

Urban mobility and public space. A challenge for the sustainable liveable city of the future

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Abstract

Public space and mobility are two challenging topics in many contemporary cities. These topics give rise to important questions such as how does the element of public space affect the sustainability of urban mobility in contemporary cities? And how does facilitating mobility contribute to the livability of the public realm? The purpose of this paper is to attempt to answer these questions. On one hand, the paper explores the relationship between public space and urban mobility in the contemporary city, specifically by addressing the extent to which urban mobility can create better public spaces and even assist in producing a more sustainable model of mobility. Although ignored for a long time in the discourse on urban planning, the relationship between public space and urban mobility has the potential to create livable cities. Indeed, the use of public space by walking and cycling contributes to economic, environmental and social sustainability. Hence, together with economic, ecological and social indicators, public space and urban mobility also constitute relevant city components, when measuring a city's sustainability performance. On the other hand, this paper seeks to suggest a set of measures related to public space and soft mobility that can be integrated into an already existing set of indicators commonly used to measure urban sustainability. In this regard, the paper contributes to the debate surrounding the need to invest more in public spaces and at the same time suggests to planners and policy makers that it is necessary to develop international measures for the evaluation of urban mobility and the sustainability of public space.

Keywords: public space; urban mobility; sustainable city indicators; contemporary city; everyday urbanism.

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Introduction

In the last 20 years, public spaces have acquired a renewed visibility in urban planning discourse as an essential ingredient for urban sustainability. Public spaces play a central role in the creation of inclusive communities and more specifically, in the formation of a public culture and in enriching cultural diversity (Low et al. 2005). In particular, there is a resumed interest in re-establishing the relationship between public space and urban mobility. The creation of attractive public spaces, (which are also mobility hubs e.g. stations, airports, bus stops, intermodal terminals), and the use of streets, sidewalks and bike lanes for daily mobility (e.g. walking and cycling) constitute a key challenge for the design of sustainable mobility systems and the creation of sustainable and liveable cities (Wheeler 2013). Improving soft mobility measures and the modal shift and upgrading the quality of public spaces, constitute two important aims for any plan to realise the sustainable liveable city of the future.

Urban mobility (e.g. our daily mobility and the experience of moving) is something that involves public spaces. Conceived for a long time as two separate entities and neglected in the discourse on urban planning, the relationship between public space and urban mobility can create sustainable cities. On the one hand, two of the most environmentally and economically sustainable ways to move around the city are cycling and walking, which involve using public streets. On the other hand, a sustainable mobility system also relies on public spaces, for example: train stations, cable cars, buses, airports and any other mobile hub that people use in daily life (Lévy et al. 2010).

According to a report published by the EU, “a sustainable city must have attractive open public spaces and promote sustainable, inclusive and healthy mobility [..]” (European Union Regional Policy 2011). In light of this, contemporary trends that re-orient/re-direct cities around people by creating good quality public spaces and favoring soft mobility measures, are now taking place all over the world, especially in cities that were most affected by modernist planning ideas. Interventions include: retrofitting parking lots to overcome the current dichotomy between the motorist and pedestrian, increasing the length of bicycle lanes to create new public spaces and increasing the green space provision per inhabitant. These urban interventions with their view to creating more attractive public spaces, go hand in hand with a change in people’s mobility habits and a more intensive use of public transportation (Newman and Kenworthy 1999).

Clearly, mobility and public spaces play a relevant role in the development of a sustainable city, but how can we measure the precise degree to which they truly contribute to urban sustainability? What instruments and which indicators would be most appropriate? Several international organizations (e.g. OECD, EEA, World Bank and UN-HABITAT) have already developed a set of indicators as tools for assessing urban sustainability. In developing variables able to describe both environmental and socio-economic issues, these organizations have established both the availability of public spaces (quantitative) and the degree to which inhabitants use public transportation or non-motorized transport as indicators. In many cases, the indicators measure the percentage of green or public spaces per inhabitant and the total number of kilometres travelled by bicycle, on foot, by car or on public transport. Although these developed measures are useful, others are also required. The simple fact that public spaces exist and that soft mobility is used reveals very little about the degree to which public space and urban mobility contribute to urban sustainability.

