# University of Baltimore Journal of Land and Development

2018

# How Will Technology Change Cities?

Klaus Philipsen

Follow this and additional works at: https://scholarworks.law.ubalt.edu/ubjld

Part of the Land Use Law Commons

## Recommended Citation

# ARTICLES

## HOW WILL TECHNOLOGY CHANGE CITIES?

### Klaus Philipsen

I. INTRODUCTION

Cities have always been shaped by their geography[1] in combination with available technology. In early history, navigable waters and shipping technology were most influential[2] Cities shaped this way include Athens, Venice, Istanbul, and Baltimore to name just a few. Later, the industrial revolution shaped cities like no other technological change before[3], adding the railroad as a significant means of transport[4] It made cities grow rapidly, brought about cheaply built worker tenements and conflicts arising from incompatible uses. In response, a regulatory framework known as zoning was created. Its initial purpose was to segregate polluting and noisy manufacturing industries from residential sections of town[5] Baked into zoning was the inequity which resulted from where pollution and noise was placed, and which communities had to live downwind from it. Baltimore's national importance peaked when it was an industrial hub. Its port helped to move goods but also attracted immigrants from many, mostly European, countries. African Americans fleeing the slave economy of the south came here to seek employment.[6]

In the change-over from the industrial economy to the service economy, the automobile and the airplane emerged as newly dominant means of

---

1. Donald Davis and Jonathan Dingel, *The Comparative Advantage of Cities*, JONATHAN DINGEL, 4-6 (2017), http://faculty.chicagobooth.edu/jonathan.dingel/.
2. Greg Clark, *Global Cities: A Short History*, BROOKINGS, (Nov. 28, 2016), https://www.brookings.edu/blog/the-avenue/2016/11/23/global-cities-a-short-history/.
3. *The Transformation of Cities and the Urban Experience*, UNIVERSTIY OF WISCONSIN GREEN BAY, (Spring, 2016), http://foundations.uwgb.org/industrialization-and-the-transformation-of-cities-in-the-urban-experience/.
4. *Railroad Towns*, UNIVERSTIY OF GRONINGEN, http://www.let.rug.nl/usa/essays/1801-1900/the-iron-horse/railroad-towns.php
5. Laurence C. Gerckens, *American Zoning & the Physical Isolation of Uses*, PLAN COMM'RS J., (Summer, 1994), http://plannersweb.com/wp-content/uploads/1994/07/5731.pdf.
6. Baltimore Department of Planning, *The City of Baltimore Comprehensive Masterplan*, 26 (2006), https://planning.baltimorecity.gov/sites/default/files/LEPL11.21.06Small.pdf.

transportation and deleted some of the prior geospatial advantages of histor-ically important cities, opening up opportunities for previously insignificant inland places. Baltimore didn't fare well in the post-industrial phase: Its man-ufacturing base shrunk and its population loss was as high as a third of its peak[7], leaving large parts of the city disinvested. Other industrial cities such Pittsburgh, Cleveland, and Detroit lost more than half of their population.[8]

The current shift of the US economy towards a knowledge economy[9] brings further change. The technology of the knowledge economy is the com-puter. Computers and their mobile version, the "smart" phone, are a global phenomenon; some argue it has made the world "flat"[10], meaning that geo-graphic and historic advantages recede in favor of a global competition in which people are highly mobile and highly connected. It is pertinent to ask, how technology will further change cities in general and Baltimore in partic-ular. The question gains further importance because our time has been de-clared *the age of cities* with now more than half the world's population being concentrated in metropolitan areas.[11]

Globally cities operate simultaneously in the industrial, in the service, and in the knowledge economy, the size of each sector is depending on the state of a country's economy. Cities in many developed countries undergo a post-industrial renaissance whereas in developing countries, cities still draw people from rural areas as part of their contemporary industrial revolution. Certain technologies such as the computer have become universal across all global developmental stages allowing consideration of large sets of data and more evidence based decision making. It isn't yet obvious how this affects the form of urban development. On the other hand, certain applications of computers let technologies emerge which will certainly shape cities. Two

---

7.  Natalie Sherman, *Baltimore population falls, nearing a 100 year low, US census says*, THE BALTIMORE SUN, (March 23, 2017), http://www.balti-moresun.com/news/maryland/baltimore-city/bs-bz-baltimore-population-loss-jumps-20170322-story.html.

8.  Campbell Gibson, *Population of the 100 largest Cities and other urban places in the US 1790-1990*, US BUREAU OF CENSUS, (JULY, 1998), https://www.cen-sus.gov/population/www/documentation/twps0027/twps0027.html

9.  Walter W. Powell, Kaisa Snellman, *The Knowledge Economy*, STAN. UNIV. LAW. LIB., (Feb. 20, 2004), https://scholar.harvard.edu/files/kaisa/files/powell_snell-man.pdf.

10.  Thomas Friedman, *The World is Flat 3.0: A Brief History of the Twenty-first Cen-tury*, PICADOR, (2007), https://www.chinhnghia.com/Fried-man_the%20world%20is%20flat.pdf.

