam, the authors found that there is a relationship between density, FSI and degree of mixed-use: in areas with lowest range of density and FSI lower than 0.5, no mixed-use was found, whereas in areas with higher densities (FSI higher than 1.50), mixed-use was common (van Nes et. al 2012). Still, literature indicates that for the purposes of walkability and street activity, mixed land use is a better tool for understanding spatial activity because it better captures elements of density and layout. Ewing (1994) argues that many of the benefits of density may in fact be attributed to mixed land uses since the two usually co-exist. Similarly, Hoppenbrower & Louw (2005) explain that intensity does not necessarily denote mixed-use, while multifunctional land use implies intensive land use.

I return to accessibility as a key function of cities and critical for meeting human needs. When many activities are within walking distance, neighborhoods are said to be “walkable” and generally result in vibrant street activity. In those areas, many activities are within reach. These neighborhoods, generally typified as the pre WWII European neighborhood, meet accessibility through proximity. They are compact, mixed use and exhibit a permeable layout that makes walking the dominant mode of transport, followed by cycling and public transport. In these neighborhoods, streets also serve non-movement functions – particularly as public spaces.

The opposite model is based on a separation of functions and assumes accessibility is met through mobility. This model presupposes streets serve movement function and keep pedestrians away. It suggests that a modernist spatial and functional organization is fundamentally incompatible with vibrant street activity.

This is why Jacobs (1961) explains that “greater accessibility by car is inexorably accompanied both by less convenience and efficiency of public transportation, and by thinning-down and smearing-out of uses, and hence by more need for cars” (pg. 351). As development becomes more dispersed, more city space needs to be allocated to driving and parking. If this process continues, a car-dependent equilibrium can be reached. At this point it can be difficult to revert to a compact form of development. This describes the equilibrium many North American and Australian cities find themselves in, where upwards of 80%; even 90% of all trips are made by car. The opposite equilibrium is reached in compact cities. Because most amenities are within walking or biking distance, and efficient transit can be reached for longer trips, the use of the automobile can be impractical or
uncomfortable. This also suggests that cities have to make a decision to prioritize pedestrians or cars – but accommodating both is difficult because what is good for one is bad for the other. Performance of streets from an automobile perspective is highest when there are no other cars around, while from a pedestrian perspective, performance of the street is higher when there is a healthy presence of other people.

The analysis thus far is summarized in a typology of two dominant and contradicting models of development. The spatial elements are bundled into the typologies of compact and sprawled city. The two models underpin many modern debates about urban development and transportation planning. Compact city is analogous to urban densification, mixed-use and fine-grained design, whereas the dispersed city corresponds to suburban spread, separation of land uses and road hierarchies (Marshall, 2005).

Table 1: Traditional and modernist city spatial characteristics and impact on street activity

<table>
<thead>
<tr>
<th>Primarily spatial elements</th>
<th>Traditional city</th>
<th>Modernist city</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>High</td>
<td>High or low (generally lower than pre-WWII cities)</td>
</tr>
<tr>
<td>Land use</td>
<td>Mixed use</td>
<td>Single use zoning</td>
</tr>
<tr>
<td>Layout</td>
<td>High permeability of streets and fine grain of buildings</td>
<td>Low permeability of streets and course granularity of buildings based on automobile considerations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact on street activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of street</td>
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<tr>
<td>How it meets accessibility</td>
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<tr>
<td>Impact on street life</td>
</tr>
</tbody>
</table>
5. Research design & methods

My goal for this research is to explain how changing spatial patterns translate into different levels and types of street activity over the past century in Amsterdam. Thus far I have identified three time periods which correspond to different models for spatial development: pre WWII, corresponding to compact city development; post WWII, corresponding to the modernist approach, and current day which rejects the modernist approach and seeks to reinstall traditional development patterns.

![Figure 16: Research framework](image)

**Urban development patterns**

I operationalize spatial development patterns based on the three spatial elements Jacobs (1961) identified as mediating successful urban spaces through the generation of active street activity as described in the literature review.

- Density – population and dwelling densities
- Land use – mix of uses and diversity among functions
- Layout – street permeability and building grain

**Street activity**

Street activity is described by reviewing photographs of Amsterdam's inner city over the past century, corresponding to the three time segments identifies. The vitality of street activity is operationalized based on two key elements identified by Gehl & Svarre (2013) and Whyte (2012):

- Number of people, and the proportion of women, children, and groups of two or more people
- Diversity of activities that people partake in. These activities can be necessary or optional, and can include walking, seating, eating, interacting with an installation, etc. Vibrant public life results when there are
opportunities for human interaction and exchange.

The research design is an exploratory and descriptive case study, providing an in-depth investigation of the link between spatial elements and use of streets on a temporal basis. I use a variety of research methods, but rely most heavily on photographs as a primary source of data, coupled with other spatial data collected primarily from O&S statistics.

**Table 2: Data sources**

<table>
<thead>
<tr>
<th>Methods of data collection and analysis</th>
<th>Primary sources</th>
<th>Secondary Sources</th>
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<tbody>
<tr>
<td>• O&amp;S Data</td>
<td></td>
<td>• Peer reviewed papers and other documents</td>
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<tr>
<td>• Photographs (Amsterdam Archives)</td>
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<td>• O&amp;S maps and analysis</td>
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<td>• Observations</td>
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<td>• Zoning Plans</td>
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This approach can be useful because changes to urban spatial form and use of streets can be detected more easily through visual comparisons, revealing patterns that are not necessarily obvious in the analysis of policy documents or readily available data source. As already mentioned, I structure my analysis into three time periods previously defined: traditional pre-WWII design, modernist post WWII design, and post modernist, and use two case studies to illustrate dominant / representative spatial patterns during each period.

**Table 3: Structure of analysis**

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<tbody>
<tr>
<td><strong>Case studies</strong></td>
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<tr>
<td>Traditional streets</td>
<td>• Jordaan</td>
<td>• Nieuwmarkt</td>
<td>• Oosterdockeiland</td>
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<td></td>
<td>• Canal Belt</td>
<td>• Kattenburg/Wittenburg</td>
<td>• Overhoeks tower</td>
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<td>Modernist streets</td>
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<td>Post modernist</td>
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<td><strong>Spatial Form:</strong></td>
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<tr>
<td><strong>Street activity:</strong></td>
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<td></td>
<td>• Number of people</td>
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<td>• Diversity of uses</td>
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The measures of analysis include physical characteristics of population and dwelling densities, mix of uses at the building / street / district level; and layout patterns, as well as the number of people in the street and the activities they partake in as observed in the photographs.
Analysis

6. T0: Traditional streets (pre WWII)

6.1. Context and Case Studies

Amsterdam dates back to the 13th century as a settlement that urbanized gradually based on increased economic activity leading to population growth. Initially a small fishing village, the city developed along its system of canals which were used for drainage, transport and defense and continue to define the spatial layout of the city today. The 17th century was a period of economic boom known as the Golden Age, during which population growth lead to increasing densities from 110 inhabitants per hectare in 1400 to 650 in the 1650 (Berhauser & Haupt, 2010).

To accommodate this rapid growth, the city planned a first territorial expansion consisting of the Grachtengordel and the Jordaan. These two projects introduced building regulations governing functional, socio-economic and aesthetic elements for the first time in the Netherlands (Berhauser & Haupt, 2010). Following these expansions – which were implemented in a phased approached over a century (the first phase staring in 1610 and the second in 1660), the density of the city fell to about 400 inhabitants per hectare in 1795 (Berhauser & Haupt, 2010).

The Grachtengordel was designed for the wealthy, while the Jordaan was intended for the poor, illegal migrants. Within the Grachtengordel, Herengracht and Keizergracht were reserved largely for housing developments for the elites; Prinsengracht was earmarked primarily for warehouses, while small shops for retail were permitted in the narrower, perpendicular streets (Berhauser & Haupt, 2010).

Quite differently, the Jordaan developed in some ways more “organically” – built around what had developed as illegal settlements along drainage canals. The redevelopment plan allowed for industrial and housing functions but called for the widening and realignment of streets. Here, activities were more intermingled with businesses and industry taking places on main floor, and residences on top. This indicates a higher functional diversity at the building,
street and neighborhood levels within the Jordaan compared to the Grachtengordel. In the Grachtengordel, zoning was meant to reduce diversity in an effort to create an enjoyable space for the elites. While these projects set the stage for a robust planning tradition in the city, they also reveal that zoning and conscious planning is rooted in the segregation of socio-economic classes.

As is often the case with periods of economic growth, the Dutch Golden age was followed by economic stagnation and periods of war in the 18th century. By 1815, the population density had naturally fallen to 320 inhabitants per hectare (Berhauser & Haupt, 2010). Then, during the end of the 19th century, industrialization drove an even more aggressive growth. The result was an increase in population from 180,000 inhabitants in 1815 to 224,000 in 1850 and 510,000 at the end of the 19th century (Berhauser & Haupt, 2010). Between 1750 and 1850, the number of families in the city increased by 20,000 to 40,500, but the housing stock increased by only 900 units to 27,600 (Berhauser & Haupt, 2010). This resulted in what were widely considered overcrowded conditions in the poor neighborhoods of the city. Despite these significant changes in growth, the structure of the city remained largely unchanged.

In 1895, the population of the Jordaan was 830 inhabitants per hectare, compared to the 270 in the neighboring Grachtengardel (Berhauser & Haupt, 2010). In those crowded areas that lacked modern amenities, disease was rampant, leading to a fourth cholera pandemic and 21,000 deaths in 1866. The majority of those affected were from the highly populated areas (Berhauser & Haupt, 2010 referring to Moll 2001).

This time period corresponds to the development of another planned expansion, outside the Grachtengordel, in what is now known as the 19th century ring. Guided by the emerging principles for increased access to light and space, a plan was put forward in 1867, stipulating that street width should be at least 1 to 1.5 times the height of the highest building to ensure adequate access to daylight inside the buildings and on
the streets (Berhauser & Haupt, 2010 referring to de Roister 1987). Based on an economic evaluation however, a different plan was implemented because of the economic advantages it offered due to narrower street design. This plan, which corresponds to some of the most dense and popular neighborhoods today, including the Pijp and Kinkerburt, was allowed to develop to some extent in an organic way – with investors able to adapt the street design based on their preferences.