If public spaces and urban mobility are key challenges for the sustainable, liveable city of the future, more tools need to be developed in order to better evaluate their relevance in achieving that urban sustainability. The daily movement of people around the city and their mobility habits, and the use of streets, sidewalks and bike lines for walking and cycling combined with the use of sustainable transport modes all contribute in differing degrees to forming a sustainable city.

The paper aims to identify a set of indicators that measure the degree to which public spaces and urban mobility, specifically soft mobility (e.g. walking and cycling), can support the development of a more sustainable city. It proposes that if new indicators related to public space and urban mobility, are integrated with the already existing, conventional indicators of urban sustainability (i.e. environmental, economic and social indicators) they have the potential to enrich knowledge related to how the city is moving towards urban sustainability. This paper contributes to the literature on urban studies in two ways: first, it supports and expands the discussion about indicators related to urban mobility and public space for measuring urban sustainability. Second, agreeing with the principles of new urbanism, it underlines the importance of considering public space as an active element in the discussion surrounding the sustainable and livable city. Indeed, public space is not only a space that people pass through. In the current process of re-imagining urbanity, public space plays a key role as an “urban collector, full of meaning”.

Reclaiming relationship of public spaces and urban mobility

The discourses surrounding public space and urban mobility intersect,, specifically relating to the degree to which efficient usage of public spaces is important for developing a sustainable mobility system and vice versa. Public spaces are not only places where activities take place; they are also places for mobility, for people to come to, leave from and pass through. Hence, offering a good range of mobility options can foster the creation of more sustainable public spaces (Gehl 2006; PPS 2014b). Moreover, providing spaces in which people can walk, cycle, sit, stand, wait, and socialize determines how people decide to move in, out and around the city and thus influences urban sustainability.

Since ancient times, streets have played a critical role in cities: they connected spaces, people and goods, and facilitated commerce, social interaction and mobility. Until the mid-20th century, streets, together with plazas and squares, were an integrated system of movement space that contributed to defining the cultural, social, economic and political life of cities. They had a natural vibrancy and were dynamic and multi-functional places, in particular for young people and teenagers who were (and still are) the main actors in the process of public space appropriation (Torricelli et. al. 2014).

The modernist ideas of order, hygiene and aesthetics regulated the use of spaces and activities, while large-scale interventions in the 1960s and 1970s with their emphasis on traffic movements reduced the importance of streets (Jacobs 1961). One of the consequences of applying modernist ideas to urban planning was a sacrifice of the “social function” of public spaces and streets for aesthetic and functional purposes. Streets started to be seen as mere links in a road network and as elements that simply enable traveling between destinations. Since the rise of the modernist idea of zoning, which facilitated the division of the city in functional areas, the experience of moving has been associated with the concept of the car and velocity and conceived as separate elements from public spaces. The arrival of the car society has unquestionably destroyed the

collective meaning of public spaces. Managing the increase of vehicular traffic has required the form of the city to change in order to satisfy the needs of a motorized population. Streets have become “spaces for cars” and urban spaces “spaces for parking”, ignoring their significance as spaces of interaction, diversity and exchange (Davis 1990; Newman and Kenworthy 1999; Mitchell 1995; Sennett 1992).

In reaction to this view of the city, starting in the 1960s, new approaches arose that sought to re-establish the relationships between streets, neighbourhoods and society. The work of sociologist Jane Jacobs contains some of the strongest critical arguments against the modernist movement. In her work, she codified a new sense of “urban” as part of cultural openness, personal enrichment, self-fulfilment and tolerance; an urban experience characterized by a perfect balance of strong social capital, economic activities and local charm (Jacobs 1961). Today, the principles suggested in her work are frequently referenced by new urbanists (Knaap and Talenn 2005) in discussions about how to design public spaces that can enrich a sense of place and improve city liveability. Although, cars are still part of the cityscape and need to be considered when planning, we can no longer rely on cars to keep our cities functioning. We should strive to create a balanced city environment where people in cars, on bicycles and on foot can coexist. Based on this idea, streets are being re-designed to recover their “past” social and multifunctional character.

Re-balancing the relationship between public spaces (particularly streets) and urban mobility implies re-qualifying streets and public space networks, in social and formal terms, by re-establishing an integrated use of spaces and multiple means of movement. Concretely, this means making streets more attractive for all users, enhancing their ability to function as both urban living and mobility spaces, as well as satisfying new functional requirements of society.