11.  United Nations, *World's population increasingly urban with more than half living in urban areas*, UN REPORT, (July 10, 2014), http://www.un.org/en/develop-ment/desa/news/population/world-urbanization-prospects-2014.html.

stand out with a large potential for physical change: The autonomous vehicle (AV) and the change of work through automation, robots, and artificial intelligence (AI). "Post- work" cities will likely first emerge in countries most progressed towards the knowledge economy[12] This article will explore the impacts of the ubiquitous computing power and data based city planning (smart cities), the autonomous vehicles, and the conversion of production and services through robots and artificial intelligence will have.

## II.  PROBLEM

Technology is not a purpose in itself and as such is not necessarily good or bad. Yet, there are veritable powers behind technology, not least the companies selling it either as hardware or as software. The IT industry is in hot pursuit of cities. In 2014, Nanette Byrnes asked in the MIT Business Report "can technology help manage rapid population expansion while also nurturing cities' all-important role as an economic driver?"[13] She adds that "selling answers to that question has become a big business."[14] IBM, Cisco, Hitachi, Siemens, and others have taken aim at this market, publicizing successful examples of cities that have used their technology to tackle the challenges of parking, traffic, transportation, weather, energy use, water management, and policing. Cities already spend a billion dollars a year on these systems, and that's expected to grow to $12 billion a year or more in the next 10 years.[15] Many mayors and urban administrations buy the promise of a better city through technology. Baltimore's mayor created a position at the "Mayor's Office of Information Technology" (MOIT). Mayor Pugh said: "I want us to be a smart city but it certainly starts with the kind of technology that we implement."[16]

Urban data collection and data based governance brought about the notion of "*smart cities*", a term now in use worldwide[17]across all

---

12.  Geoff Colvin, *Planning for the No-Jobs, Post-Work Economy*, FORTUNE, (Dec. 8, 2015), http://fortune.com/2015/12/08/post-work-economy-tech-disruption-jobs/.

13.  Nanette Byrnes, *Cities Find Rewards in Cheap Technologies*, MIT TECHNOLOGY REVIEW, (Nov. 18, 2014), https://www.technologyreview.com/s/532466/cities-find-rewards-in-cheap-technologies/?set=532461.

14.  Stephen Babcock, *Mayor Pugh names new MOIT director*, TECHNICAL.LY BALTIMORE, (Sep. 6, 2017), https://technical.ly/baltimore/2017/09/06/mayor-pugh-names-new-moit-director/.

15.  *Id*.

16.  Byrnes, *supra* note 13.

17.  Babcock, *supra* note 14.

18.  Vito Albini & Umberto Berardi & Rosa Dangelico, *Smart Cities: Definitions, Dimensions, Performance, and Initiatives*. J. OF URB. TECH., https://pdfs.semanticscholar.org/656e/4fb0564d96407161d9e541a9ca15375d6c60.pdf.

developmental stages. In India urbanization is rapid and caused Prime Minister Modi to issue a *smart city challenge*[18] with the goal of modernizing urban India and making at least 100 metro areas "smart". But what does it mean for a city to be smart? Does it mean evidence based governance and management, more efficient use of resources, or can it also solve some of the deeper problems plaguing cities such as lack of equity? Everybody wants to be prudent and efficient as opposed to being wasteful, but if efficiency is applied to unjust or otherwise principally flawed practices, more efficiency may not even be desirable. In using technology, it is of utmost importance, to not simply grease the wheels of its implementation, but to ask what outcomes are desirable? We will investigate this in the following chapters.

When approaching the topic of smart city and data based decision making, it is useful to understand that urban planning is a "wicked problem"[19] City planning is not a strict science where a problem be resolved with mathematical equations, however complex they may be. In city planning there are just too many variables. Rittel reminded people already in the 1970s that measuring efficiency isn't sufficient in planning without a thorough investigation of what questions are asked, what outputs are being desired and what metrics are used for what purpose.[20]

In pursuit of an answer to the question how cities can become "smart", it is useful to be mindful of Rittel's admonition that values and context are more important than technology per se, yet value and context are frequently left out of discussions about technology. Liu and Puentes write "a smart city should be economically-driven, not technology-driven. A technology-first approach to smart city development, without a clear map of a city's future direction, will often lead to new technology that will fail to result in sustained, community-wide change."[21]

Not all new technologies alter cities visibly. Water and sewer pipes initially changed cities by removing open sewage and higher density. But if those pipes now become "smart" through sensors which report flow problems or leaks the change remains invisible. Traffic signals can be equipped with sensors as well to coordinate traffic with sophisticated programs which respond to volume not only at one intersection, but within an entire network of

19.  Amy Liu, Robert Puentes, *Delivering on the Promise of India's Smart Cities*, BROOKINGS, (Jan. 20. 2015), https://www.brookings.edu/research/delivering-on-the-promise-of-indias-smart-cities/.

