

# Smart Cities And The Sharing Economy: The Evolving Nature of Urban Public Space

**CELEN PASALAR**

North Carolina State University

**GEORGE HALLOWELL**

North Carolina State University

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**Over the last decade, a new generation of city design paradigms has emerged as a result of advancing technology. Communication and sharing technologies are now a driving force in defining new spatial development. Traditionally, urban public spaces have ensured the functional operation and resource sharing of a city, with streets, plazas, and parks playing a crucial role in supporting cultural and socio-economic functions. New sharing economies allow a process for underused resources to be easily shared or transferred to others for greater benefits to an urban community. However, these sharing economies and technologies can also dramatically redefine urban public space.**

**As part of smart city development, designers are questioning the social, cultural and economic effects of a shared economy on the use and experience of public space, including the function and configuration of individual plazas, parks, and streetscapes. At this stage it is not yet clear how sharing economies will change the activities and formation of space in city parks, streets and plazas.**

**Beginning with a robust examination of relevant literature, we explore the potential impacts that sharing economies and smart technology may have on the way urban public spaces are generated, used, and altered. If space in cities is a continuum from the most public along a street, to the most intimate within our homes, this spectrum can be made ambiguous by new technologies and business platforms in a sharing economy. At the public end, streetscapes will change as autonomous cars and sharing technologies alter parking, drop-off zones and driving lanes. Sharing economies may also increase, clarify, or confuse POPS (Privately Owned Public Spaces). At the extremes of the public/privacy spectrum, we study how sharing models such as AirBnB may change the nature of our living rooms, streets and neighborhoods.**

## INTRODUCTION

Over the past ten years, North American cities have been undergoing significant change as a result of the technologies and business models of the new sharing economy. This change is also resulting in a new generation of planning and city design

paradigms. Digitally interconnected businesses and personal sharing technologies are helping to establish new formal and spatial developments and defining how public spaces function within cities. Traditionally, urban public spaces have ensured the functional operation, social meeting places and resource sharing of a city. For centuries, streets, plazas, squares and parks have played a critical role in supporting cultural, social, political, and economic functions for the benefit of society (Loukaitou-Sideris et al., 2009, p. 272; Furman, 2017; Mitchell, 1995). However, cities have struggled to foster interconnected communities and the use of urban public spaces as cars continue to claim a dominant presence in how cities are built, and as commercial and residential properties compete for prime locations in dense urban centers. While the technology propelled the sharing economy, the larger catalyst was related to the global economic downturn causing loss of jobs and homes in the early 2000s (Inspire, 2019). This drastic change caused the need for optimized resources and supplemental, flexible income, which resulted in the emergence of business models as part of sharing economy.

This study is focused on these new sharing economies and related technologies, and how they may impact the way urban public spaces are generated, used and changed. This is a crucial discussion considering how public spaces in our cities afford the way we interface socially, economically, and culturally, and they are one of our most important civilizing elements. The goal of this investigation is to prepare architects, landscape architects and planners for the rapidly changing urban landscape of the sharing economy.

Sharing economies, often defined as collaborative consumption or a peer-to-peer business models, allow a process for underused resources to be easily shared or transferred to others to create additional value or benefits to an urban community (Rinne, 2017; Schor, 2016, p. 2). For example, Uber or Lyft provide opportunities for people to make extra money by driving others. Bike sharing programs in cities also create options for people as they search for ways to save on gas and create more awareness of global carbon emissions accelerating climate change. Those who have flexibility and an extra room in their homes or apartments found ways to earn extra income by renting their bedrooms out through Airbnb or Vrbo. This activity can in turn increase business for local cafes, shops, restaurants in adjacent urban neighborhoods or districts. In addition,



Figure 1. The Highline, New York City.. Image credit: George Hallowell.

freelancers and small businesses have leveraged co-working spaces such as WeWork to provide flexibility in their work environments, while remaining connected to a business community.

Because of the evolving concept of a sharing economy, streamlining supply and demand through transforming technology has shown broad impacts beyond simple changes in business activities and models. These practices have led to the creation of shared spaces in cities that redefine how urban public and semi-public areas are being used to foster cooperation among city dwellers. As part of the ongoing smart city development and an emerging focus on human-centered design and planning, designers, policy makers, and economists are questioning the socio-cultural and economic effects of a shared economy on the use and experience of public spaces. Technology associated with sharing economies is also producing a significant impact on business models and human interactions. However, it is not clear how shared economies will continue to change the activities and formation of space in city parks, plazas, and streetscapes.