Despite these improvements, living conditions remained poor and debates for the need to improve these conditions intensified, driven largely by visions for the ‘Healthy City’ (Baumeister), the ‘Beautiful City’ (Sitte), and the ‘Social City’ (Howard) (Berhauser & Haupt, 2010) at the turn of the century. The emergence of these ideals leads to national and municipal governments assuming greater responsibility in creating a better city. In the Netherlands, the Housing Act in 1901 marked a new era that would seek to improve conditions for the poor working classes in an effort to mitigate disease and social unrest. Similar policies in England were motivated by the goal to contain poor living conditions and prevent their spread to the more “civilized” areas of the city; while in Germany, spending on the poor was seen as a way of mitigating a revolution (Berhauser & Haupt, 2010). In the Netherlands, the motivations were arguably more respectable and enlightened, emphasizing that improved housing can have a positive effect on the productivity and well being of workers (Berhauser & Haupt, 2010). A shift occurred from market to government lead development, made way for a period during which social housing construction dominated developments in the city.

During the early decades of the 20th century, Berlage was an important figure, whose urban expansion known as Plan Zuid emphasized public and aesthetic qualities in the built environment resulting in the beloved Amsterdam School design (Berhauser & Haupt, 2010).
While the earliest version of the plan proposed much wider streets – a final compromise informed by economic considerations resulted in a few broader axes but maintained the traditional layout of buildings opening to the street. Berlage’s vision, which was only partially implemented, tried to overcome socio-economic segregation through the provision of public spaces. This portion of the plan was arguably not met, as this part of the city is largely unaffordable for lower socio-economic groups and relatively homogenous.

In 1921, Amsterdam began annexing neighboring lands with the intention to expand residential and business developments. By 1934, a new development plan for Amsterdam was put together, based on four distinct, separated functions: housing, commerce, recreation and transport, envisioned by van Eesteren – the head of the newly created Town Planning department of Public Works - and heavily inspired by Le Corbusier. Housing and living was to occur in the Western and Southern parts of the proposed extension. Recreation would be woven in between the living and working areas, in the form of large green areas. These plans were based largely on the principles of light, air, and space – contrasting the cramped, slum-like conditions of inner city living. Whereas developments up until this period were de facto in the style of “compact city” due to restrictions on land availability, the new vision would be based on a more “dispersed model”.

![Figure 21: AUP Plan (Amsterdam Archives)](image)

Even before the Second World War, these new ideas began to change the form and function of city, as rapid growth at relatively low densities expanded the urban footprint, facilitated by the growth in the automobile. The population density of Amsterdam decreased from approximately 600 to 195 people per hectare between 1880 and 1939 (Berhauser & Haupt, 2010).
6.2. Spatial patterns summarized

The previous chapter has provided a description of the spatial development of Amsterdam prior to the Second World War. I summarize the key elements regarding density, land use and layout below.

**Density**

Density was largely the outcome of organic urban development, guided primarily by economic considerations. As land was a scarce resource, poorer people accessed less of it and therefore lived in more dense developments and were therefore at greater risk of communicable diseases.

**Land use**

Zoning regulations date back to the 17th century and were implemented at the neighborhood level based on socio-economic considerations. Despite different levels of functional separation among neighborhoods, it can be said that all pre WWII neighborhoods were mixed to some extent. In the Jordaan, functional mixing consisted of three key functions: residential, commercial and industrial. These functions were mixed at the street level, as well as at the building level. In the Canal Belt, mixing consisted of three key functions: residential, commercial and storage. These functions were mixed primarily at the district level.

**Layout**

Despite some variance based on neighborhood and time period, short blocks and a high density of intersections resulting in a “permeable” layout are generally characteristic of pre WWII neighborhoods. The houses open to the street and their style can be described as granular because of their generally small size. The provision of wider streets as proposed in the 19th century did not start materializing until the 20th century, and even then it was not very pronounced.
What makes traditional neighborhoods walkable is their size, which vary between 60 and 120 hectares (O&S 1920). Neighborhoods functioned as complete units, centered around a church and market and defined by clear edges. Assuming “circular” neighborhoods, this means that from the center of the neighborhood to its edge, the distance travelled is ~400- 600 meters, which can be covered in approximately five minutes on foot. This also means that crossing the neighborhood will take normally 15 - 20 minutes.

Based on these descriptions, a typology that matches the characteristics of a “compact city” model emerges as summarized below. This classification is established as a baseline scenario against which developments in the subsequent time period are evaluated.

### Table 4: Spatial pattern pre WWII.

<table>
<thead>
<tr>
<th>Spatial element</th>
<th>Summary</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density</td>
<td>1920 (O&amp;S, 1920)</td>
<td>Population densities vary at the district level depending on socio-economic class. In crowded Jordaan live 976 inhabitants per hectare, but typically the population densities are 200-400 inhabitants per hectare for all other neighborhoods.</td>
</tr>
<tr>
<td></td>
<td>Oude stad: 278</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jordaan: 976</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grachtengardel: 281</td>
<td></td>
</tr>
<tr>
<td>Dwelling density</td>
<td>1920 (O&amp;S, 1920)</td>
<td>Dwelling densities vary by district. 60 dwellings per hectare is standard but in the poorest part of down, densities are more than three times as high. This means there is a lot less space per person in these areas.</td>
</tr>
<tr>
<td></td>
<td>Oude stad: 62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jordaan: 218</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grachtengardel: 60</td>
<td></td>
</tr>
<tr>
<td>Land use</td>
<td>Mixed use at the building, street or neighborhood level, depending on the neighborhood.</td>
<td>Poorer neighborhoods have more mixture of incompatible functions (housing nearby polluting industry) Neighbourhoods vary in size from ~ 66 hectares (Jordaan) to 180 hectares (Grachtengordel)</td>
</tr>
<tr>
<td>Layout</td>
<td>Short blocks and fine grained buildings result in a permeable development</td>
<td>All neighborhoods are 400 - 600 meters radius from the center to the edge, which is considered “walkable”. Streets are generally short and narrow, and buildings open to the street</td>
</tr>
</tbody>
</table>

35
6.3. Corresponding street activity

Figure 23: T0-1 Damstrat 1868 (Amsterdam Archives)

Figure 24: T0-2: Reguliersbreestraat 1900 (Amsterdam Archives)
Figure 25: T0-3: Haarlemmerdijk 1900 (Amsterdam Archives)

Figure 26: T0-4: Museumplein 1906 (Amsterdam Archives)
Function of streets

The photos illustrate that streets in the late 19th century / early 20th century were multifunctional and nature, and intensely utilized. They reveal what can be described as a “localized” life, where most activities occur within walking distance. They reveal the multifunctional nature of streets for movement, public space and access to buildings. Three of the four photos (#1,2,3) are dominated by what can be broadly categorized as necessary activities, with many people merchandizing, probably for a living. Arguably, most people are not in the street by choice but by necessity – many of them partaking in work related activities as indicated by the presence of street carts, particularly in photo #3. Optional activities are observed primarily in photo #4 and some evidence of promenading in photos #1 and #2 by groups of ladies.

Behind the chaotic nature of the street there are formal rules and informal norms guiding the activity. In light of the congested streets of the 1900s, the police implemented a first traffic rule that required carriages and carts, cyclists and strollers to keep right, and cars were not allowed to drive faster than a horse at moderate trot (Gemeente Amsterdam, 2013a). This describes the “shared space” nature of streets, regulated by pedestrian speeds and flows, but accommodating a diversity of users, including carts, horses, bikes and cars. The tram lines (observed in photos #2 and #3) speak to movement between neighborhoods. In the 1910s and 1920s, bicycles became increasingly important, and in the 1930s cars become more predominant too although pedestrian activity remained high all throughout the period leading up to WWII.

Who is using the streets?

When people are counted, the photos reveal as many as 100 people per photo. The intermingling of different types of people is evident: different socio-economic classes are distinguished on the main streets (particularly #1, #2) as revealed by skin color and attire. Children, women and groups of two or more people are present in all four photos. Socio-economic division is most visible at Museumplein (#4), where higher socio-economic classes are best represented. Meanwhile, Harlemmerdijk (#3) illustrates the high densities and poor living conditions of Jordaan during those years.

Summary of activities

Table 5: Pre WWII Street Activity summary (Baseline)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Traditional (pre WWII) streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number and diversity of people</td>
<td>High (50-100+)</td>
</tr>
<tr>
<td></td>
<td>Presence of women, children, groups of people, different socio-economic groups based on skin colour and attire</td>
</tr>
<tr>
<td>Diversity of activities</td>
<td>Necessary activities dominate: movement and merchandizing</td>
</tr>
<tr>
<td></td>
<td>Some optional activities: promenading, socializing, observed</td>
</tr>
</tbody>
</table>
7. **T1: Modernist streets (post WWII)**

7.1. **Context**

Below is a map of Amsterdam in 1945. This is the time when the process of urbanization at lower rates would shift to a process of suburbanization (Berhauser & Haupt 2010). This development can only be understood in the wider context of socio-economic shifts of the time. Among them, growth in population and income, and the proliferation of the automobile as a consumer good were extremely important.

![Map of Amsterdam in 1945](image)

*Figure 27: Amsterdam at the end of WWII (source Amsterdam Archives)*

During the early phase of the reconstruction period, the General Extension Plan (AUP) of 1935 based on light, air and space and its Schedule Plan for traffic improvements (1931) were embraced rapidly, but with important changes. Whereas the Schedule Plan of 1931 already laid out the principles for highway locations, in the 1950s, the vision was for the demolition of entire neighborhoods -- not just the roads, as previously proposed. The plan was guided by the principles of separate uses, with the city center prioritized as a business center and living areas accommodated on the periphery.