20.  Horst Rittel, Melvin Webber, *Dilemmas in a General Theory of Planning*, POLICY SCIENCES, 155, (1973), http://urbanpolicy.net/wp-content/uploads/2012/11/Rittel+Webber_1973_PolicySciences4-2.pdf.

21.  *Id*. at 155.

22.  Puentes, *supra* note 19. at 58.

roads and could successfully optimize traffic flow and even differentiate between cars and transit. Yet, even this would hardly be noticed or visible.

Similarly, smart technology serving better governance isn't physical and remains invisible. If better governance simply means to do the same just with metrics and measures for efficiency as in *Baltimore's CitiStat program*[22], inaugurated by then Baltimore Mayor O'Malley, an opportunity for a qualitative change may be missed. While technology is applied in the service of efficiency, the question "to what end" would be better and would, for example, avoid optimizing undesirable outcomes. In the investigation of what autonomous vehicles and artificial intelligence could mean to cities and their physical form, the question of purpose and value will be central.

## III. THE AUTONOMOUS VEHICLE "AV"

Recently, an automobile driving in autonomous mode killed the first pedestrian ever.[23] As a result, the autonomous vehicle became the focus of mass media and public debates about the technology and its safety. The post crash debate maintained the technology focus which surrounded the conversation about AVs: the cameras, the radar, the artificial intelligence that makes vehicles "learn" and the liability issues which come with those technologies. How reliable can the technology can be and what impacts have AVs would have on the existing laws set up around the automobile and driver liability?

The Trolley Dilemma[24] with the famous question whether it was more ethical to run over one person versus over a group to save a life was applied to illustrate the dilemma of the AV and the question how an onboard computer should be ethically programmed?[25] While those questions are certainly interesting, they do not get to the bigger issues of discussing the purpose of transportation and in what way AVs could potentially re-shape cities by deeply influencing future land use and development. Even superficial

23. City of Baltimore, *CitiStatSMART Meetings*, MAYORS OFFICE OF SUSTAINABLE SOLUTIONS, https://moss-citistatsmart.baltimorecity.gov/citistatsmart-meetings.
24. Sam Levin & Julia Carrie Wong, *Self-driving Uber Kills Arizona woman in first fatal crash involving pedestrian*, THE GUARDIAN, (March 19, 2018), https://www.theguardian.com/technology/2018/mar/19/uber-self-driving-car-kills-woman-arizona-tempe.
25. Judith J. Thomson, *The Trolley Problem*, 94 YALE L.J. 1395, 1395-96, (1985), http://waleszczynski.pl/wp-content/uploads/sites/4/2016/02/trolley_j_thomson.pdf (giving a general overview of the trolley problem).
26. Aarian Marshall, *Lawyers not Ethicists will solve the Robocar Trolley Problem*, WIRED, 5/28/2017, https://www.wired.com/2017/05/autonomous-vehicles-trolley-problem/.

investigations make it quickly apparent that the AV will change how much capacity current roads will have, how long it will take to go places, and most importantly, how people whom the technology converts from drivers to passengers experience their trip?[26]

Moving by car has defined the current built environment.[27] It is less clear in which way a self-driving car will affect people's decisions about where they live, work, and how far they are willing to commute. Two physical revolutions appear possible: one which would put the still dominant American dispersed low density pattern of development ("sprawl") on steroids because people would accept far longer commutes if they don't have to drive but ride in an individually owned vehicle where they can do other things in relative privacy. An in many ways opposite outcome would be one in which AVs are not privately owned but predominantly fleet vehicles that come on command, drop riders off and like a taxi or ride share vehicle today serves many riders during the course of a day without the need to park for extended periods. As a result, cities could re-purpose much of the space devoted to parking for green spaces, pedestrians, or retail. This could make cities much more pleasant and could result in denser more concentrated developments to make the share vehicle even more efficient. These two futures[28] are almost mutually exclusive, with the density model being vastly more sustainable. Yet, there is very little public discussion how the calamitous outcome of more sprawl could be averted or how the desirable one of more livable communities could be incentivized.

As we have seen, which of these scenarios will become reality will chiefly depend on whether AVs will operate as private vehicles or whether the AV will lead to a further increase in ride sharing and a deployment of fleet based vehicles which are hired for use and not owned by the individuals who need them for a ride. Which of these operational models will be prevail is to a large extent a result of policies. Will decades of policies which subsidized and furthered the possession of a private automobile give way to new policies that focus on mobility, sustainability, and better cities?

Ride sharing has become very popular in recent years, in part fueled

---

27.  David Metz, *Developing Policy for Urban Autonomous Vehicles: Impact on Congestion*, URBAN SCIENCE, (APR.13,2018), HTTPS://WWW.MDPI.COM/2413-8851/2/2/33/HTM.

28.  Martin Melosi, *The Automobile and the Environment in American History*, THE UNIVERSITY OF MICHIGAN, (2016), http://www.autolife.umd.umich.edu/Environment/E_Overview/E_Overview6.htm.