This process can have at least two positive consequences for urban sustainability. On the one hand, by improving the mobility system, especially by re-enforcing the soft mobility scheme, we can create more socially and environmentally friendly cities. At the same time, we can establish a model for a more sustainable, urban mobility pattern and habitable public space. Denmark’s capital city of Copenhagen exemplifies how a public space network can become more sustainable where walking and cycling are the most common modes of daily movement and transport. On the other hand, upgrading urban mobility can create new public spaces or improve the sustainability of existing ones. By making major investments in infrastructure, Medellín in Colombia has created, numerous sustainable mobility systems such as an urban cable car lines to serve marginal (and often informal) sectors and an incredible 300-foot long escalator that provides access to one of the most forgotten parts of the city (Alcaldía de Medellín). Similarly, Bogotá in Colombia has improved its bike path networks and extended the Bus Rapid Transit-BRT¹ (Transmilenio) as well as created new public spaces, libraries and parks (Torricelli 2009). This has not only produced a dramatic drop in crime but has also re-populated the city’s public spaces. More recently, La Paz in Bolivia has significantly upgraded mobility opportunities for commuters by installing urban cable car lines between the city center and the huge and chaotic suburb of El Alto, among others. (Shahriari 2014).

By investing in walking and cycling, with a commitment to social equity, these cities have animated people to move in the streets and improved the quality of life for all residents, making neighborhoods more accessible and inter-connected. Constructing bicycle paths

and an efficient public transit system constitute typical examples of how mobility has helped create public spaces and further promoted the sustainable use of public space. Re-establishing the relationship between urban mobility and public space and restoring the social value of streets is an opportunity to: integrate people's everyday activities, make moving through the city appealing and understand how the quality of spaces affects our experience of moving. Walking or cycling through public spaces or using public transport should be a positive and enriching experience, an opportunity to enjoy the environment, be actively involved with society and interact with others who are sharing the same experience. In this sense, public spaces and associated urban mobility potential are crucial for urban sustainability.

Methodology

To identify a set of indicators that can be used to assess how public spaces and urban mobility contribute to urban sustainability, we follow three steps: Firstly, we review the literature to picture existing indicators for measuring urban sustainability. Secondly, we define sustainable public space and sustainable urban mobility so as to extrapolate potential parameters from these definitions. Thirdly, we suggest a list of indicators to be used to assess urban sustainability, focusing on the dimensions of public space and urban mobility. These steps are better described in the following subparagraphs.

First step: review of established indicators for measuring urban sustainability through improving public spaces and urban mobility

Over the past two decades, we have seen an increasing interest from a number of international organizations (OECD, EEA, UNCHS, CSD, World Bank, UN Habitat and IISD²) in developing indicators for measuring urban sustainability. Some of these organizations have also created programs to monitor sustainable development worldwide. Most existing and established indicators of urban sustainability tend to be amalgams of environmental, economic and social variables. Yet, there is no inter-organizational consensus on a shared set of indicators that can be considered and measured. The reason for this is that there are many different definitions of sustainability, this is due both to the polysemic nature of the term and the fact that it applies to different geographical scales and contexts, thus making it difficult to generalize (Alberti 1996). Indeed, several organizations and institutions have selected different indicators that respond to their policy focus and geographical scale. Consequently, within the existing established list of urban sustainability indicators, the category of "public spaces" and "mobility" are taken into consideration in a limited fashion, and are only included in broad categories such as "green spaces", "urban quality", and "transportation".

Table 1 below shows the most relevant existing indicators related to mobility and public spaces. Three interesting aspects emerge when examining the table. a) Indicators for urban mobility are more common than those for public spaces. b) Indicators frequently evaluate the availability of parks and green spaces, omitting the consideration of streets, squares and other more constructed types of public space. It is well known that open and green areas enhance the well-being of residents as they relate to the principles of comfort, access, diversity of use, and sociability (Chiesura 2003; Carmona et. al. 2003), yet streets, squares and constructed types of public space also play a relevant role in

people's quality of life. c) With the exception of those employed by the World Bank, chosen indicators rarely consider factors related to the physical quality of the environment and the reasons that make people choose to use public spaces, walk or cycle. Although these factors are difficult to grasp due to their subjective nature, we cannot ignore the fact that multiple elements present in the city, not only pedestrian streets or parks, contribute to an accurate assessment of urban sustainability. Certainly, the availability of public spaces and urban mobility options are necessary indicators. However, they alone are not sufficient to describe how public space and urban mobility can contribute to urban sustainability. More indicators are necessary.

