1 WHAT IS ACCESSIBILITY?

1.1 Definition of urban accessibility

Accessibility is the ease with which people can reach places and opportunities – or, conversely, a characteristic of places and opportunities in terms of how easily they can be reached by the population (Geurs and Van Wee, 2004; Neutens et al., 2010).

Accessibility conditions are influenced both by the spatial co-distribution of the population, economic activities and public services, as well as by the configuration and performance of the transport network. In this sense, urban accessibility plays a fundamental role in shaping people's ability to move in order to access opportunities, such as jobs, schools etc.

Urban accessibility levels, therefore, are determined by three distinct components, as follows.

1) Infrastructure: how easy it is to access activities depends on existing infrastructure and transportation services. This includes, for example, the spatial coverage and connectivity of the public transport and street networks, the existence of rapid transit services such as trains and subways, etc. Here, both the efficiency and the spatial and temporal connectivity of the transport network are of utmost importance.

2) Land use: how easily activities can be accessed also depends on the spatial co-distribution of people and activities, such as schools, health services, leisure areas, etc. This component is related to the geographical proximity between people and opportunities: the further away an activity is, the more difficult it is to access it.

3) People: finally, it is important to note that the individuals' ability to access activities is also affected by their personal characteristics. Factors such as motor and cognitive difficulties, age, gender, race, and income, for example, can significantly influence people's ability to get around, use certain transport modes, and move around the city without fear of some kind of violence or discrimination.

This last component can be of critical importance for equity and social inclusion analyses. However, the influence of people's personal characteristics on accessibility conditions is usually better assessed through qualitative surveys: due to operational and computational challenges, this dimension of accessibility usually

receives little attention from impact assessments of large-scale transportation projects. Chapter 2 discusses the operational, theoretical and communication advantages and disadvantages of different accessibility measures.

1.2 Difference between micro-accessibility and urban accessibility

In order to clarify the concepts we use throughout the book, it is important to distinguish between what we mean by urban accessibility and what is the colloquial use of the term accessibility.

The term *accessibility* is commonly used to refer to issues of universal design standards and regulations, as well as construction and planning practices aimed at the inclusion of people with different degrees of motor and cognitive challenges. This is usually understood as *microaccessibility*, because it covers issues of access to services and activities at the micro scale – i.e. how the planning of public and private spaces, and the design of vehicles and buildings, for example, affect the ability of individuals to access places, services, products etc.

Urban accessibility, on the other hand, can be understood as *macroaccessibility*, because it deals with a broader understanding of access. When we talk about urban accessibility, we focus on how structural issues of planning and urban development, such as the configuration of transport corridors and the spatial distribution of people and activities, affect people's ability to access opportunities. Urban accessibility addresses how the ability to access activities is influenced by people's ability to use transportation technologies, by the spatial co-distribution of people and activities, and by the spatial coverage and connectivity of transportation networks.

Microaccessibility and macroaccessibility are complementary elements of a broader notion of accessibility. Microaccessibility conditions, for example, directly affect the ability of people to board and use different modes of transport, to move safely on sidewalks, to cross streets etc. It is of little use for a person to live in a region served by various transport modes if, for example, she has limited mobility and the transport network and vehicles are not adapted to these challenges.

In this book, we will focus only on urban accessibility analyses and will often use the term accessibility as a synonym of macro-accessibility. It is important to recognize, however, that macroaccessibility alone provides only a limited account of one's accessibility conditions, and a more nuanced understanding of accessibility requires a closer inspection of microaccessibility conditions as well (Grisé et al., 2019; Buliung et al., 2021).

1.3 Why does urban accessibility matter?

The concept of accessibility is critical to transport and planning studies for different reasons. First, it explicitly articulates how the interaction between transport, urban development and land use policies impact people's ability to access opportunities dispersed in space. Moreover, access to opportunities and activities, such as jobs, education, and health services, plays a fundamental role satisfying individual and social needs and promoting social inclusion (Pereira and Karner, 2021; Luz and Portugal, 2022). Good accessibility is also a necessary condition, although not sufficient on its own, to expand people's freedom of choice (Church, Frost and Sullivan, 2000; Lucas, Van Wee and Maat, 2016; Van Wee, 2022). Therefore, the concept of accessibility helps us understand how transport and land use investments relate to elements that constitute the notions of social exclusion and wellbeing, such as freedom and one's satisfaction of basic needs.