This paper first provides a review of basic theory and terminology that has guided our understanding of urban spaces by city designers and planners for many decades. It then examines each of the sharing technologies and business platforms that have arrived during the last decade, and suggests

implications for how we might better design for their use, and manage our urban public spaces in the future.

## BACKGROUND

### *The Urban Experience and Affordances of Urban Public Spaces*

Over the last half-century, architects, planners and researchers (Marcus and Francis, 1997; Gehl, 2011; Gibson, 1977; Lynch, 1960; Jacobs, 1961; Mehta, 2013; Whyte, 1980) have investigated and theorized about the way that we interact in urban public spaces, how urban spaces function, what their purposes are, how they operate, what kinds of behaviors are afforded by them, and so forth. For example, in the following scene of the Highline project in New York City (Figure 1), we see an extraordinarily successful project that interweaves public and private uses, and affords activities such as encountering, congregating, interacting and so on. Ownership, management and affordances in this project are a mixture, from privately owned retail or food vendors, to public seating, walking and viewing areas. The proximity of privately owned buildings alongside and over the elevated walkway also offers constant visual and audible connections, as well as the frequent entrances or exits and associated semi-public courtyards and plazas.

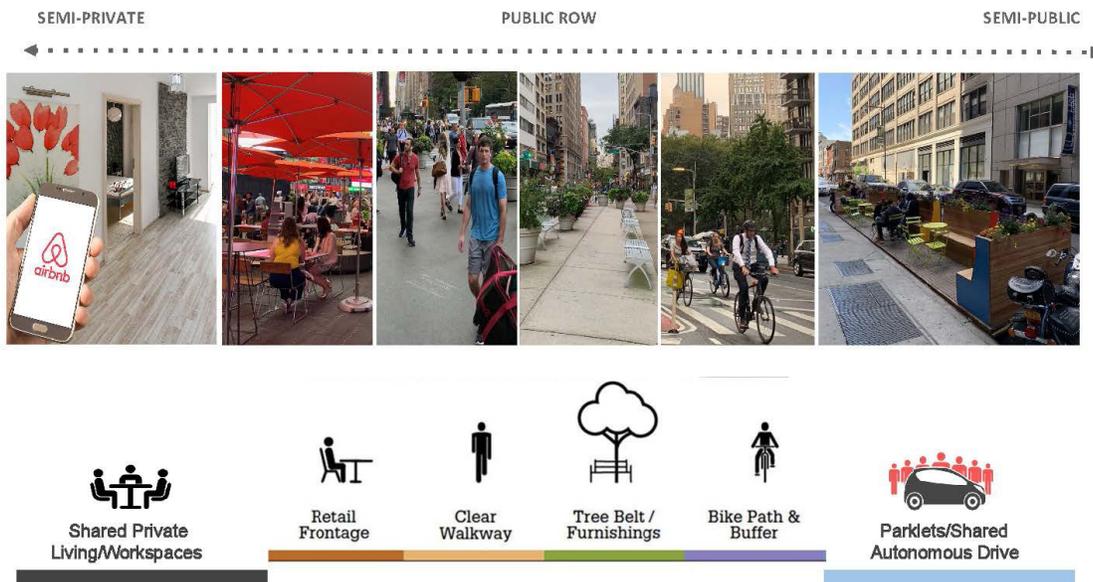


Figure 2. The new public to private transect of the sharing economy. Image credit: Authors

Public spaces have historically functioned as the socio-economic center of our cities, and just as in the ancient agora or medieval streetscape have often been a mixture of both public and private uses. However, those spatial patterns are likely to change with the advent of a sharing economy. Hence, it is essential that a few concepts and terms should be considered and reviewed.

Leary-Owhin (2016) presents the implications of Lefebvre’s three types of space; abstract space, differential space and counter projects. Lefebvre (1991) uses the term differential space to describe places that are often in transition, and which prioritize human-use value over economic value. This further emphasizes the complexities of public and private interests on space, and asks how social struggles and changes contribute to urban development and evolving demands by our societies. This results in the expectations that cities spatially need to adapt and evolve to changing social, political, and economic circumstances (Leary-Owhin, 2016). Streets, squares, plazas and parks, in their role as public or semi-public spaces contribute to the creation and reproduction of urban life and society. According to Leary-Owhin (2016) public space is always a work in progress and is never a finished product. In that sense, Lefebvre also problematizes urban space, emphasizing that public space is not

simply a neutral container but it is a reconceptualization of both material product and social process (ibid, 2016).