29.  Eric Phillips, *The Future of Autonomous Vehicles in American Cities*, 21 NYU J. LEGIS & PUB. POL'Y 287, (2018), http://www.nyujlpp.org/wp-content/uploads/2018/06/Legis-21-1-Note-Phillips-FutureAutonomousVehicle.pdf

by the financial crisis and the resulting reduction of how much people drive[29], how many people own one or more automobiles and which mode of transportation they prefer. When the economy recovered, and gasoline prices fell against all previous predictions, vehicle miles traveled increased again.[30] Still, car ownership among the youth was low for some time.[31]

This has given ride sharing such a boost that cities now recognize that fleet-based car sharing in itself isn't a way to reduce traffic and get better cities. It turns out ride sharing reduces the number of vehicles parked, but through demand arising simply from the availability of the services has the potential of increasing the number of vehicles on an urban street and contributing to congestion.[32]

Even in its current traditional set-up in non-autonomous driver operated vehicles, the expected positive effects on cities (less private cars) are overshadowed by unexpected effects such as additional trips causing congestion from too many roving ride share vehicles looking for a fare.[33] Already, cities like New York and San Francisco are considering measures to limit the endless fleets of transportation network companies (TNC) such as Uber and Lyft, which do not operate under the traditional taxi licenses. San Francisco County Transportation Authority modeled, and mapped a slew of their own traffic data, since they didn't get data from the ride share companies, to estimate where, when, and how many TNC trips occur every day. Their analysis found that about 15 percent of car trips, and 9 percent of trips in any mode are made by TNCs.[34] Automated, self-driving car share vehicles would be

30. Alternative Fuels Data Center, *Annual Vehicle Miles Traveled in the US 1971-2013*, US DEP'T OF ENERGY, https://www.afdc.energy.gov/data/.

31. Angie Schmitt, *America's Car Ownership Rate Higher Now Than Before the Recession*, STREETSBLOG, (Oct. 10, 2017), https://usa.streetsblog.org/2017/10/10/americas-car-ownership-rate-higher-now-than-before-the-recession/.

32. Nicholas Klein, Michael Smart, *Millenials and Car Ownership:Less Money, Fewer Cars*, TRANSPORT POLICY, (Apr. 24, 2016), https://www.researchgate.net/publication/308021126.

33. Bruce Schaller, *The New Automobility: Lyft, Uber and the Future of American Cities*, SCHALLER CONSULTING, HTTP://WWW.SCHALLERCONSULT.COM/RIDESERVICES/AUTOMOBILITY.HTM.

34. University of Michigan Energy Institute, *Weekly Briefing,* (February 20, 2018_, https://www.researchgate.net/publication/308021126_Millennials_and_car_ownership_Less_money_fewer_carshttp://energy.umich.edu/sites/default/files/umei_weekly_02_20_18_do_ride_hailing_platforms_increase_congestion.pdf.

35. *TNCs today, a Profile of San Francisco Transportation Network Company Activity*, SAN FRANCISCO COUNTY TRANSPORTATION AUTHOURITY, (June, 2017), https://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs_Today_112917.pdf.

vastly cheaper since no driver has to be paid which could lead to further increase of AVs roaming the street, potentially in service for frivolous errands, such as getting a café latte from a nearby coffee shop. Cheap AVs can also seriously imperil fixed route transit.[35] If even the fleet-based AV can represent a potential threat to a livable city, the privately owned AV would cause chaos. From tests and models many experts expect that, once they would be the predominant form of transportation, the AV would increase road capacity through denser and better coordinated driving.[36] If this would come to pass, especially freeways would see less congestion and potentially entice additional driving, an effect that is known as induced demand.[37] If the car drives itself, it could become a mobile office and make even long trips more bearable by eliminating the stress of driving, which is frequently seen as a strong deterrent for very long commutes. As a result of less congestion and less stress people could decide to live even further away from their work. The sprawl effect could be stunning. It appears clear that policy is needed to avoid undesirable outcomes. More discussion about desirable outcomes and more research and data about alternative scenarios such as fleet-based AVs and privately owned vehicles would facilitate consensus about which policies to enact.

Public policies and fees for parking, fuel, congestion, or regulations managing TNCs can incentivize or stifle a shift from private cars to TNCs. For example, Uber and Lyft are prohibited from operating in many European cities lest they would follow the licensing process established for taxis.[38] The State of Maryland has created an AV task force, (The Maryland Connected and Automated Vehicles (CAV) Working Group), but in the first 10 meetings which took place since the creation of the group, the agenda was mostly

---

36.  Bruce Schaller, *Growth and Impacts of New Mobility Services*, SCHALLER CONSULTING (January 2018), http://www.schallerconsult.com/rideservices/schal-lertrb2018.pptx

37.  Martin Hartman, Nassim Motamedidehkordi, Sabine Krause, Silja Hoffmann, Peter Vortisch, & , Fritz Busch. *Impact of Automated Vehicles on Capacity of the German Freeway Network.* (Oct., 2017), https://www.researchgate.net/publica-tion/320868890_Impact_of_Automated_Vehicles_on_Capacity_of_the_Ger-man_Freeway_Network.