Additionally, the idea of accessibility brings attention to the spatial dimension of inequality of opportunities, a central social justice problem. Urban accessibility helps to explicitly incorporate the notion of space into policy design to address inequalities (Farrington and Farrington, 2005; Pereira, Schwanen and Banister, 2017). Thus, accessibility is a fundamental concept when thinking about the equity implications of public policies and when evaluating which social groups and localities benefit from them.

As mentioned before, the accessibility levels in a city are a joint result of each person's ability to use transportation technologies, the spatial co-distribution of activities and population in the city, and the spatial and temporal connectivity of the transport network (Miller, 2018; Páez, Scott and Morency, 2012). As such, accessibility-oriented planning seeks to promote the integration between land use and the transport systems, getting people and activities closer together and reducing the dependence on motorized modes of transport (Banister, 2011). Planning cities and transport systems to improve accessibility conditions is therefore essential to promote more inclusive and sustainable cities.

1.4 Difference between accessibility and mobility

It is important to clarify the difference between accessibility and another concept widely used in our daily life: mobility. Unfortunately, the difference between these concepts is often ignored, even by researchers and planners who deal with these topics on a daily basis.

After all, there is a large intersection between accessibility and what is meant by "urban mobility" as a broad field of research and public policy: a field that deals with people's daily mobility patterns and which is related to the planning of public and individual transport systems, to the planning of cycling and pedestrian

networks etc. In this context, it is not uncommon to hear, for example, that a given socioeconomic group has "less mobility" than another, when it's actually meant that this group has worse accessibility conditions. So what is the difference between accessibility and mobility?

In the urban and transport planning literature, the concept of mobility refers to people's daily travel behavior patterns – for example, how many trips are taken, which transport modes are used, the average trip distance and how much time people spend on commute.

Mobility data is commonly collected through household travel surveys. More recently, new technologies have been enabling the use of new data sources, such as mobile phones location services and smart cards, to examine daily mobility patterns (Anda, Erath and Fourie, 2017; Kandt and Batty, 2021). Mobility data and analyses provide information on how transport systems are used and on the travel behavior of people from different socioeconomic groups, which reflect important aspects of the economic and environmental performance of cities and of the well-being of the population.

Accessibility, however, refers to the *potential* ability to reach activities and opportunities. While a mobility analysis would focus, for example, on the time people spend commuting, an accessibility analysis would examine, for example, the quantity and variety of jobs one could potentially reach within a reasonable travel cost. Accessibility addresses how easy/feasible it is to reach a location, while mobility is concerned with the means of movement used to reach a location. Accessibility levels are, therefore, potential measures, while mobility data describe observed travel behavior.

Traditionally, urban and transport planning focuses on mobility (Banister, 2011; Vasconcellos, 2018; Levinson and King, 2020). Even today, the focus on mobility leads to the implementation of policies that prioritize private automobiles and that increase traffic flow and speed as a means to tackle congestion and reduce travel times (Levine, Grengs and Merlin, 2019). These policies tend to concentrate on the quantitative side of mobility, focusing on increasing the number of trips, increasing the average speed, decreasing congestion, etc.

From this perspective, mobility is understood as an end in itself, and the solutions to "improve" it would purely depend on technical solutions that "optimize" the quantitative aspects mentioned before. Mobility, however, cannot be seen as an end in itself. People seldom travel for the sake of moving around. On the contrary, people most oftenly travel as a means to access the activities or people they want to engage with at the trip destination.

In this sense, there is growing consensus among researchers and transportation agencies that the goal of a transport policy is to improve people's access to opportunities (Pereira, Schwanen and Banister, 2017; Martens, 2012; Bertolini, Clercq and Kapoen, 2005). If what people want is to access activities, we need to rethink how urban, land use and transport planning practices could be redesigned to improve accessibility without necessarily increasing traffic speeds or the dependence on motorized vehicles, which are known to cause negative economic, environmental and public health externalities.

There is a call for a paradigm shift in urban and transport planning in which the pursuit for more sustainable travel patterns requires changing the focus from mobility to accessibility (Banister, 2008; Cervero, 2005; Levine, Grengs and Merlin, 2019).

Policies that aim to increase traffic speed and road capacity, for example, could be replaced by policies that bring people and activities closer together and that encourage a more diverse land use mix, promoting the integration between transport and land use planning. Thus, the focus shift from mobility to accessibility opens up a wider range of possible public policy instruments and actions that aim to contribute to an urban development based on sustainability and social inclusion principles (Banister, 2011; Levine, Grengs and Merlin, 2019).