A Reconstruction Plan for the center was put forth in 1950, followed by reconstruction plans in 1953 for Nieuwmarktbuurt, Jodenbreestraat and Weesperstraat. These developments were largely motivated by a rapid increase
in automobile traffic, which already in 1954 resulted in a radical proposal by the Chief Commissioner of Police, Kaasjager, to reduce traffic congestion by transforming the city’s canals into roads and parking garages for cars. The goal was to realize fast transport between Central Station and the garden cities being built at the time – illustrating a spatial shift from the neighborhood level as the basic spatial unit, to managing the city from a unitary perspective. Although this plan caused outrage with the general public and it would never be implemented, some of these same principles were found in a report on the topic of the inner city, published by City Council a year later.

According to the aforementioned plans for the inner city, despite its monumental value, the city center would need to be adapted to modern times. It needed to be devoted to the economy and restructured to accommodate major businesses and major roads (Healey, 2006). The plan tried to address the growing congestion problem by stipulating that population growth should occur in new expansions on the periphery and in designated regional growth centers (Bertolini, 2007). The vision for a new transportation system was laid out, consisting of a metro system as an alternative to the private automobile and the prioritization of space for driving and parking above ground. To meet the vision for a strong central district, it would be necessary to create major traffic breakthroughs and “neighborhood clean-ups”. This meant that some neighborhoods, including the Jordaan and the Nieuwmarktbuurt would be cleared away, and radial streets would be widened to facilitate car access.

Following the cleanups, new living spaces of higher quality and comfort would be provided. But in reality, the shift was towards the construction of large scale, mono-functional buildings, as Figure 28 illustrates some of the key proposals relevant in 1962.

Figure 28: Amsterdam 25 years from now, De Telegraaf newspaper, 19 May 1962 (Amsterdam Archives)
Among the projects illustrated, the Ij and Coen Tunnel and the Netherlands Bank were completed. Many of these projects ignored the spatial fabric of neighborhoods and in some cases destroyed it completely. Other proposals that did not materialize include a helicopter-landing pad near the Jan van Galenstraat. In the description, the article focuses on speed - claiming that given technological advances in the next 20 years, the travel time between New York and Amsterdam could be reduced to 2.5 hours. This illustrates the modernist’s technological determinism, which inspired so much of the developments during the 1950s-1980s. This vision is radically different from the traditional neighborhood design with a 400-600 meter radius from the center and it fundamentally shifts the scale of development away from the neighborhood level to the city level.

One building dating to this time period is the ABN Bank on Vijzelstraat which was approved in 1966 but encountered opposition and became known as the 'Mortar Bank'. A key group opposing the development was the newly formed Provos who organized a “teach-in” to inform people about the proposals (Schoonenberg, 2013). The Provos were the first in a line of urban social groups to contribute to the debate on urban life and the character of the inner city. Starting in 1965, this small group of anarchists instigated many urban social debates and contributed to the student, female, and environmental movements of the day. Their influence on urban living and transportation is highly relevant, as they envisioned the world’s first bike sharing program and the car-free Canal Zone. According to their manifesto:

“In a space where one million people live, tons of poisonous gasses are produced and spread; that the streets and sidewalks are disappearing underneath the automobiles; that hundreds of deaths and thousands of casualties are being offered up to the laziness of a minority of motorists; and that a unique city is suffering irreparable damage induced by the auto-holic part of the population” (in Jordan, 2013).

The Provos noted the negative impact of the car on street life, and suggested that a system of bike share could make space again for people to socialize in the street again:

“the car is antisocial. The car is the enemy of a mirthful city center. That thought must ripen. That can happen with the white bicycles plan. It’s a question of mentality improvement. Five years ago, someone who spoke out against the car was an enemy of progress. The view that the auto is an antisocial object is beginning to take hold. Many more people will realize this soon if they can again walk in the city center. People will also be able to communicate on the street again.” (in Jordan, 2013).

These statements illustrate both the general view that the car represented progress and the counter view that an urban environment that caters to cars will do so at the expense of its social wellbeing. Soon an alliance merged between the Provos (representing young urban social grounds) and conservationists groups interested in preserving the monumental quality of the city. The two groups discovered that they were pursuing the same cause despite significant difference in backgrounds and styles. They forged an important cooperation and created
the “Ban Bank action group” (Ban de Bank-actie), and the Working Group Amsterdam 1975 (Werkgroep Amsterdam 1975), established in 1967 with the goal of celebrating the seven hundredth anniversary of Amsterdam as a ‘healing’ inner city (Schoonenberg, 2013). The group had two main goals: a recovery plan for the whole city and immediate withdrawal of the Reconstruction Plan Nieuwmarkt, where the government policy of large scale demolition and reconstruction were in full swing.
7.2. Case study: Nieuwmarkt

Nieuwmarkt is widely considered a critical element in the shaping of Amsterdam in the past half-century. Originally the Jewish neighborhood, it was one of the areas of the city which suffered the most damage during the war and its reconstruction was inevitable. The proposed plans however, suggested its demolition and reconstruction along modernist lines making space for modern office buildings and car parking. The Lastageweg highway was meant to replace the St. Antoniesbreestraat and Jodenbreestraat, connecting to the newly constructed Weesperstraat, and be paralleled with a new metro line connecting Central Station to new garden city of Bijlmermeer.

[Image of Jodenbreestraat 1925 (Amsterdam Archives)]

In 1964, the city began expropriation and demolition, but the program proceeded slowly, delayed by legal opposition from local residents and illegal action by squatters who were growing in number. Starting in 1967, the Working Group Amsterdam began engaging local citizens about the need to oppose the views of the city through clever and modern advertising campaigns. They addressed the council calling for a review of urban plans based on depopulation, extensive demolitions, road expansion and new construction in dimensions that were not related to the scale and function of the inner city (Schoonenberg, 2013). They believed the reconstruction plans were outdated, based on the conventional wisdom of twenty years prior that assumed one could impose large scale roads and buildings in an ancient urban pattern (Schoonenberg, 2013). They were successful in preventing the demolition of monuments, and rebuilding part of the neighborhood on the original right of way. In the case of Jodenbreestraat however, a wide right of way was implemented, and along it, one of the largest buildings in Amsterdam was built. Figure 31 illustrates the new form of this area.

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1 The damage was primarily caused by people ravaging the houses for wood during the Hunger Winter of 1944.
Previously narrow Jodenbreestraat has been widened and redesigned for auto-mobility (Amsterdam Archives)

Figure 31: Aerial view reveals the upsized Jodenbreestraat (in red) and the newly constructed longest building in Amsterdam (yellow) (Amsterdam Archives)

The new automobility centric redesign at Visserplein provided pedestrians with underground tunnels for movement and public space, consistent with the modernist ideals of separating pedestrians from the streets.
Still, the Nieuwmarkt is largely considered a success because public opposition created the support for public consultation and the creation of neighborhood committees\(^2\). In 1972 the government decided to abandon its plans for the remaining portion of the highway and committed instead to rebuilding the neighborhood along its original right of way. Efforts were made to preserve the original layout of streets and character of the neighborhood, making provisions for shops on the main floor. This was a success considering the mono-functional nature of buildings constructed during this time period, and hints at a new approach emerging.

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\(^2\) despite opposition from more senior planners who believed urban planning was much too complex to involve residents in the decision making process (Roegholt, 2006)
7.3. Case Study: Kattenburg

Jodenbreestraat was one of the first streets to be demolished following WWII. The areas targeted for urban renewal next were the inner city islands of Kattenburg and Wittenburg. These islands were built during the second half of the 17th century near the harbor and were primarily residential although they also served some port functions.

The islands were the focus of urban renewal projects, suffering large-scale demolitions starting in the 1960s. Reconstruction was in the modernist style – replacing small buildings with large ones and providing large areas for green spaces and parking. These buildings are less flexible than their old counterparts, which often contained shops on the bottom floors. On Kattenburg, as many as 30-60 individual houses per block were replaced by one superblock. These new buildings have dull blank facades and are a lot less flexible in accommodating multiple uses, such as shops on the bottom floor. The buildings are also set back from the street and provide large amounts of parking. As illustrates in Figure 35, the network of permeable streets has been replaced with a car-centric layout. In the new design, Klein Kattenburgstraat and other small streets no longer exist.
Figure 34: Kleine Kattenburgerstraat 1964, during demolition (Amsterdam Archives)

Figure 35: Katenburg after reconstruction (Amsterdam Archives)
Figure 36: Katteburg and Wittenburg spatial layout at the end of 19th century (above) and current day (below) (Amsterdam Archives and Google Maps)
7.4. Spatial pattern summarized

This chapter has described the ways in which spatial development patterns changed following the Second World War. These changes were driven by important societal changes following the Second World War, as rebuilding efforts gave way to economic growth and to industrialized mass production. The automobile, as a technology that became increasingly available to the masses, had a significant impact on urban development and practically all other areas of urban life. Large-scale projects and the demolition of existing neighborhoods were dominant forms of development. The principles of modernist city building were widely embraced – with impact on density, land use and layout of neighborhoods. A fundamental shift was from development at the neighborhood level which was previously viewed as a complete entity, to the city level which was the new scale of development.

Density

Following WWII, there was first an increase in population, but as urban renewal projects began to unfold in the 1960s, the population of the inner city (within the Singelgracht) dropped by nearly 30% in less than a decade (O&S, 1975). Within some inner city neighborhoods, the clean-up program resulted in population drops by 46% and 50% over the decade (O&S 1975). The population decrease was much more pronounced in the inner city, compared to the city as a whole, where the decrease was by 12% (O&S, 1975). This net migration continued to a low point of 670,000 people in 1984. These trends should not come as a surprise as the inner city demolition and the city’s “overspill plans” encouraged residents to relocate to newly built areas such as Almere (Roegholt, 2006). As middle class families moved to the new garden cities or new towns such as Almere, the city center began to drain financially and socially. The resulting lower densities threatened the ability to sustain amenities, transport efficiencies and community interactions sustained previously by higher population densities - further incentivizing residents to move away (Roegholt, 2006).

Figure 37: Demographics 1950 -1990 (O&S 1990)
**Land use**

New developments during this time period were functionality separated, focusing housing in the new garden cities while the inner city would be devoted to offices and space for cars. Within the inner city, housing was going to be maintained only in the Canal Belt. When renewal plans designated an area for housing, as was the case with Kattenburg - the new developments resulted in large scale, mono-functional complexes featuring blank walls, which made no provisions for bottom floor / corner shops as was previously the case. New automobile-centric designs and their dull nature continue to be evident today. From the case studies presented, it can be said that the Post WWII period is characterized by a decrease in functional mixing at the building, street and neighborhood level.