In order to suggest new indicators to add to the list of existing indicators, a definition of sustainable public space and of sustainable urban mobility is not only recommended but is necessary in order to categorize new measures. While there is an agreement on the definition of sustainable urban mobility, the definition on what constitutes a sustainable public space is more complex, and will be discussed in the next subparagraph.

Second step: choose a definition for sustainable public spaces and urban mobility

Defining indicators to examine how public spaces and urban mobility can contribute to urban sustainability implies having clear definitions of what sustainable public space and sustainable urban mobility are.

There are many definitions of sustainable urban mobility. Here, we adopt a definition used by the World Business Council for Sustainable Development as part of that organization's Mobility Project 2030 (2004). It considers as sustainable a level of mobility that "meets the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological requirements today or in the future". The definition of sustainable public spaces is more complicated.

Sustainability is rarely mentioned in existing discourses on public space. In literature, the focus is on different issues related to environmental sustainability (Chiesura 2003; Sauri et. al. 2004; Agyeman et. al. 2003), gender and cultural diversity (Low et. al. 2005; Madanipour 1996), globalization, privatization and global movements (Sennet 1992; Davis 1990; Zukin 1995). Moreover, on concerns related to public space design, place making and management (Gehl 2006; Lynch 1960; Jacobs 1961; Reiter 2003; Montgomery 1998; PPS 2014a).

Although these contributions intersect the discourse on sustainability (i.e. social sustainability), the subject of sustainability remains absent from social and anthropological debates on public space. Hence, in searching for a definition of sustainable public space, our approach is to adapt the definition of sustainable development to the category of public space and consider the characteristics that a public space should have in order to be considered as sustainable.

The most common definition of sustainability is the one provided in the Brundtland report. Sustainable development is the development that "meets the needs of the present without compromising the ability of future generations to meet their own needs". This definition refers to a pattern of resource use that aims to meet human needs while preserving the environment in the long term. If we want to adapt this to the concept of public space, sustainable public spaces are those able to preserve long-term usability. In addition to the temporal framework implied in the definition, the concept of sustainability

holds three dimensions: environmental, social and economic. Therefore, sustainable public spaces need to be planned and managed by integrating these three dimensions in the long term, and by considering social issues such as social justice and socio-cultural diversity, promotion of a sustainable use of natural resources and enhancement of the local economy.

This paper proposed that the theoretical and analytical contributions offered by Jan Gehl (1987), Kevin Lynch (1960), Jane Jacobs (1961) and William Holly White (1980) are essential for establishing defining measures for public space sustainability. Gehl's approach is useful in establishing these measures to investigate the physical characteristics of public space, the public spaces network and pedestrian activities, as well as understanding how people use public spaces and interact there every day. Kevin Lynch's (1960) work offers an understanding of how individuals perceive and navigate the urban landscape. By introducing the concept of place legibility, which is understood as the ease with which people understand the layout of a place, Lynch was able to see what specific components make a city vibrant and attractive to people. The work of Jane Jacobs (1961) offers a broad understanding of how urban streets and neighborhoods work and how to develop an "urban way of life", consisting of cultural openness, personal enrichment, self-fulfillment and tolerance. William H. White's (1980) work is significant as he conceived public space as a relevant element of people's quality of life. By observing people in public spaces, he defined some roles for designing public spaces for people. Sigrid Reiter (2004) suggested looking at three dimensions of public spaces: coherence, co-existence and contextuality. Coherence refers to the degree to which public spaces become places enriched with a collective identification. Co-existence denotes the ability of public places to favor the gathering of differences; and contextuality refers to the integration of public spaces into the local context. Moreover, Project for Public Spaces (PPS 2014) offers a guide on how to design sociable public spaces that are rich in activities and able to guarantee access and linkages: a guide which is widely used by urban planners to design new or revitalize existing public spaces, in a sustainable way. Although, "sustainability" and "public spaces" are contested concepts as their definitions change across space and time, it is still possible to identify common characteristics that all public spaces should have in order to be considered sustainable. In addition to that, each city has its physical characteristics (topography, geology, climate and geographical position) its culture, historical background, attitudes and lifestyle, which all determine how people use and behave in public spaces. It follows that each public space has its own spatial, historic, environmental, social and economic features that have to be taken into account. The promotion of social diversity, through creating inviting and active spaces for social and related activities is related to how public spaces are designed, what they offer and how they are managed.