38.  Todd Litman, *Generated Traffic and Induced Travel*, VICTORIA TRANSPORT POLICY INSTITUTE, (Nov. 6, 2011), http://usa.streetsblog.org/wp-content/up-loads/sites/5/2012/07/gentraf.pdf.

39.  Rob Davies, *Uber suffers legal setback in France and Germany*, THE GUARDIAN, (June 9, 2016), https://www.theguardian.com/technology/2016/jun/09/uber-suf-fers-legal-setbacks-in-france-and-germany.

technology and liability driven. Topics included technology, driver's licenses, infrastructure needed for AVs, manufacturer's testing, and the implications for the Maryland Transit Administration, data collection through connected vehicles, truck platooning, and regulations.

The impact of the AV on urban planning has only come up in a couple of presentations about smart growth and what else the state should be thinking about. One slide made reference to "urban planning for streets"[39] and through a suggestion to "Implement Land Use Policies and Parking Requirements to support market penetration of [shared AVs] at transit nodes and other activity centers".[40] Meanwhile urban development continues without much consideration of the AV in general, regardless of the form of ownership. Cranes tower over newly erected buildings on top of giant parking garages. Garages continue to be constructed either above or below ground, frequently even with those sloping floors acting as ramps which will prevent any other use than driving and parking cars on it. Commenting on the dead investment that these garages represent, developers often refer to the banks who make funding dependent on constructing parking. In a recent exchange between a Baltimore design review panel and a developer, panelists asked if a 10-floor 550-space garage was really needed for the proposed 20 story office building, the developers responded that "you need to supply what's good for the next five years".[41] Investing money in traditional parking to store cars which are on average parked 95% of the time[42] seems to be a perilous strategy when that demand could drastically diminish if shared vehicles would continue to be a popular choice.

The continued willingness to readily sink huge amounts of capital into frequently no revenue producing concrete is an especially curious thing when one considers the long amortization times for those investments. The time it

40. Anuja Sonalker, *State Strategies For Cav – Smart Growth, Planning & Opportunities For Collaboration*, MOTOR VEHICLE ADMINISTRATION (2017), http://www.mva.maryland.gov/safety/CAVAugust28STEEROK_ForPublicRelease1_003.pdf.

41. Dr. Johanna Zmud, *Strategies to Advance Automated and Connected Vehicles: A Primer for State and Local Decision Makers*, MOTOR VEHICLE ADMINISTRATION (2017), http://www.mva.maryland.gov/_resources/docs/Zmud-Texas-AM-Transporation-Institute.pdf.

42. Melody Simmons, *Merritt receives preliminary OK for 20-story office tower in Canton*, BALTIMORE BUSINESS JOURNAL (Feb. 16, 2018, 10:00 AM), https://www.bizjournals.com/baltimore/news/2018/02/15/merritt-properties-office-tower-canton.html.

43. Paul Barter, *Cars are parked 95% of the time. Let's check!*, REINVENTING PARKING BLOG, ( Feb. 22, 2013), https://www.reinventingparking.org/2013/02/cars-are-parked-95-of-time-lets-check.html

takes the new technologies of autonomous cars, taxis, buses, and trucks to become common could be short, given the accelerating pace of technological innovation taking hold.[43] If one contemplates a future city in which the urban land area devoted to circulation and off-street parking could be repurposed and redesigned, a very different city emerges as a possibility. No matter what the time-frame of predictions, when AVs will become commonplace, the opportunities for reclaiming space from cars for better walkways, bikeways, and green spaces are enormous. Those alternatives represent not only immediate cost savings for developers but can also become a boon for cities. More intensely used cities, in turn boost municipal revenue and eventually add value to all real estate.[44] Even though the technological frontiers for deploying AVs are already being crossed, transportation planners and engineers are largely in the dark about the potential impact of such technologies on urban form and land use patterns, beginning with the change on parking demand.[45] "Today, in the second decade of the 21st century, and as we anticipate the arrival of self-driving vehicles on city streets, we have a historic opportunity to reclaim the street and to correct the mistakes of a century of urban planning. This adaptation starts with a plan"[46] says Janette Sadik Khan, the previous New York City transportation commissioner who oversaw the transformation of Times Square from a space for cars to a place for people,[47] cities, state departments of transportations, citizens, and developers will be affected by new transportation technologies and delivery models. So why is there such a dearth of research about the urban future with AVs?

The National Association of City Transportation Officials with their Blueprint for Autonomous Urbanism[48] is a rare exception and so are the studies of a few transportation and engineering professionals which were cited

---

44. Barry Ritholtz, *The World Is About to Change Even Faster*, BLOOMBERG, (July, 2017), https://www.bloomberg.com/view/articles/2017-07-06/the-world-is-about-to-change-even-faster.