**Layout**

Despite the population decrease during this period, the city's footprint expanded greatly after the 1950s. In 1931, the city's spatial spread covered 17,122 hectares, of which 5,717 ha (37%) was categorized “urban space”. By 1980, the city's spatial layout increased to 20,740 hectares, of which 14,392 (68%) was urbanized (O&S, 1990). This dispersal coincides to a shift from neighborhood living where most activities are within walking distance to living and working in separate areas of the city, connected by (auto)mobility. This reorganization meant that streets were now primarily devoted to moving cars and parking. At the street and neighborhood level, redevelopments altered the existing fabric, in some cases destructing it completely. The new modernist buildings are often large – sized to accommodate car access and parking. The permeability and grain of development is reduced.

**Transportation**

The same time period is characterized by a sharp increase in cars entering the city. Between 1957 and 1973, the number of cars entering the Singelgracht during the morning commute increased three-fold (O&S, 1975). In parts of the city such as Oude West, the increase in cars was as high as four times during this period (O&S, 1975). This resulted in serious congestion problems as the old city center which was unfit for high car volumes. More radical plans emerged for the restructuring of the city, including Jokinen’s 1967 proposal of urban motorways connecting new peripheral developments and a ‘modernized’ city center (Bertolini, 2007). This illustrates the way in which modernist principles of separated land use impacted the function of streets and made them less attracting for pedestrians.

**Table 6: Development patter post WWII.**

<table>
<thead>
<tr>
<th>Spatial characteristic</th>
<th>Modernist streets (post WWII)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density</td>
<td>1975 (O&amp;S, 1975)</td>
<td>In less than a decade, population densities in the inner city decrease by 30%; in</td>
</tr>
<tr>
<td></td>
<td>Jordaan: 244</td>
<td>some neighborhoods by 50%</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td></td>
<td>Grachtengardel: 88</td>
<td></td>
</tr>
<tr>
<td><strong>Dwelling Density</strong></td>
<td>1975 (O&amp;S, 1975)</td>
<td>The number of dwelling in some inner city neighborhoods decreased by 50% during the 1960s due to large scale demolitions of residential areas to be replaced with space for offices and roads</td>
</tr>
<tr>
<td></td>
<td>Oude stad: 28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jordaan: 122</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grachtengardel: 36</td>
<td></td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td>Decrease in mixed use:</td>
<td>Functional mixing decreased during this period at the building, street and neighborhood level. The inner city is prioritized for office space with only some housing in the Grachtengardel.</td>
</tr>
<tr>
<td></td>
<td>Several multifunctional buildings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>replaced with mono-functional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structures</td>
<td></td>
</tr>
<tr>
<td><strong>Layout</strong></td>
<td>Reduced permeability:</td>
<td>Completely new layouts were implemented, designed primarily for auto mobility. Neighborhoods are no longer the basic spatial unit – planning occurs at the “city level”.</td>
</tr>
<tr>
<td></td>
<td>short blocks and fine grained</td>
<td></td>
</tr>
<tr>
<td></td>
<td>buildings replaced with bigger /</td>
<td></td>
</tr>
<tr>
<td></td>
<td>wider blocks and bigger structures</td>
<td></td>
</tr>
</tbody>
</table>
7.5. Corresponding street activity

Figure 38: T1-1: Damstrat 1981 (Amsterdam Archives)

Figure 39: T1-2: Reguliersbreestraat 1984 (Amsterdam Archives)
Figure 40: T1-3: Haarlemmerdijk 1971 (Amsterdam Archives)
Function of streets

The photos of Amsterdam's streets in the decades following WWII contrast strongly against the scenes during the early part of the 20th century. The trend to lower population and dwelling densities corresponds with lower levels of activity in the streets. It is also obvious that the function of streets have changed - from shared space dominated by pedestrians to space facilitating primarily the movement and storage of cars. The streets are no longer used for merchandizing and socializing activities and the social climate of streets has been degraded. At Museumplein (#4) the conversion from public place function to auto mobility function is most evident. This previously busy public space now counts only one cyclist and a few pedestrians in the distance. Indeed, there is even a sign forbidding pedestrian access, consistent with the modernist approach of separating pedestrians from the street.

Who is using the streets?

Compared to traditional streets, during the modernist era there are very people in the street, and it is more difficult to judge the diversity of people. Fewer women and children are observed, and fewer groups of people. The variety of activities has also decreased, as merchandizing activities have disappeared completely and there is less socializing. Some of the main streets such as Reguliersbreestraat and Haarlemmerdijk (recognizable by tram lines in the pre WWII photos) have maintained their diverse quality of shops and here pedestrian traffic remains high as people frequent the city center for shopping. But here pedestrians are squeezed to the sidewalks even thought they
outnumber the cars which have been given disproportional space for movement and parking.

Table 7: Summary of street activity Post WWII

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Modernist streets (post WWII)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number and diversity of people</td>
<td>Lower levels of activity: 10-50 pedestrians &amp; cyclists per frame</td>
</tr>
<tr>
<td></td>
<td>Women observed on shopping streets</td>
</tr>
<tr>
<td></td>
<td>Children are not observed</td>
</tr>
<tr>
<td></td>
<td>Groups of two or more are not observed much besides shopping streets</td>
</tr>
<tr>
<td>Diversity of activities</td>
<td>Less diversity of activities compared to pre WWII</td>
</tr>
<tr>
<td></td>
<td>The dominant activity is accessing shops, and some window shopping</td>
</tr>
</tbody>
</table>
8. T2: Post-modernist streets (1990s- present)

8.1. Context

By the late 1970s, spatial development patterns began to change again. In 1978, a new City Council took office and implemented a “compact city” vision for land use and mobility planning (Roegholt, 2006). This new program placed increased attention on the conservation of cultural and historic value of the city center, and emphasized the city as a place to live. It introduced a new land use policy that moved away from urban renewal (i.e. demolition and reconstruction) to ‘building for the neighborhood’ - implying a more gradual redevelopment of the inner city without displacement of existing inhabitants (Healey, 2006). The same year, a “traffic circulation plan” represents a similar shift in transportation planning – with the goal of striking a balance between accessibility and livability by means of expanding the existing tram system, reallocating space from cars to cyclists and pedestrians, and by restricting parking in the city center (Bertolini, 2007). The same plan included provisions for the construction of a main bicycle network and gave Fietserbond a role in the development of policy – making transportation planning more democratic by bringing officials and cyclists together. The two plans – one spatial and one transport-oriented, mark a turning point from a dispersed approach to development, to a more “compact city” approach.

In 1984 the municipality published the draft structure plan ‘De stad centraal’ (Focus on the City) in which the goals of compactness and mixed-use were officially introduced (Hoppenbrouwer & Louw, 2005). The aim was to contain further sprawl and encourage urban revitalization by increasing densities and diversity of uses through housing led consolidation of the city center along the banks of the IJ (Healey, 2006). In 1985 the plan was officially adopted, and that same year the suburbanization trend began to turn.

A shift from greenfield to brownfield developments occurred with many of the new ideas about city building materializing in the redevelopment of Eastern Docklands. Compared to the 1970s approach to building standardized social housing, the new developments of Java Island, Borneo, and Sporenburg in the 1990s and 2000s were more mixed and human scale. Many of the living areas were designed to accommodate home offices, and a variety of designs were implemented (Hoppenbrouwer & Louw 2005).

In 1991, the Structural Plan “Amsterdam” further reduced the scope of peripheral re-development plans, in line with the 1985 plan, and the same year, a public referendum resulted in a strong debate about car accessibility in the city. Although by a narrow margin, the outcome was in favor of restricted car access – putting an end to free parking and reducing the amount of parking spaces significantly (Roegholt, 2006). This was not without significant opposition, including a lawsuit by the business community against the city, who claimed that restricting car access would damage the economy. Employment data illustrates that the number of businesses and employed people in the city center decreased between 1970 and 1984, before increasing again.
In 1996, the Structural Plan “Open city” abandoned plans for western expansion and instead refocuses on the IJ banks as a hub for live-work-leisure activities. Amsterdam North and the South Axis were identified as new sub-centers – creating the vision of major nodes and legitimizing what was emerging as a poly-nuclear city (Healey, 2006).

These municipal policies were further enhanced by national programs for investment in city centers and policies which restricted development of out-of-town shopping malls (Evers, 2002) helped prevent further deterioration of the inner city. The national “ABC” classification requiring public transport accessibility for employment centers further strengthened public transport based developments (Healey, 2006). The ABC policy not only requires concentration of major activities around railway stations (“A”), but it also limits the amount of parking spaces made available at these locations (Hanssen & Hofstad, 2013). Another important national policy was adopted by city council in 2000, setting a new standard for traffic safety as mandated by the national government, introducing 30km/h zones and traffic calming for all residential streets, a 50 km/hour speed limit and separate bicycle lanes for main roads and roads for through traffic. These policies further improved the conditions for non-motorized transport and place-making in the city, and it points to a rescaling from the city level to neighborhood level.

In 2011, Amsterdam published the Structural Vision 2040, which prioritizes densification of the city center and transforming mono-functional areas to serve a mix of uses. Investment in public transport and park and ride facilities along the ring road are highlighted and high quality public spaces are prioritized. These and other recent measures align with and continue to enhance what has become an vibrant center, especially compared to the situation in the 1970s and 80s. The current approach to development is further illustrated with two case studies.