According to these considerations, the definition of a sustainable public space should relate to concepts such as accessibility, diversity, community collective life, identity, public owned and network.

- From an environmental perspective, sustainability of a public space is achieved when natural conditions of the local physical environment are respected (Sauri et. al. 2004; Agyeman et. al. 2003).
- From a social perspective, sustainability of a public space is enhanced when the space stimulates accessibility, diversity, identity, interactions, openness, social cohesion and capital as well as cultural diversity (Jacobs 1961; Madanipour 1996).

- From an economic perspective, sustainability of a public space is achieved when there are opportunities to develop the local economy and when the space sustains itself economically (Heynen et. al. 2006).

Thus, a sustainable public space can be defined as: “a space that is accessible to all (Madanipour 1996), able to contain diverse behaviors, city users, activities and functions (Ghel 1987), well designed and well managed in respect of the local context (PPS 2014b), capable to provide comfort (Reiter 2003), vitality (Lynch 1960; Schiller 1994), and able to promote urban life (Carr et al. 1992).”

Third step: Suggesting new indicators of public space and urban mobility

Whereas defining indicators for urban mobility is relatively easy, determining public space sustainability indicators is more complex. As stated in Alberti’s (1996) work “[...] while the task of defining objective measures of physical quality is relatively easy, we know little about how to incorporate the subjective dimension in valuing them” (Alberti 1996, p. 390). We also know little about different ways to measure people’s perceptions and values as they relate to the urban context. An important contribution to the identification of indicators for measuring public space sustainability is offered by the Global Public Space Toolkit report: from Global Principles to Local Policies and Practice, published by the UN-HABITAT in 2016, where a comprehensive list of indicators is provided for the examination of the quality of public space.

Table 2 below suggests a list of indicators that can be added to the existing ones and that specifically consider the role played by public space and urban mobility. The suggested set of indicators, which resulted from an elaboration by the authors based on both the existing list of indicators (Table 1) and thoughts on the definition of sustainable public space, consider both the physical quality of public spaces and mobility as well as people’s activities and perceptions. Indeed, the suggested list takes into account the objective and subjective dimensions of city spaces, where by subjective we refer to the individualistic perception people have about places and by objective we mean the measurable features that characterize spaces. The objective dimension is examined through the following parameters: 1) availability, 2) accessibility, 3) urban design quality (including comfort), 4) dominant uses, activities and functions in public spaces. The subjective dimension refers to people’s view of public spaces, green spaces and public transport quality.

In proposing this new set of indicators, no consideration was given to the type and size of the city. The reason for this, is that our contribution is prevalently theoretical. However, in practical terms, it should be taken into consideration. Measuring the sustainability of urban mobility in a large city or a small town is not an equivalent task. It is, for example, very difficult to compare the sustainability of a city on the plains with a town in the mountains, primarily due to the fact that residents and users have different needs, habits and behaviors. Hence, when using the list of suggested indicators it is useful to take into account the local specificities of places. Another important element to consider is data availability, which for the selected list of indicators should be relatively high. Indeed, most of the data for the suggested indicators can be collected from EU/ international data providers as well as nationally or regionally. Alternatively, data may be created by using GIS/GPS tools. GIS enables investigation of the characteristics of public spaces and measures accessibility and linkages, while GPS tracking enables the collection of data on individual and collective movements and the study of pedestrian behavior (e.g. trips,

access to transportation and public spaces, the most frequently used streets, main activities and the intensity of spaces used)³.

Conclusion

This paper discussed the relationships between urban mobility and public spaces with the aim of identifying new indicators that can be used to measure urban sustainability.

Research undertaken for the purpose of the paper revealed that while indicators for measuring the sustainability of urban mobility have been studied since the late 1990s, and several indicators already exist and are in use, indicators for determining the sustainability of public spaces are less common. Literature on this subject matter includes relevant contributions that propose how to study, design, manage and plan spaces, but the list of common indicators used to investigate public spaces in both objective and subjective terms, at the international level and in a comparative perspective, is limited to the work done by the UN-Habitat.