45. Emily Badger,  *The Simple Math That Can Save Cities From Bankruptcy*, CITY LAB, (Mar. 30, 2012), https://www.citylab.com/life/2012/03/simple-math-can-save-cities-bankruptcy/1629/.

46. Todd Litman, *Autonomous Vehicle Implementation Predictions*, VICTORIA TRANSPORT POLICY INSTITUTE, (July 2018), https://www.vtpi.org/avip.pdf. (The paper is full of uncertainties and seemingly opposite possible outcomes the AV could bring. )

47. National Association of City Transportation Officials, *Blueprint For Autonomous Urbanism*, NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS, (2017), https://nacto.org/wp-content/uploads/2017/11/BAU_Mod1_raster-sm.pdf.

48. Janette Sadik Khan & Seth Solomonow, *Battle for a new Times Square*, URBAN LAND MAGAZINE, (Apr. 15, 2016), https://www.vtpi.org/avip.pdf._

49. *Id.*

here. "The biggest impact is going to be on parking. We aren't going to need it, definitely not in the places we have it now. Having parking wedded or close to where people spend time, that's going to be a thing of the past. If I go to a football game, my car doesn't need to stay with me. If I'm at the office, it doesn't need to be there. The current shopping center with the sea of parking around it, that's dead" says Alain Kornhauser[49], a Professor at Princeton in the same NACTO publication.

To imagine the immensity of the change, just consider that in the US there are currently about 260 million cars on the road with an upper estimate of 2 billion parking spaces taking about as much space as all of Puerto Rico.[50] The American historian, sociologist, philosopher of technology, and literary critic, Lewis Mumford is often quoted as having said: "The right to have access to every building in the city by private motorcar in an age when everyone possesses such a vehicle is the right to destroy the city."[51] Regardless of the various scenarios which could play out, certain consequences seem almost definite, such as these possibilities compiled by the consulting firms KPMG and Steer Davies Gleave[52] under the title *Reclaiming space in the autonomous vehicle era* and the headline "How will parking change?"

With the uptake of AVs, the need to park near one's destination will no longer be necessary, potentially re-shaping land-use on a massive scale: There may no longer be a need for businesses, residential buildings, or any other facility to provide adjacent parking.Parking lots could be relocated to cheaper spots on the edge of town.The capacity of parking lots will increase, cars will be able to park efficiently nose to tail, side by side or stacked closely on top of each other. AVs may not even need to park, simply driving around until they are needed, or parking on the edge of roads, taking advantage of AVs needing less road width to pass safely. Parking lots may evolve from

---

50. *See* Sharon Adario, *Professor Alain Kornhauser talks about whether the driverless car is good for the environment*, PRINCETON UNIVERSITY, (May 25, 2017), https://research.princeton.edu/news/professor-alain-kornhauser-talks-about-whether-driverless-car-good-environment.

51. Andrew Long, *Urban Parking As Economic Solution*, INTERNATIONAL PARKING INSTITUTE, (JAN., 2016), HTTPS://WWW.PARKING.ORG/2016/01/19/TPP-2013-12-URBAN-PARKING-AS-ECONOMIC-SOLUTION/. (International Parking Institute, quoting Eran Ben-Joseph Re-Thinking A Lot – The Design and Culture of Parkin", MIT 2015)

52. Quoted from NYT article by Michael Kimmelman, *Paved But Still Alive*, N.Y. TIMES, (Jan 6. 2012), https://www.nytimes.com/2012/01/08/arts/design/taking-parking-lots-seriously-as-public-spaces.html.

53. Anita Mauchan, James Long, *Reclaiming space in the autonomous vehicle era*, KPMG NEWSLETTER, (April 13, 2017), https://home.kpmg.com/xx/en/home/insights/2017/04/reclaiming-space-in-the-autonomous-vehicle-era.html.

their current form into servicing centers, where AVs are recharged, valeted, and maintained.

With so much change in sight, one would think cities and developers are jostling for the opportunity to get in on the future by testing out models, conducting experiments, and creating prototypes of a desirable transportation world. But in reality, neither cities nor developers seem to pay much attention to policies, proof of concept, or experimentation. Cities and the development community appear to rely on that the future of transportation is in good hands with Google, Tesla, Ford, and Cisco, the same corporations that are already selling their smart city hardware and software to politicians who sometimes seem to be overwhelmed by their own smart phones. A report of the transportation consulting firm Nelson Nygaard concludes that "Only 6% of cities' long-range transportation plans acknowledged the prospect of autonomous vehicles for their city."[53]

Shannon McDonald who wrote a seminal book about parking garages[54] has shifted her attention to the AV and its impact on planning, development, and policy. She doesn't mince her words when she states: "This will completely change us as a society; I think it'll have the same transformational change as the introduction of the automobile."[55]

The real estate service firm Transwestern published a fairly comprehensive report investigating the real estate implications of the AV under the title "Urban Landscape Reimagined". In it the authors predict that " […] if AV adoption becomes widespread, the demand for parking across the U.S. may decrease 70 – 90%, cutting the need for parking spaces by approximately 60 billion square feet"[56] Even if that prediction is high, city councils and urban planners across the country will need to reevaluate parking requirements, a sticking point that has historically hampered development since minimum parking requirements have not allowed developers to build up to the maximum capacity. This may provide a massive opportunity to reposition or