<table>
<thead>
<tr>
<th>Year</th>
<th>Registered Businesses</th>
<th>Employed Persons</th>
<th>Employed Persons per Registered Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>9991</td>
<td>128543</td>
<td>12.9</td>
</tr>
<tr>
<td>1984</td>
<td>7682</td>
<td>74936</td>
<td>9.8</td>
</tr>
<tr>
<td>2000</td>
<td>13808</td>
<td>87689</td>
<td>6.4</td>
</tr>
<tr>
<td>2012</td>
<td>20244</td>
<td>93044</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Source: O+S

Figure 42: Registered businesses and people in employment in Amsterdam Centrum (Gemeente Amsterdam, 2013a)
8.2. Case study: Oosterdokseiland

Oosterdokseiland (ODE) was created during the damming of the IJ in 1800s in preparation for the construction of the Central Station and served largely as a railway yard. In the 1960s, it was decided that this island would be dedicated to a then modern post office head quarters and distribution center that was completed in 1968. But as the post functions declined through the 20th century, the complex couldn’t be easily adapted to other functions. In the 1990s, a decision was made to demolish the existing structure and replace it with buildings for culture and leisure. The goal was to connect this area to the existing inner city, while achieving a high quality, dense and mixed area.

Two projects: the public library by Jo Coenen and the conservatorium by Frits van Dongen anchor the 225,000 sqm of development, which includes space for a hotel (~13% of floor area), retail (8%), offices (~36%) and apartments (~20%) (MAB, 2015)

The development has been demarcated into six lots, each designed by one or two different architects. A strong emphasis was placed on public space with two large squares, or “stages” conceived for meetings and performances. These spaces make the island a nice place to stroll by the water, to people watch, to drink on a terrace, to visit cultural institutions, to shop, etc.

The area is only accessible to local traffic and designed to prioritize pedestrians and cyclists. Car access is restricted on the main promenade but cars can still access the island and its underground car parking (for 1,700 cars and 2,500 bicycles) using a backside access lane that is also used for deliveries. The spatial layout and the design elements create an environment that is diverse and people centric, and is a good illustration of current approach to urban development.
Figure 44: Ooserdockseiland plan by functional space (MAB, 2015)

Figure 45: OBA is one of the cultural anchors at ODE (Schlijper, 2014)
Figure 46: The “main street” of ODE is a car-free zone (Schlijper, 2014)
8.3. Case study: A’DAM Tower

Across the IJ another project illustrates the direction of spatial development in recent years. One of city’s most iconic modernist projects, “Toren Overhook”, also known as “Shelltoren” was commissioned by Royal Dutch Shell and served as the home of the oil company between 1971 and 2009. After the company moved out, the city hosted a competition for the redevelopment of the building. The winning proposal will transform this mono-functional tower into a space for mixed activity. Repurposing and rebranding the headquarters of the country’s leading petrochemical company into a mixed space for creative economies represents the de-industrialization of the city and the shift from manufacturing to the service economy with increasing emphasis on urban life.

![Figure 47: From monofunctional modernist tower to hyper-diversity of use](image)

Due for completion in April 2016, the new redesign will house a mix of offices, cafés, restaurants, a hotel, an observation point and a revolving restaurant. The project’s website underlines the transformation of a dull, mono-functional 1970s tower into an edgy, multifunctional, diverse cultural hot-spot and highlights the focus on density and diversity of use:

“The (re)development of A’DAM is a unique transformation project and the perfect example of the rezoning of empty office space. Originally a mono-functional office tower for 400 employees, A’DAM will be transformed into a multi-functional building visited by 2,500 people on a daily basis.”

The transformation of large scale, mono-functional modernist projects into hyper mixed-use spaces for the creative industries mirrors the move from modernist to post-modernist building for urbanity. Whereas traditionally mixing of function occurred vertically along the street, the new model shows how vertical mixing can be achieved in large mono-functional buildings of the modernist era. What is evident is an emphasis on infilling and redevelopment of buildings that contrast against the post WWII mentality of greenfield development.
8.4. Spatial pattern summarized

Density

Having reached the physical limits of its administrative boundaries in the 1980s, the city of Amsterdam has over the past three decades shifted its attention to infilling and densification. This shift in policy has coincided with the stabilization of domestic departures, and since 2006 more people are choosing to move to Amsterdam than away from it, indicating the city is becoming increasingly popular place to live (O&S 2012).

Figure 48: Population changes 1975 -2012 (O&S, 2012)

Land use

Particularly in the past few years the emphasis on mixing has been heightened. The case studies illustrate the transformation of modernist projects into hyper diverse developments. Oosterdockseiland illustrates the demolition of a mono-functional site into an area of horizontal mixing at the street / area level. The transformation of Overhoeks to A’DAM Tower illustrates the retrofitting of a mono-functional building for vertical hyper diversity. A key trend has been the repurposing of office space to new uses, particularly hospitality, housing and education.

Layout

In line with increased functional mixing of land uses, in recent decades new developments have been laid out in finer grain, more permeable spatial patterns. For new developments, shorter, narrower streets are now the norm. In areas
where modernist designs yielded impermeable spaces, interventions to increase permeability for pedestrians and cyclists are prioritized

Table 8: Spatial Typology of Amsterdam post-modernist

<table>
<thead>
<tr>
<th>Spatial quality</th>
<th>Summary</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density</td>
<td>2014 (O&amp;S, 2014)</td>
<td>Population densities are increasing in inner city neighborhoods</td>
</tr>
<tr>
<td></td>
<td>• Oude stad: 76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jordaan: 295</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Grachtengardel: 93</td>
<td></td>
</tr>
<tr>
<td>Dwelling density</td>
<td>2014 (O&amp;S, 2014)</td>
<td>Dwelling densities are increasing in inner city neighborhoods</td>
</tr>
<tr>
<td></td>
<td>• Oude stad: 46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jordaan: 191</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Grachtengardel: 55</td>
<td></td>
</tr>
<tr>
<td>Land use</td>
<td>Increased functional mixing</td>
<td>Conversion from mono-functional multifunctional buildings, streets and</td>
</tr>
<tr>
<td></td>
<td>Increased diversity among</td>
<td>neighborhoods</td>
</tr>
<tr>
<td></td>
<td>functions (ie. increased</td>
<td>Emerging examples of vertical mixing</td>
</tr>
<tr>
<td></td>
<td>diversity of building types)</td>
<td>Diversity of building types and units prioritized</td>
</tr>
<tr>
<td>Layout</td>
<td>Fine grain and permeable</td>
<td>New developments emphasize fine grain, permeable designs</td>
</tr>
</tbody>
</table>
8.5. Corresponding street activity

Figure 49: T2-1: Damstraat 2014 (Schlijper)

Figure 50: T2-2: Reguliersbreestraat 2013 (Schlijper)
Figure 51: T2-3: Haarlemmerdijk 2015 (Schlijper)

Figure 52: T2-4: Museumplein 2014 (Schlijper)
**Function of streets**

The form and function of streets in recent years has transformed compared to a few decades ago. All four photos illustrate how the space function has been reclaimed by reducing access to cars and parking, in favor of non-motorized transport. When cars are still present (photo #3) they are represented in low volumes and at low speeds, which makes sharing the space more compatible. Parking has been reduced significantly, and squares are again used for markets and public spaces. Streets no longer act or feel as parking lots. Still, as is in the case of Damstraat, the sidewalks seem crowded and conflicts between pedestrians and cyclists can be detected, hinting at new challenges.

The shift is consistent with Gehl’s (2006) observation that whereas traditional uses of the street concerned primarily with work and trade, street activities now relate primarily to recreational and social activities. Those optional activities are typically in the form of promenading, people watching, and sitting. There is also in increase in the so-called “triangulation” elements that provided strangers the opportunity to interact with each other, particularly in photo #4. These make streets amicable and convivial, and provide opportunities for interaction among strangers.

**Who is using the streets**

The high levels of pedestrians and representation of women, children and groups is evident in the streets. This contributes to an active streetscape, however, it seems that these central areas are now dominated by tourists / visitors. It seems that the diversity of tourism activities has increased, but it is not clear that other functions are as well represented. Compared to traditional streets where a diversity of people was detected in the street (based on skin color and attire), the diversity of people and activities seems to have decreased somewhat – or to shift in a way that makes it difficult to assess which scenario is more diverse.

**Summary**

Judging just by the number of people, the streets seem lively. In some areas, there are now extended spaces for “passive” activities such as sitting and people watching. Triangulation elements are also increasing, facilitating interaction and exchange. However, the inner city doesn’t seem to capture the diversity of people of Amsterdam.

Table 9: Summary of street activity post-modernist (1990s-present)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Post Modernist streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number and diversity of people</td>
<td>Pedestrian activity is as high or higher than in the traditional streets</td>
</tr>
<tr>
<td></td>
<td>Women, children and groups are well represented</td>
</tr>
<tr>
<td>Diversity of activities</td>
<td>Optional activities dominate promenading, people watching, window shopping, sitting</td>
</tr>
</tbody>
</table>
9. Key findings: impact of spatial patterns on street activity

In this thesis I evaluated levels of street activity primarily by the number of pedestrians in Amsterdam’s inner city streets as revealed in photographs over the past century. The three periods identified demarcate spatial development based on distinct spatial patterns of development: traditional form (1880s – 1945), modernist (1945 – 1980s) and post-modernist (1990s – present). These periods correspond to compact city by necessity, dispersed city by design and compact city by designs respectively.

My approach is consistent with Jacobs (1961), Gehl (1987) and Whyte (2012) who find that the presence of people in streets is a minimum requirement for a vibrant street life. Based on their methods, I considered the presence of “indicator” species of good streets: women, children and groups. The diversity of people and the activities they engage are also important to consider for the quality of street life but these are more difficult to evaluate, particularly because of the changing socio-economic contexts over the past century. In line with Gehl’s theories, I found that Amsterdam’s inner city streets shifted from places supporting necessary activities a century ago, to low levels of street activity following WWII, to a renaissance of street activity in the past decade related primarily to activities of recreation and culture, especially tourism.

Traditional, pre-WWII streets were dominated by pedestrians with streets acting as space for movement, access to buildings and public space for merchandizing and socializing activities. Following WWII, pedestrian activity decreased significantly as more space was given over to cars and the emphasis on place-making in the streets deteriorated. The devaluing of public spaces lowered opportunities for social interaction and exchange. The deterioration of street life is easily observed in post-WWII photographs which indicate that until the 1990s streets were largely dominated by cars, at the expense of pedestrians and cyclists. This deterioration corresponds to much lower levels of people in the street during the 1960s -1990s, and indicates an inverse relationship between the number of cars and people present. In recent years a revival of the street is observed, with high volumes of people using the streets. “Indicator species” such as women, children and groups are again observed although the diversity of people and activities varies compared to a century ago. Whereas traditional streets were dominated by necessary activities, post-modernist streets are dominated by recreational activities. While it is evident that traditional and post-modernist streets are more vital than modernist streets, it is difficult to judge which scenario better meets the needs of the community.