Furthermore, this contribution aimed to ignite a debate on this issue. As a conclusion, new efforts should be made to consider public spaces and urban mobility as essential elements for evaluating, measuring and monitoring urban sustainability. As among the requirements of sustainable and livable cities, provision of spaces for social interaction and opportunities to be mobile are relevant. There is nothing new in stating that our cities need to offer adequate transportation, soft mobility options, as well as inclusive and well-designed spaces. Without coherent and efficient strategies for urban mobility one cannot expect to improve the quality, usability and ultimately the sustainability of public spaces. Simultaneously, without investing in attractive public spaces, one cannot expect to make urban mobility more sustainable. If this is correct, then more measurable indicators should be introduced to evaluate the sustainability of public spaces and mobility.

Although little discussed in this paper, analysis of public spaces data at an international level should also be enforced and promoted. Furthermore, more consideration should be paid to different geographical scales and types of cities. Much of the debate on urban mobility and public space relates to large cities where urban sustainability is most at stake. However, small and medium sized cities should be examined as well. Finally, the proposal of considering public spaces and mobility as measures for urban sustainability will require further indicators that could foster an increased examination of the topic and enrich literature on the subject matter. Evidently, the suggested list of indicators is not yet complete, and consideration of the implications of the size and type of cities must be discussed in more depth. This will be the objective of future works.

Table 1. Public Spaces and Mobility Indicators According to Various Sources

Organizations	Mobility	Public Spaces
UNCHS	<ol style="list-style-type: none"> 1. Modal split (proportion of work trips by car, train, bus, motorcycle, bike, walk, other) 2. Average time in minutes for a trip to work 3. Per capita expenditure on road infrastructure 4. Number of automobiles per 1000 population 	
World Bank Thirty-seven-city Study (Newman & Kenworthy 1999)	<ol style="list-style-type: none"> 1. Journey to work (JtW) %: Private / Public / NMM (*4) 2. MJ/Pass Km: bus, rail, ferry 3. JtW Km 4. JtW mins 5. Transports deaths 100,000 inhabitants 6. % Transports Deaths of Total Deaths 7. Total CO2 per capita (kg) 8. NOx per Capita (kg) 9. SO2 per Capita (kg) 10. CO per capita (kg) 11. VHC per Capita (kg) 12. VP per capita (particles, KG) 13. Road Expenditure per Capita (U.S. dollars) 14. %GRP spent on Commuting 15. %Transit Cost Recovery 	
EEA	<ol style="list-style-type: none"> 1. Motorway length km/railway length km 2. Number of average length of trips per km per inhabitants per mode of transport per day 3. Number of commuters in and out of conurbation 4. Total inflow and outflow vehicle in km and numbers of vehicles on main routes 5. Number of people injured in traffic accidents per 10000 inhabitant 	<ol style="list-style-type: none"> 1. Accessibility of green space: percentage of people within 15 minutes walking distance of urban green areas
WHO Healthy cities indicators (1994)	<ol style="list-style-type: none"> 1. Pedestrian streets 6. Cycling in the city 7. Living space 8. Public transport 9. Public transport network cover 	<ol style="list-style-type: none"> 1. Public access to green spaces 2. Relative surface area of green space in the city
Urban audit Eurostat (2014)	<ol style="list-style-type: none"> 1. Automobile ownership: number of automobile per 1000 population 10. Number of people dead in traffic accidents per 10000 inhabitant 11. Percentage of users of Public Transient 12. Percentage of used walking and cycling 13. Percentage of users of Mass Transient 	
Green City Index (EIU)	<ol style="list-style-type: none"> 1. Modal split 	<ol style="list-style-type: none"> 2. Amount of parks, open spaces/ green areas
Alberti (1996)	<ol style="list-style-type: none"> 14. Mobility and modal split 	<ol style="list-style-type: none"> 1. Adequate of green areas and open spaces
UN-HABITAT (2016)		<ol style="list-style-type: none"> 2. Quality and quantity of public space

Table 2. Indicators Related to Public Spaces and Urban Mobility to Add in Conventional Definitions