According to Chen (2017) the sharing of urban public or semi-public spaces, compared to ordinary goods, has implications on the use of those spaces. The sharing of urban plazas, parks and streets, however, are faced with more challenges and problems at both overall and local levels than are the sharing of ordinary goods. The spatial forming process is often determined or controlled by different authorities including parks and recreation, transportation, urban management, and so on. The process of forming a public space and the fragmented ways of managing these spaces have resulted in governance and management issues, but often produces a high quality supply of public spaces (Chen, 2017).

Madanipour (2003) theorizes that private and public spaces influence and continuously shape each other and are therefore essentially interdependent. As these two space components push and pull against each other, the boundary between them, and indistinct areas of semi-privacy, can blur and change. Public and private spaces are a continuum where semi-public or semi-private spaces interact, identifying various levels of either private or public nature without a discrete separation (Madanipour, 2003, p. 210; Gehl, 1971, p. 59). However, it can

be argued that this continuum of public to private in the urban realm of our cities is changing relatively quickly as a result of the evolving technologies and economic practices of a sharing economy. This inquiry is particularly focused on the edges and boundaries of this continuum, from the most public, such as the corridor of the street to the intimate privacy within our homes, and how they are being shifted or blurred by the technologies and economic practices of the sharing economy.

### **Sharing Economy**

As noted earlier, the term ‘sharing economy’ refers to the mechanism of collaborative consumption, providing a process for underused resources to be easily shared or transferred to others to create more value or bring more benefits to society. Over the last decade, the concept of a sharing economy has attracted a great deal of attention (Rainwater, 2018; Jiao and Bai, 2019). There is no universal definition of the term - sharing economy. However, there is a common understanding of the concept among researchers and businesses in the field. With the rapid development of information and communications technologies, the concept of shared economy has been merged with collaborative economies and collaborative consumption as the peer-to-peer-based activities of obtaining, giving, or sharing the access to goods and services (Hamari, Sjöklint, and Ukkonen, 2016).

Shor (2014) suggests four discrete categories of sharing in order to further sort the concept into more understandable functional areas: 1) the recirculation of goods, 2) increased utilization of durable assets, 3) exchange of services, and 4) sharing of productive assets. Chen (2017) contends that the joint use of underused resources can produce additional benefits at a minimal cost for users renting or sharing them. In a sharing economy, people are more often concerned with an ability to use rather than possess in the process of social sharing, in areas such as real estate, ordinary goods, or vehicles (Chen, 2017). With the support of online platforms, sharing economy connects decentralized users and suppliers into a collective network with common interests. Chen (2017) also notes that a sharing economy allows the individual to perform as a resource or service provider, enabling users and providers to communicate through an open exchange system that enhances the efficiency of resource use.

While investigating how sharing economies might be changing the nature of urban public spaces, this inquiry focuses on the increased utilization of resources, such as car or ride sharing, house sharing, and sharing of productive assets (such as office space sharing, e.g. WeWork). In both cases, the intent is to understand the spatial implications of these services and the crucial goal of envisioning the formation and use of future urban spaces.

### **Urban Public Space and Transect**

In order to help understand how urban public spaces may be altered by sharing technologies and their business platforms,

the continuum of public to private within urban public areas as well as the private buildings and spaces that surround them must be reconsidered. Borrowing the term transect helps us to depict this public to semi-public to private continuum. Until the late 20th Century, a traditional transect existed from public to private, running perpendicularly from the centerline of the street - the most public zone - to the privacy of individual homes alongside the road. Although it is easier to demonstrate a transect when talking about a section cut perpendicular to the centerline of a street, the same transect also holds true along the edges of all urban public spaces. Where a public space, park, or plaza abuts private buildings, there is a transition from the most public spaces of the plaza to the privacy inside buildings or privately controlled areas along the edges of the public spaces.

Although a transect at a residential street would depict a common scene from the latter-half of the 20th century across many cities in the U.S., it could also apply to similar urban street scenes as far back as ancient Rome or Greece; with comparable social and spatial methods to protect and separate the public from the private, such as sidewalks, fences, yards, stoops, porches, and the permeable front wall of homes or private businesses. Over the last two decades, we have seen changes occurring with the 20th century public/private transect as we upgrade our streets to more environmentally and socially appropriate designs, such as complete streets. As architects and planners, we must consider how a sharing economy and associated technologies will change the public to private transect at streets and public spaces in order to envision and plan for changes to the urban landscape.