54. Nelson Nygaard, Perkins & Will, Autonomous vehicles and the future of parking, 5, (Apr., 2016), http://nelsonnygaard.com/wp-content/uploads/2017/04/AutoVeh_FutureParking_FINAL.pdf.
55. Shannon Sanders McDonald, *The Parking Garage*, URBAN LAND INSTITUTE, (2007).
56. Patrick Sisson, *As self-driving cars hit the road, real estate development may take new direction*, CURBED, (May 16, 2017), https://www.curbed.com/2017/5/16/15644358/parking-real-estate-driverless-cars-urban-planning-development.
57. Jamie Mahoney, Adrianna Boursalian, *The New Industry Driver*, TRANSWESTERN, (2017), https://download.transwestern.com/public/Research/2017/The%20New%20Industry%20Driver%202017.pdf

redevelop thousands of parking garages, surface parking lots, and underground parking structures. In the same paper it is further predicted that "cities could evolve to see fewer multi lane streets, street side parking, and signaled intersections, potentially freeing up more than 30% of urban space." The paper  goes on to describe how "cities could once again become pedestrian-oriented as they reclaim real estate that has been developed over the course of decades around the needs of the automobile."[57] Projects like New York City's recently completed 270,000-square-foot pedestrian recapture initiative in Times Square could be more common as cities figure out ways to repurpose busy city streets for additional retail, outdoor restaurants and open space.[58]

Based on those research reports and studies immediate and practical recommendations for a new approach to development and design could include the following:

- Don't build more parking than the absolute minimum you have to build under zoning or lender requirements.
- Build the parking cheaply on shared lots, through share agreements with other nearby garages or whatever the law allows
- Build the parking as a flex space that has enough height and frontage to be converted to lucrative office or apartment space, ideally in stages (floor by floor, starting from the top).
- Include space assignments for care share services such as Uber or Lyft, initially with drivers and eventually driverless.
- Designate pick-up and drop off zones that allow a proper match between rider and vehicle, comfortable waiting, and safe access to those points.
  Don't forget transit. Even if a project isn't doesn't qualify as transit-oriented-development (TOD) for its immediate proximity to high capacity transit, new technologies addressing the "*last mile problem*" (how to cover the distance from the transit stop to the actual destination) could expand the view of what is

---

58. *Id.*
59. Jamie Mahoney and Adrianna Boursalian, *The New Industry Driver - How the Rise of Autonomous Vehicles Could Impact Future Real Estate Strategy*, TRANSWESTERN, (2017), https://download.transwestern.com/public/Research/2017/The%20New%20Industry%20Driver%202017.pdf.

considered as having good transit access. *Last mile* options include bikeshare, electric scooters, car share, automated shuttles, orrobotic people pods.

- Transit could look different than its traditional forms: Many experts expect that AV technology will allow a much more seamless transit delivery in which traditional fixed-schedule, fixed-route transit (transit which operates on a published schedule on published routes) can be combined with demand-based van or taxi type transit solutions.

- Consider different cars: Even privately owned cars may park themselves and could use automated garages with lifts and stacked cars that occupy about half as much space making it easy to navigate ramps, aisles, and wide spaces superfluous and would function much closer to those New York City valet parking garages, where operators pack the vehicles in tandem spaces without much space around them.

- Consider new propulsion technologies such as electric motors. Build electric charging facilities or eventually even hydrogen fuel stations. Charging technologies are rapidly changing, but whatever they are, they likely won't look like gas stations, but places where vehicles are staged anyway, be it as a private vehicle or a fleet vehicle.

- Consider space for all the automated service vehicles that will deliver stuff to a building, potentially even via drone. Delivery of packages by USPS, UPS, FedEx or pizza is already a usually unresolved problem, whether it is for where these vehicles stop to unload or where their deliveries get stored.

Developers and city administrations should take a hard look at their most recently completed projects, most likely developed around the outmoded mobility formulas of the past in which the car was the sovereign above anything else. They will likely find that due to recent trends they already sit on a surplus of parking.

It isn't rocket science to predict that semi or fully autonomous vehicles will accelerate this trend. Urbanization is continuing all around the globe. Even the prestigious new Tesla cars, popular among innovators, won't be able to stop the fact that owning a car has become much less a status

symbol or object of dreams than it was in the past. For one, space in already congested urbanized areas is limited. Another reason is economic: A research paper by RethinkX predicts "In the near future, transport-as-a-service (TaaS) will offer vastly lower-cost transport alternatives to what currently exists. TaaS will be four to ten times cheaper per mile than buying a new car, and two to four times cheaper than operating an existing vehicle by 2021. Cost savings will be the key factor driving consumers to adopt TaaS. This reduced cost is due to ten-times-higher vehicle utilization rates, 500,000-mile vehicle lifetimes and far lower maintenance, energy, finance, and insurance costs. Because of these cost factors, TaaS fleets will quickly transition from human driven, internal combustion engine (ICE) vehicles to autonomous electric vehicles (A-EV), offering consumers transportation at a fraction of today's price. […] Savings on transportation costs will boost annual disposable income for U.S. households by a total of $1 trillion by 2030".[59]