<table>
<thead>
<tr>
<th>Number and diversity of people</th>
<th>Traditional streets</th>
<th>Modernist Streets</th>
<th>Post-modernist streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>High volumes of people</td>
<td>High volumes of people</td>
<td>Lower volumes of people</td>
<td>High volume of people; presence of women, children, and groups</td>
</tr>
<tr>
<td>High diversity: children, rich, poor,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Activities</td>
<td>Activities: walking, promenading, seating, talking, eating, climbing sculpture, taking photos, biking, biking next to each other, dinking, window shopping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Necessary activities dominate: movement, merchandizing and access to buildings. Some optional activities such as promenading and socializing are observed.</td>
<td>Accessing shops and movement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Street Activity</td>
<td>High - necessary activities dominate</td>
<td>Low - necessary activities</td>
<td>High - optional and social activities dominate</td>
</tr>
</tbody>
</table>

**9.1. Impact of spatial patterns on street activity**

In the pre WWII period, the “traditional” city grew slowly in a de-facto “compact city” model, characterized by high densities, mixed use, diverse and permeable neighborhoods that were walkable and met a plurality of needs. The level of mixing at the building, street and neighborhood scale depended on the socio-economic conditions of the neighborhood, but generally functional mix was high. The poorest neighborhoods were also the most mixed, and in some cases this mixture included “incompatible” functional within close proximity, as in the case of residential and industrial uses. Generally buildings were constructed to allow for shops and other businesses on the bottom floors, with residential units on top. The streets themselves were also functionally divers, facilitating movement, access to buildings and also used for merchandizing and socializing activities. These necessary activities gave the street an active feel, and in many cases, a diversity of people were observed using the street.

After the war, the city adopted a model of development consistent with the modernist paradigm of the time, which was based on separation of functions; particular living, working, recreation and transport. This type of functional separation depended on and encouraged the proliferation of the automobile. During this period, the city grew outwards, consuming greenfield space at a rapid rate. Particularly due to the separation of functions, it became increasingly more difficult for people to walk, bike or take transit to places of destination because by design, the separation of functions increased the distance between destinations. Mixing of functions at the building and street levels also
decreased as residential buildings were not built to accommodate retail or other functions on the bottom floors, and many mono-functional large scale buildings were constructed. The scale of the buildings and the design of the streets to accommodate cars can be described as less permeable and coarser grain. Instead of a “localized” life where accessibility is met through proximity at the neighborhood scale, the modernist periods corresponds to a dispersed “A to B” existence at the urban scale where accessibility is met through auto-mobility. In these photos, the streets have been redesigned to serve the needs of cars, and the public space function of the street has been eroded. The result is low levels of street activity – with only some use for movement by pedestrians and cyclists, and access to shops.

In recent years, the development pattern is again consistent with the principles of compact form, prioritizing intensity and diversity of uses and permeable layout. The decision to intensify is compatible with the prioritization of pedestrians and cyclists for transportation, and the reallocation of space from mobility to public space functions. The shift also corresponds to a reorganization of the city along the neighborhood lines, and the prioritization of residents’ need for livability over the needs of through-traffic as was the dominant approach during the modernist period. These changes also correspond to increased tourism, a growth in highly educated young people and families to the city, and growth in bicycle mode-share (O&S 2014). Figure 53 and Table 11 summarize the findings. Appendix 1 includes the raw data used to calculate population and dwelling densities.

Figure 53: Summary of findings – evolution of spatial patterns and street activity
Table 11: Summary urban spatial elements

<table>
<thead>
<tr>
<th></th>
<th>Traditional streets (pre 1945)</th>
<th>Modernist streets (1945-1990s)</th>
<th>Post Modernist (1990s – present)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban pattern typology</strong></td>
<td>Compact city by necessity</td>
<td>Dispersed city by design</td>
<td>Compact city by design</td>
</tr>
<tr>
<td></td>
<td>Oude stad: 278</td>
<td>Oude stad: 68</td>
<td>Oude stad: 76</td>
</tr>
<tr>
<td></td>
<td>Jordaan: 976</td>
<td>Jordaan: 244</td>
<td>Jordaan: 295</td>
</tr>
<tr>
<td></td>
<td>Grachtengordel: 281</td>
<td>Grachtengordel: 88</td>
<td>Grachtengordel : 93</td>
</tr>
<tr>
<td></td>
<td>Oude stad: 62</td>
<td>Oude stad: 28</td>
<td>Oude stad: 46</td>
</tr>
<tr>
<td></td>
<td>Jordaan: 218</td>
<td>Jordaan: 122</td>
<td>Jordaan: 191</td>
</tr>
<tr>
<td></td>
<td>Grachtengordel: 60</td>
<td>Grachtengordel: 36</td>
<td>Grachtengordel : 55</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td>Mixed use at the building, street or neighborhood level, depending on the neighborhood.</td>
<td>Decrease in functional mixing Several multifunctional buildings replaced with mono-functional structures</td>
<td>Mono-functional areas are being converted to multifunctional uses Increase in vertical mixing Increase diversity in unit and building types</td>
</tr>
<tr>
<td><strong>Layout</strong></td>
<td>Permeable and fined grained</td>
<td>Reduced permeability: short blocks and fine grained buildings replaced with bigger / wider blocks and bigger structures</td>
<td>Permeability is lower than in pre WWII neighborhoods but higher than in post WWII</td>
</tr>
<tr>
<td><strong>Street Activity</strong></td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

### 9.2. Density

The analysis of densities was restricted to population and dwelling densities in three inner city neighborhoods. This decision was made based on data and time availability constraints. The results indicate a positive relationship between residential population density and street activity, however, this relationship is not linear. While the decrease in population densities following WWII corresponds to lower levels of street activity, there has been a relatively minor increase in population densities in recent years yet street activity has increased significantly. A better understanding thus requires a consideration of other
factors, for example the evolution of visitor and job densities in these areas. Between 1998 and 2014 for instance, there has been a 79% increase in overnight stays in the city, with a significant proportion of these visitors concentrated within the Singelgracht (O&S, 2014). As Pakfa (2013) suggests, the job density, number of visitors and the street network might be better indicators for explaining the revival of street activity in recent years despite only relatively modest increases in density.

![Figure 54: Population density in three neighborhoods at times representative of T0, T1, T2](image)

Similarly, a positive trend is observed between dwelling density and streets activity, where a decrease in dwelling densities during urban renewal (demolition) corresponded to lower street activity, and an increase in dwelling densities since 1975 corresponding to increased levels of street activity. The stronger increase in dwelling density but not population in recent years is partially explained by a growth in single person dwellings which now account for 55% of the population (O&S, 2014).

![Figure 55: Dwelling density in three neighborhoods at times representative of T0, T1, T2](image)
9.3. Land use

Consistent with Jacobs (1961) who believed that mixed functional use was the most important factor in generating an active street life, my findings suggest that whether zoning prioritizes mono-functional or multi-functional use of buildings, streets and neighborhood is an important factor impacting street activity. The main reason has to do with the interaction between land-use and impact on accessibility. When uses are mixed in a way that allows people to reach desired activities within short distances, pedestrians and cyclists dominate the street. When mono-functional developments are prioritized, accessibility must often be met through mobility and the streetscape becomes hostile to people walking and cycling. Similarly, when a city is designed to function as a series of diverse, mixed-use neighborhoods, streets can be designed to meet first the residents’ need for accessibility. This contrasts the functional design resulting from mono-functional zoning where streets serve as through roads for people crossing neighborhoods to get to different areas of the city because their needs can not be met at the neighborhood level.

Due to practical limitations in this research, I was only able to track whether developments prioritized a mix of primary functions at the building, street and neighborhood level based on the dominate development pattern and representative case studies of each time period. Although I made some efforts, I was not successful in quantifying the mixing of different functions over the century at the neighborhood level, other than to say that the mix of living-working functions in the inner city has shifted from 39%-61% in 1980 to 48%-52%3 in 2013 (Gemeente Amsterdam, 2013b). This suggests that a higher proportion of living-working is beneficial for street activity although further analysis is necessary to understand these shifts at the neighborhood level and temporal scale.

Figure 56 illustrates the relative levels of mixing at the different scales for each time period. During the modernist era the level of separation increased at the city level, with areas designated to living or working; at the street level as mono-functional modernist blocks replaced multiple smaller buildings, and at the building level, as new buildings offered little or no opportunity for functional mix.

Very differently, traditional and post-modernist developments both emphasize higher levels of mixing, but pinpointing the levels is difficult because of variations at neighborhoods scales during both periods. The range of mixing varied more in traditional streets with some neighborhoods exhibiting very low mixing at the building or street level and very high for others (Grachtengordel vs. the Jordaan). This variation is less pronounced today, with most neighborhoods exhibiting on average higher levels of mixing of compatible functions, although further analysis of these trends should be based floor-area data over time.

---

3 Jordaan, the current mix of live-work is 70%-30% while parts of the Western Grachtengordel it is 40%-60% (Gemeente Amsterdam,
As with my analysis of densities, further analysis that quantifies the amount of space allocated to different functions over time at the building, street and neighborhood level would allow for more precise conclusions which can not be made based on this more rudimentary and relative analysis.

Figure 56: Mixing of primary functions at the building, street and neighborhood level

9.4. Layout

The layout of a development will either facilitate pedestrian movement or impede it. Short, narrow blocks and frequent intersections are compatible with walkability, whereas car-centric street design undermines what is pleasant and attractive to pedestrians to improve conformity for automobiles through wider right of ways and less frequent intersections. The layout of traditional neighborhoods in Amsterdam proved highly resilient, as they remained largely unchanged until after WWII despite periods of intensification and population decline.