In this transect diagram (Figure 2), we see a clear demarcation of transition from the most public in the center through layers of bike paths, walkway, and retail frontage to the most private spaces inside the building on the far left and right. The idea of complete street guidelines and development has been a very positive direction for our cities. But how this diagram, showing layers of transition from the public zone of the street to the inside of the building will change, should be considered as more and more sharing technologies are added to the way streetscapes function.

Jan Gehl (1971), prescribes a probabilistic concept concerning the relationship between design and behavior within public spaces. Gehl contends that by providing the necessary ingredients for activities, designers can influence how many people use public urban spaces. They can also sway how long individual or group activities will last in those spaces, and which types of activities can easily occur (Carmona et al., 2012, p. 107). Public spaces such as streets, plazas, and parks afford the opportunity for people to be “among, to see and to hear others, to experience other people functioning in various situations” (Gehl, 1971, p. 9-14). Gehl also divides contact opportunities into a range of three activities from low contact intensity to high contact intensity. At the lowest end of his scale are necessary activities that are essential, such as walking to work or school or delivering the mail, and so forth. Since they have no choice



Figure 3. Traffic lanes along Broadway are converted to gathering spaces in New York City. Image credit: George Hallowell.

in being there, they are only slightly influenced by the setting. The middle of the range of influence are optional activities, such as sitting at a sidewalk cafe or watching people. Because these optional activities are voluntary, they are more influenced by affordances for sitting or playing and provide richer involvement in the space. Social activities at the highest order of contact depend on the presence of other people in the space to accomplish social contacts, such as greeting or conversation. These social activities can occur spontaneously as a result of sitting or moving through the space, and are supported by affordances that allow longer periods of communal activities, such as tables and chairs, or simple sport functions. Essentially, in poorly designed public spaces, only the most necessary activities will occur, but in higher quality spaces, necessary activities will continue to exist at the same rate, but people will choose to spend more time in the space with richer and more durable social connectedness.

It is worth considering how Gehl's lowest order necessary activities in urban public spaces will change with new technologies and the sharing economy. If the daily trip to work is comprised of merely scheduling an Uber and walking directly to the car upon its arrival, it is not clear that any accidental or impromptu social interaction will remain. Some have argued that with car ride and other forms of sharing through organizations such as Uber or Airbnb, social interactions and

the possibilities for longer term connections has increased. However, the limited range of studies focused on sharing and social connections have shown mixed results. One study of car sharing found "that the two parties to the transaction often never met on account of remote access technology" (Schor, 2016, p.6; Fenton, 2013). Some sharing websites advertise social connections as a benefit of their activities, but the evidence for prolonged social connections developing from sharing are not clear at this point (Shor, 2016). Further research is needed to develop a better understanding of the resilience of potential social connections from the new sharing economy.

## TRANSFORMATIVE TECHNOLOGIES AND BUSINESS MODELS

### *Ride Sharing and the Driverless City*

The use of ride sharing and autonomous vehicles is inevitable, and for some they will either eliminate car crashes and save the environment, or for others they will endanger pedestrians and create gridlock. Despite the divide over the impact of this technology, as designers, we should anticipate and plan for the future effects of self-driving cars. For example, will they require drop-off zones, and how will they interact with pedestrians? It is incumbent on us to research, design, and plan for the rapidly approaching changes arising from shared and



Figure 4. Traffic lanes along Broadway are converted to gathering spaces in New York City. Image credit: George Hallowell.

driverless vehicles as an opportunity for inclusive and positive urban change.

As parking space for private cars is reduced through the use of ride sharing and automated vehicles, a remarkable resource is being created along city streetscapes, and this transformation should accelerate as sharing and the use of automated technologies increase. Some of the most heavily used streets in New York are being converted to parklets or pedestrian gathering spaces as designers plan for a future with less private vehicles. Along Broadway and in Times Square, road surfaces that were formerly heavy traffic zones have become pedestrian gathering spaces, and often include retail/food booths, bike lanes and scooter or bike rental stands (see Figure 3).

As street traffic and private parking spaces along city streets are further liberated by sharing technologies and automated vehicles, architects, landscape architects and city planners have the opportunity to design for these new opportunities. In the congested downtowns of older cities around the world such as New Orleans or Singapore, it has become common place to see streets being converted to pedestrian and retail spaces, with a blurred edge between what is private and what is public. Figure 4 shows a city street in Singapore that can function as a vehicular or pedestrian/retail zone at different times of the day and year. The transect between public and private becomes fluid as the street changes function.