Dimensions	Indicators	Dataset	Tools
Availability	Number of green spaces per 1000 inhabitants	WHO	Statistics
	Square meters of green space per Capita	Land cover LAU2 data	Statistics/ GIS
	Number of squares/ pedestrian streets /plazas per 1000 inhabitants	LAU2 data	Statistics
	Length of bike lanes	LAU2 data	Statistics
	Length of pedestrian streets/ street network	LAU2 data	Statistics
	Type of existing public spaces/green spaces/pedestrian streets/bike lanes	LAU2 data	Statistics
	Covering of bus line network of major city neighborhoods	LAU2 data	GIS
	Incidents /collision involving biker and walkers	LAU2 data	Statistics
	Number of parking spots per 1000 inhabitants	LAU2 data	Statistics
	Traffic volumes	LAU2 data	Statistics
Accessibility	Number of people entering public and green spaces on a weekly day	-	GPS tracker
	15 min. walking distance to key access points of public spaces	Google maps	GIS
	15 min. walking distance to key access points of green spaces	Google maps	GIS
	Number of average length of trips per km per inhabitants per mode of transport per day	EEA	Statistics
	Percentage of people using bus transit, walking and cycling	Urban Audit	Statistics
	Percentage of people within 15 minutes walking distance of urban green areas	EEA	Statistics
	Main Pedestrian movement		GPS tracker
Urban Design	City topography for biking and walking	EEA	GIS
	Number of places to sit	LAU2 data	observation
	Comfort	LAU2 data	observation
	Natural elements	LAU2 data	observation
Activities and Functions	Number of social and cultural activities (e.g. events and festival) per year and per 1000 inhabitants	LAU2 data	Statistics
	Activities/uses/functions in public space	-	GPS tracker
	Most recurrent activities in public space	-	GPS tracker
	Number of Cafes	LAU2 data	Statistics
	Sociability	LAU2 data	observation
Perception	Satisfaction/perception on the beauty of streets and buildings in the neighborhoods/public parks and gardens/public spaces/markets/pedestrian areas	Eurostat	Statistics
	Satisfaction/perception on the quality of public transport	Eurostat	Statistics
	Satisfaction with outdoor recreation /e.g. walking or cycling)	Eurostat	Statistics

TERMINOLOGY

Urban mobility: ability of persons to move in urban space by adopting strategies to overcome the friction of the distance that characterizes their activities (Newman & Kenworthy 1999).

Sustainable urban mobility: a set of measures designed to meet people's urban mobility needs in the present and in the future in order to ensure a better quality of life in the city and its surroundings

Sustainable mobility system: an urban transport system that adequately satisfies a citizen's daily mobility needs without (or as few as possible) incurring environmental and social external costs over time (i.e. pollution, congestion costs, etc.).

Soft mobility: includes pedestrian and cycling mobility

Sustainable Urban Mobility Plan: is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation and evaluation principles.

Modal shift: policy and process to encourage car users to use sustainable transport alternatives, such as walking, cycling and public transport.

Urban public space: refers to responsive, democratic and meaningful spaces in the city like streets, squares, plazas and urban green spaces, which are open and accessible to everyone for gathering and socializing. Public space is a public good and the pedestrian can be seen as the central figure within public spatial practice. (Gehl 1987, Lévy et al 2010).

Sustainable public space is a space that is "accessible to all" (Madanipour 1996); "Capable of containing different ways of doing, uses, activities, and functions" (Gehl 1987); Well-designed and well-managed with respect to the local context (PPS 2014b); capable of providing "comfort" (Reiter 2003), "vitality" (Lynch 1960, Schiller 1994) and favoring a vibrant urban life (Carr et al. 1992) ".

New Urbanism: is an urban design movement that promotes environmentally friendly habits by creating walkable neighborhoods containing a wide range of housing and job types. It arose in the United States in the early 1980s and has gradually influenced many aspects of real estate development, urban planning and municipal land-use strategies. The agenda of new urbanism is articulated in the charter of the Congress for the New Urbanism (CNU), founded in 1993 by a coalition of architects, planners and environmental advocates (Knaap & Talen 2003).

Notes

- (1) Bus rapid transit (BRT) is a large capacity bus network, including ordinary and rapid buses, and an electronic ticketing system.
- (2) OECD is the Organization for Economic Co-operation and Development, the EEA is the European Environmental Agency, UNCHS is the United Nations Center for Human Settlement, CSD is the United Nations Commission on Sustainable Development, and IISD the International Institute for Sustainable Development.
- (3) Today, an increasing number of smartphone Apps are available allowing recovery of journeys, routes, daily movements and such, useable for measuring sustainability of public space and mobility in real time.
- (4) Not motorized mobility.

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