The invasion of cars after WWII required a very different type of layout and resulted in large-scale redesign of streets and neighborhoods in the 1960s and 70s. Jacobs (1961) summarized the impact of such designs with a vivid illustration of the way auto-mobility planning destroys permeable city fabric around the same time that Amsterdam began its inner city urban renewal projects:

“Traffic arteries, along with parking lots, gas stations and drive-ins, are powerful and insistent instruments of city destruction. To accommodate them, city streets are broken down into loose sprawls, incoherent and vacuous for anyone afoot. Downtowns and other neighborhoods that are marvels of close-grained intricacy and compact mutual support are casually disemboweled. Landmarks are crumbled or are so sundered from
their contexts in city life as to become irrelevant trivialities. City character is blurred until every place becomes more like every other place, all adding up to Noplace. And in the areas most defeated, uses that cannot stand functionally alone-shopping malls, or residences, or places of public assembly, or centers of work - are severed from one another.” (p. 338)

Not only did the new form require more space and wider streets for cars, but it also impacted the layout of buildings – which were built often at much larger, coarser grain to accommodate access to cars, and were often placed as free-floating blocks delinked from the streets. This different pattern of development is most evident in the garden cities outside the ring road, but also inside the city in areas that underwent urban renewal, such as Kattenburg. Many of those developments now exhibit low levels of street activity but that is mostly because they were not designed to support a mix of functions. Here again it is difficult to pinpoint the effect of any one element because, and it is better to consider their interlinked nature as typologies: permeable, fine grain design is compatible with mixed functions, whereas car-centric layouts are compatible with monofunctional designs. In more recent years, permeable layouts have been again prioritized in new developments such as Oosterdockseiland. These new designs are inspired by historical building form and prioritize pedestrian and cycling access.

9.5. Other factors & revised model

As described in the literature review, there are also non-spatial elements which have contributed to the changes in street activity observed in Amsterdam over the past century. The aesthetics of the street, presence of food vendors, green space, water features that people can interact with (Whyte, 2012; Metha, 2007) are some of the key non-spatial elements correlated with increased street activity that the city is increasingly providing for. These elements help animate the street and are a magnet for people, who then attract more people. Similarly, programming can infuse vitality in public spaces and generate vibrant urban scenes (Montgomery, 1999) irrespective of spatial elements. Here too Amsterdam has been making significant improvements with more festivals and events being staged, so spatial elements are likely only one of the elements driving the change in streets activity observed in the photographs. The implication is that it is difficult to say to what extent the change in street activity is due to changes in spatial developments patterns, or the result of these other interventions. This could only be done when quantitative data is available for a regression analysis, which could be difficult to determine and collect data for. Most likely, the effects are symbiotic and reinforcing. But as Montgomery (1999) and Jacobs (1961) suggest, while programming and image elements are important, only through mixed use can active streets be generated spontaneously and organically.

In Figure 57, I update the initial model I laid out in the research question, illustrating that density, diversity and layout impact street activity.
Figure 57: Spatial and non-special factors impacting street activity.

I insert street function as a mediating variable which links between these spatial elements and the observed street activity. I add transportation as another spatial element because of the distinct role it plays in influencing street activity. I place the four elements within the same circle because they are interlinked and interdependent, as discussed previously -- mixed land use is compatible with non-motorized transport and permeable layouts, whereas separate functions are generally dependent on auto mobility and car-centric layouts. I also illustrate that street activity generates more street activity in a self-reinforcing positive loop, and that there are other factors impacting street activity such as image and programming (Whyte, 2012; Metha, 2007)

10. Recommendations

10.1. Enhancing non-material exchange

The inner city of Amsterdam is now bustling with street activity – particularly with commercial exchanges that are critical to its dynamism. However, to return to Engwicht (1993), there are many other sorts of human exchanges that livable cities much facilitate: information, friendship, culture, knowledge, skills, insight, as well as emotional and spiritual support. Take for instance Amsterdam’s “Red Carpet” project envisioned as a new commercial corridor for international and independent retailers that is designed to attract tourists and locals alike. During the recent Thinking City Summery School, the international group of students tasked with thinking critically about this project noted that “monoculture is never sustainable” – or, livable for that matter. They proposed the city infuse its “master plan” with an “action plan” capable of generating new types of interaction through interventions such as non-commercial “conversation cafes” and other triangulation interventions on Rokin’s underutilized east-west alleyways. Although the level of street activity is now high in Amsterdam’s city center, further analysis and work should consider the diversity of activities and
how more opportunities for meaningful exchanges and interaction can be generated.

10.2. Addressing gentrification

There are some who are skeptical that increased street activity is desirable at all. These people are usually concerned that an increase in street activity and vitality are achieved at the cost of social diversity when ‘cappuccino urbanity’ displaces locals. Amsterdam needs to address these concerns of gentrification particularly in light of increasing disparity between the rich and the poor, which is most evident in the city center and neighboring areas (O&S 2014). With 55% of Amsterdam’s population already living as single households (O&S 2014), one of the key ways to mitigate these concerns is by protecting space for local residents in a city that continues to intensify, through the provision of small living spaces (~30-40 squared meters). Small units are usually affordable because they are usually not of interest to investors and expats who can afford larger, more expensive units. This provision of affordable units is important particularly in inner city areas which are at risk at “hollowing out”, as the number of tourists increases, the local residence decreases. This is a risk, because if residential qualities of a neighborhood erode beyond a certain point, the neighborhood becomes “unlivable”. Considering the level of residential function to other functions is thus important and should be further analyzed. Consider for example that for the Jordaan the current mix is 70%-30% residential – work function, compared to certain parts of the Grachtengordel, where this ratio is 40%-60%.

11. Key lessons & reflection

11.1. Planning for human needs

One of the key lessons I take away from completing this thesis is the need to plan for human needs. This now seems to me as a rather obvious observation and I am somewhat disconcerted that nowhere in this urban planning masters program was this formally presented or discussed. Stranger still, this insight also seems to escape so much of planning literature I reviewed over the course of this thesis.

This is perhaps also why Penalosa’s (2007) approach is so appealing to me. The former mayor of Bogota notes that cities must be able to meet “the need to move about by foot, the need for interaction with other people, and the need to feel equal to others.” I think this is a good starting point for a discussion of what modern cities should offer their citizens. In my opinion, academics studying the questions of urbanism should contribute to the debate on what those needs might be, how they might be similar or different in different communities, and what are the necessary measures to meet the identified needs.

Similar to Penalosa, my focus in this thesis has been on how spatial form impacts people’s ability to engage in activities and exchanges. My emphasis on street
activity is motivated by a personal belief, supported by empirical evidence, that vibrant public spaces help meet human needs for belonging, esteem and self-actualization by creating more opportunities for interaction. It is through human exchanges that we fulfill these needs, and these opportunities for interaction increase when people are brought together in public spaces, of which streets are among the most abundant and distributed in cities.

I believe now that many urban ills are the result of failures to meet human needs, and that more sophisticated discussions of the “just”, “happy”, “soft”, “beautiful” and other utopian cities are misplaced unless fundamentally linked back to a discussion of human needs. Does it not seem obvious that only by designing for human needs can there be a convergence towards all these different ideals? Isn’t strange that we would design cities for anything other than people? This is what makes Jan Gehl’s discussion of building “cities for people” the more important, albeit troublesome – what kind of cities have we created if building for people constitutes an innovation?

In Amsterdam, the expansion in car traffic leading to record levels of traffic fatalities in the 1960s and resulting in large-scale protests in the 1970s was a manifestation of people’s physiological and safety needs not being met. Similarly, violence, crime and other urban ills in cities around the world can be linked to built environments which prevent people from having their basic needs met. Of course, planning is ultimately a political process and planners can only achieve these goals when political players are interested in the same goals. However, as a profession, urban planners should be able to better articulate their values and priorities.

11.2. Planning using historical photographs

“*The farther back you can look, the farther forward you are likely to see.*” - *Churchill*

Another lesson I take away from this thesis is that many cities can answer their own questions of how they can become more pedestrian friendly by reflecting on the nature of their own streets in the past. The more common method is to hire expensive consultants who will produce renderings of streets that might or might not match the future reality. I am not suggesting that Amsterdam or other cities should necessary design and use streets as they have in the past, even though past street designs were more capable of generating and supporting lively and vibrant streetscapes. Some people dismiss this sort of approach as “nostalgic” but those old designs persisted for hundreds of years because they worked. This is also the reason people are generally more attracted to historical city centers and not to their post WWII garden city or suburban counterparts.

Mark Twain is thought to have said that “history doesn’t repeat itself but it does rhyme”. What I’m suggesting is that transportation planning should be based less on last year’s traffic counts and forecasting models, and more on what we want our streets and cities to look like. This is why I think planning through the use of historical photographs can be similar and complementary to scenario
planning. By looking back farther than last year’s traffic counts we can see in Amsterdam at least two distinct visions for streets and cities. The older set of photos provides practical design solutions for streets that are dominated by pedestrians but still accommodate other users. At a minimum we know that the design has been tested in the past. These foundations can then be considered in the context of societal changes, such as relevant and emerging technologies such as ICTs and shared vehicles to inform urban development policies. However, to start with futuristic renderings without considering the past is to not make use of a wealth of data and knowledge that is available to us. This is the approach adopted by the generation of modernist planners, who in the name of modernity threw out a wealth of knowledge about that makes cities work. I hope the current generation will do better.

11.3. Planning for complexity in the real world

The modernist approach to planning corresponded to the fine-tuning of a “machine”. Over time, cities were understood to be more dynamic and a new metaphor comparing the city to an “organism” emerged. Now the new metaphor consistent with planning for urbanity views cities as “ecosystems”, implying an infinitely greater level of diversity and complexity compared to previous metaphors.

Montgomery (1999) provides a basic formula for how to plan for what he terms “structured complexity”, through the provision of two key elements. The first is “reasonably ordered and legible city form” and the second is the creation of “places of many and varied comings and going, meetings and transactions” (Montgomery 1999 p.93).