### ***Privately Owned Public Spaces***

Another concept of sharing in urban spaces that this study looks at is Privately-Owned Public Spaces, (POPS) that are dedicated to public use and enjoyment, but owned and maintained by private property owners, often in exchange for bonus floor area or waivers. POPS were first introduced as a part of zoning regulations in New York City in 1961.

There are now more than 550 POPS in NYC alone, and they provide a myriad of opportunities to sit, relax, people watch, eat, and meet others. They provide an opportunity to partake and enjoy urban life in one of the world's greatest cities. POPS come in many shapes and sizes, both outdoor and indoor, and offer a variety of amenities. POPS are often the result of City zoning ordinances aimed at ensuring the densest areas of a city can still offer a measure of open public space and greenery. POPS can be sunny or shaded plazas or sitting areas in indoor atriums, where users can enjoy their lunch or simply allow new places to gather and congregate.

In successful POPS, sometimes the shared urban space and economy becomes entirely subsumed by private functions. The public to private transect begins to be taken over by the private function. The City of New York POPS enforcement calls this "cafe creep". At worst, POPS are barren, vacant lobbies, or simply,

and often illegally, inaccessible. For example, Trump Tower in NYC is one of many properties around the city to benefit from a city program allowing real estate breaks in exchange for setting aside public space. The reality of the Trump Tower Lobby is that it is now very inaccessible.

### ***Residential and Workplace Sharing***

Another form of sharing that is undergoing rapid growth is house or apartment sharing. In recent years, a number of studies have looked at large and small scale problems associated with short term vacation rentals such as VRBO and AirBnB (Frenken and Schor, 2017; Cheng and Foley, 2018). Often these studies focus on considerations such as intensive gentrification, exclusion, and prohibitive rents or housing costs. But also of concern, although less studied, is the rapid change that occurs in neighborhoods in identity, social, cultural, and public-to-private terms, such as the cultural-social shift taking place in the Treme neighborhood of New Orleans (Peck and Maldonado, 2017). What is clear in many instances, is that the home sharing market in a community can relate to profound changes in the character of the neighborhood.

Workplace sharing has also become an increasing function in the commercial and downtown cores of North American cities. Commercial enterprises at both large and small scales sometimes find it easier and more flexible to rent co-working space rather than committing to long term contracts for private business buildings (Cohen and Muñoz, 2016; Roth and Mirchandani, 2016). This has indeed become a trend in cities like Seattle and New York. The trend of renting co-working spaces for both large and small businesses has even expanded out into public plazas and park spaces causing a shift in the public and private transect.

## **DISCUSSION AND CONCLUSION**

Advancing sharing technologies and business models are providing new opportunities in response to current urban challenges. As technologies continue to evolve, businesses investing in the concept of sharing are causing changes in the use of public spaces and related social behaviors. As part of ongoing smart city discussions, planners, designers, and economists are looking into these concepts and questioning the socio-cultural and economic effects of a sharing economy on the use of public space. It is apparent that there are spatial implications from these technologies and services, and the pressing need to envision the design of future urban public spaces with a human-centered focus.

Open spaces in cities are a transect from the most public along a street, to the most intimate spaces in our homes. This spectrum, though, is made ambiguous by the technologies and socio-economic and cultural practices within the sharing economy. At the public end, the use of streetscapes that change as autonomous cars and sharing technologies alter parking and drop-off zones, as well as the use of the road itself. Privately Owned Public Spaces (POPS), blur the line between private and

public use of urban areas such as plazas, parks, and even building lobbies. Streets, sidewalks, and porches can all be altered by the technology and economics of sharing. At the extremes of the public/privacy spectrum, sharing business models such as AirBnB may change the nature of our living rooms, streets and neighborhoods.

The unintended results of the sharing economy and technological changes, may create urban public spaces that are unsafe or unsuccessful, and therefore will require close attention to the ways we might reconfigure the design of our current streets and public spaces, and even our own homes (Furman, 2017).

The immediate and observed influences of sharing economies and technologies, are by no means the end of this rapid change. It is predicted that as autonomous vehicles and future advancements in information sharing apps continue to evolve, more changes will be seen in human behaviors and the use of the environment. This will then contribute to further alterations in the ways that streetscapes and urban open spaces are designed. It is incumbent on designers and planners to be agile enough to study and accommodate the resulting changes as they occur. Opportunities and challenges that we must respond to include an understanding of how the public to private transect in our urban spaces, streets and buildings will change as a consequence of sharing. Part of researching and predicting design challenges and opportunities for the future also require that we establish baselines that can be used to determine change over time.

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