I think this dual approach is capable of creating the conditions for an active street life, and the many exchanges and interactions that make cities places of opportunity. If planners are going to play an active part in creating this structure complexity, then students of urban planning need the relevant tools to create this legible city form and those places of varied interactions. Although there is a growing realization within the planning community that we are not going to accomplish these as blueprint master planners in white coats, there is nevertheless a set of spatial knowledge and skills planners should master, including an understanding of how densities, functional use and layout impact livability. I think one effective way to teach students how to recognize and construct such legible urban form is through experiential learning, where the city becomes the classroom. Particularly for one-year masters programs that usually attract students more interested in professional practice than academic research, more learning should occur outside the classroom and should focus on the topics that planners deal with on a daily basis. Inhere lies and opportunity for UvA’s Urban and Regional Planning master program, which in my opinion is currently missing the chance to use Amsterdam’s rich history of planning to train the next generation of city makers. Whereas the department’s summer school programs Thinking City and Planning the Cycling City provide students with rich experiential learning experiences, the one-year masters program falls short of delivering the same high quality learning environment.
12. Conclusions

In this thesis tried to contribute to the understanding of the impact of the physical urban environment on street life. I started with the assumption that that an active street activity of varied urban activities can enrich the life of a community by meeting basic and growth related human needs. Following the arguments of Jacobs (1961) I identified density, land use and layout as the key spatial elements impacting street activity and have tested their impact over the past century in Amsterdam’s inner city. I made use of two widely known typologies: compact and dispersed city – to illustrate how street activity is impacted by the interaction of these three spatial elements in certain configurations. Street activity was evaluated based on the number of people and the variety of activities they partake in during each time period as judged by photographs of inner city neighborhoods over the past century.

The results indicate that when urban development occurs along the lines of compact city model, street activity is higher than when a dispersed model of development is pursued. Pre WWII developments were largely mixed-use, with streets serving movement and place functions which resulted in a vibrant street life. Following WWII, the shift to single use zoning with transport serving primarily auto-mobility made walking and cycling less feasible and street life deteriorated. In a couple of short decades, what were previously spaces for people became rather hostile to humans. A return to denser, mixed-use development refocused at the neighborhood level in recent years coincides with higher than ever levels in pedestrians and cyclists. It is difficult to say to what extent these factors have contributed to the changes in street activity over the past decades because other non-spatial elements influencing street activity have been identified.

What is relevant for other cities is that in neighborhoods which already exhibit compact city spatial form, it could be easy to increase street activity though street redesign and space reallocation interventions. However, in cities / neighborhoods which are low density, mono-functional and car centric, spatial interventions will probably be required before real activity can be generated.

What is often needed is the ability to think differently about streets and their functions. Although this requires some imagination, many cities can begin to get inspired by taking a walk down memory lane and contemplating the design and function of their streets a century ago. Today, Amsterdam’s culture of tolerance and celebration of diversity permeates many of its streets, but the current scene is a strong contrast to the photographs from just a few decades ago. What Amsterdam can teach the rest of the world is that there are many different activities that can take place in our streets and that cities and their residents benefit as this diversity increases.
13. References


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O&S. (1975) Jaarboek Amsterdam in cijfers 1975 Het Amsterdamse Bureau voor Onderzoek en Statistiek (Stadsdrukkerij, Amsterdam)


Annex 1: Population and dwelling densities

Population and dwelling densities raw data retrieved from O&S annual reports

<table>
<thead>
<tr>
<th></th>
<th>1920</th>
<th></th>
<th></th>
<th>Pop Density (in/ha)</th>
<th>Dw density (dw/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old City</td>
<td>26739</td>
<td>5757</td>
<td>92.48</td>
<td>278</td>
<td>62</td>
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<tr>
<td>Jordaan</td>
<td>64051</td>
<td>14325</td>
<td>65.64</td>
<td>976</td>
<td>218</td>
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<tr>
<td>Grachtengordel</td>
<td>50581</td>
<td>10842</td>
<td>179.87</td>
<td>281</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1975</th>
<th></th>
<th></th>
<th>Pop Density (in/ha)</th>
<th>Dw density (dw/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old City</td>
<td>7811</td>
<td>3238</td>
<td>114.47</td>
<td>68</td>
<td>28</td>
</tr>
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<td>Jordaan</td>
<td>15978</td>
<td>8022</td>
<td>65.48</td>
<td>244</td>
<td>123</td>
</tr>
<tr>
<td>Grachtengordel</td>
<td>10853</td>
<td>4382</td>
<td>123.12</td>
<td>88</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th></th>
<th></th>
<th>Pop Density (in/ha)</th>
<th>Dw density (dw/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old City</td>
<td>8679</td>
<td>5271</td>
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<td>Grachtengordel</td>
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<td>123.12</td>
<td>93</td>
<td>55</td>
</tr>
</tbody>
</table>

Notes on Data
- Data Sources: O&S 1920, 1975 and 2014 are selected as representative years for respective time periods T0, T1 and T2.
- Before 1920, population and dwelling densities are reported in a format that is difficult to manipulate / analyze (due to shifting neighborhood boundaries and lack of data on the area of these neighborhoods)
- I attempted to create data series since 1900 to present day but I wasn’t able to because of changes to neighborhood boundaries and inconsistent reporting of areas (in some years net in others gross)
## Annex 2: Photo Analysis

### Traditional Streets (pre-WWII)

<table>
<thead>
<tr>
<th>Picture</th>
<th>Number of people</th>
<th>Presence of women</th>
<th>Presence of children</th>
<th>Groups of 2 or more</th>
<th>Diversity of people</th>
<th>Diversity of Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damstrat 1868</td>
<td>70+ people</td>
<td>~10</td>
<td>Yes</td>
<td>At least 5</td>
<td>High: People of different socio-economic class (based on skin color and attire)</td>
<td>People standing on the steps of the building, looking at the camera, merchants, people carrying things on their heads, people carrying backpacks, person on horse, people with carts</td>
</tr>
<tr>
<td>Reguliersbreestraat 1900 ca.</td>
<td>60-70 people, one bike</td>
<td>~18</td>
<td>1-2</td>
<td>At least 5 groups, mostly of women</td>
<td>High: People of different socio-economic class (based on attire)</td>
<td>People looking out the window, women promenading in a group, policeman looking at the street, bike.</td>
</tr>
<tr>
<td>Haarlemmerdijk 1900 ca.</td>
<td>60+ people</td>
<td>~12</td>
<td>At least 10</td>
<td>At least</td>
<td>High: People of different skin color and socio-economic class (based on attire)</td>
<td>Tram lines, high diversity of shops, at least 8 carts, people carrying things, women walking and talking, people standing on the steps of the building, looking at the camera, merchants, person looking out the window</td>
</tr>
<tr>
<td>Museumplein 1906</td>
<td>40-50 people</td>
<td>&gt;20% women</td>
<td>At least 8 children</td>
<td>At least 10 groups: Couples, families, etc.</td>
<td>Primarily higher socio-economic class</td>
<td>Site for leisure activities: promenading, talking, meeting people</td>
</tr>
<tr>
<td>Summary</td>
<td>50-100 people</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
<td>Merchandizing, socializing, movement Diversity of people and activities Necessary activities dominate but also places for recreation and leisure</td>
</tr>
</tbody>
</table>
## Modernist streets (post-WWII)

<table>
<thead>
<tr>
<th>Picture</th>
<th>Number of people</th>
<th>Presence of women</th>
<th>Presence of children</th>
<th>Groups of 2 or more</th>
<th>Diversity of people</th>
<th>Diversity of Activities</th>
</tr>
</thead>
</table>
| Damstrat 1981               | 20-30 people, of which 4 on bikes | 2-3 women (difficult to tell) | No | One or two groups | Difficult to judge | Low pedestrian activity  
A few bicycle  
People walking to / from the car  
Low diversity of activities |
| Reguliersbreestraat 1984    | ~30 people       | ~5                | No                   | 3 couples           | Diversity of people doesn’t seem very high | People walking  
Getting out of the car  
Couples walking  
Two cyclists |
| Haarlemmerdijk 1971         | 50-60 people, of which 7 bikes | ~ 15              | 1 child              | A few groups        | Difficult to judge how diverse is the group | Window shopping  
Accessing shops  
Walking to / from and between cars  
Low diversity of activity |
| Museumplein 1987            | <10 people       | ~ 2               | No                   | One group           | Difficult to judge | Pedestrians activities are restricted as indicated  
by the pedestrian access prohibited sign  
Design is car-centric  
Large parking lot observed in the background (on the right)  
Large illustrations are meant to be consumed from the car |
| **Summary**                 |                  |                   |                      |                    |                    | Low diversity of activities: accessing shops and movement  
No merchandizing or socializing activities  
Streetscape dominated by cars |
| **Compare to pre WWII baseline** |                  |                   |                      |                    |                    | Much lower diversity of activities |

Women present on shopping streets  
Almost no children  
Low number of groups  
Difficult to judge
## Post-modernist streets (since 1990s)

<table>
<thead>
<tr>
<th>Picture</th>
<th>Number of people</th>
<th>Presence of women</th>
<th>Presence of children</th>
<th>Groups of 2 or more</th>
<th>Diversity of people</th>
<th>Diversity of Activities</th>
</tr>
</thead>
</table>
| Damstrat 2014            | 100+ people, of which ~ 10 bikes | >30% women | Yes | A few groups | Area dominated by tourists | People walking
Person seating
People riding bike
Person riding scooter
Person talking on the phone |
| Reguliersbreestraat 2013 | 100+ people of which 3 bikes | > 30% women | Yes | At least eight groups of two or more people | Area dominated by tourists | Dinking
Women walking and talking
Groups looking at displays
Person leaning against the wall |
| Haarlemmerdijk 2015      | 40-50 people, of which ~18 on bikes | >30% women | Not in this photo | At least four groups | Mixtures of tourists and locals? | People biking
People sitting down
People eating / drinking / ordering food
People chatting
Person using their cell phone
Couple walking |
| Museumplein 2014         | 100+ people | >30% | Yes | Yes – high rate of groups of two or more people | Area dominated by tourists and visitors | Space for passive activities: people are sitting down, people watching, socializing, interacting with the installation |
| **Summary**              | 100+ people | Yes | Yes | Yes | Not as high / different from pre WWII? | High diversity but different from traditional streets. More optional activities and more tourists. |