Cities will become even more attractive as a choice to live because the modern city can offer everything that a suburb can't offer. Excellent access to a multitude of services for work, entertainment, and living in a clean environment with plenty additional green space form spaces reclaimed from former parking uses. If cities push in the direction of clean shared vehicles properly applied to mass transit, demand based transit, and well managed car sharing there will be a way to grow without congested traffic and choking on fumes. The future of transportation with autonomous vehicles of all kinds will offer for the first time a future city which avoids the pollution, the congestion, and the dangers of old style traffic and production. The path into such a desirable future needs to be laid by adjusting regulations and policies today.

IV. POST WORK CITY

The technological innovation of the AV and its impact on urban form pales in comparison to the changes that are likely to come from the transformation of work. *The future of work* has become "one of the hottest topics in 2017" according to McKinsey[60]**,** but what is meant is far from being well

---

60. James Arbib & Tony Seba, *Rethinking Transportation 2020-2030*, RETHINKX, (May 2017), https://static1.squarespace.com/static/585c3439be65942f022bbf9b/t/591a2e4be6f 2e1c13df930c5/1494888038959/RethinkX+Report_051517.pdf.

61. James Manyka, *What is the future of work?*, MCKINSEY GLOBAL INSTITUTE, (Dec. 2017), https://www.mckinsey.com/global-themes/future-of-organizations-and-work/what-is-the-future-of-work.

defined. Equally speculative are the possible impacts on the shape of cities. To gauge work in terms of human history, it is useful to be reminded that the 40 hour work-week, the two-day weekend, a two-week annual vacation, and a life in retirement after 65 have been only a blip in the history of work. The set-up with its strict separation of work and free time and its separation of work and living is a result of industrialization which brought the end of agrarian living or the economic, spatial, and social order of pre-industrial towns.[61]

The order of uses segregation that came with industrialization[62] still prevails today, along with the separation of work time and free time, which represents the fruit of the hard fought struggles of the workers movement in the industrial age.[63] Increasingly, these separations become more permeable with the "mixed use" designation in zoning, a visible outcome of the changes in city planning. The separation between work and free time crumbles as well.[64] Strict separation no longer represents how life in the service and knowledge society is organized. Off-time used to be defined by what it was not, work-time. People's identity was defined through their work. "What do you do?" is a question not aimed at a personal interest or hobby, not even the profession, but simply means "what job do you have?"

The life forms of the post-industrial society are still emerging. The transition from a manufacturing to a service society already showed a new type of city emerge. The shift from industrial production to the service industry created downtowns which consisted mostly of offices and spawned the growth of *sunbelt cities* such as Charlotte, Miami, Austin, and Phoenix in the south and west of the United States.

The second shift, in which the city becomes a place of experience, discovery, adventure, and active lifestyle combined with innovative, smaller, and cleaner forms of production, is still emerging and may give industrial legacy cities a second chance. Urban development which used to be entirely defined by work, production, transport, commerce, and exchange will have to adjust. Downtowns are now increasingly becoming mixed-use

---

62. Gideon Sjoberg, *The Preindustrial City*, 60 AM. J. SOC. 5, (1955), http://www.urbanleaders.org/540UrbanReality/04HistoryCityUrbaniz/Sjoberg%20in%20GMelchUrban+Life+The+Preindustrial+City.pdf.

63. Laurence Gerckens, *American Zoning and the Physical Isolation of Uses*, PLAN COMM'RS J., (1994), http://plannersweb.com/wp-content/uploads/1994/07/5731.pdf.

64. Benjamin Blake et al., *The Eight Hour Day*, THE UNIVERSITY OF MARYLAND LIBRARIES, https://www.lib.umd.edu/unions/labor/eight-hour-day.

65. *Work in the Post Industrial World*, EBSCO RESEARCH STARTERS, (2009), http://www.dswleads.com/Ebsco/Work%20in%20the%20Post%20Industrial%20World.pdf.

neighborhoods with tens of thousands of residents living in converted old office buildings and warehouses[65] for mixed uses that used to be separate. A common example is the increasing conversion of obsolete single use office buildings into condominiums and apartments, turning downtowns into neighborhoods. It can be speculated that new technologies such as artificial intelligence (AI) and robotics would also allow clean, small scale methods of production to be embedded into mixed use urban districts.[66]

In the industrial society work was hard and taxing, a drudgery which required 8 hours of sleep to recover, leaving barely enough time to organize the private life of eating, shopping, raising children, or keeping up with the household. Age 65 was just about as long as such a schedule could be sustained.[67] Having fun wasn't part of that schedule, nor was adventure, exploration, continued education, or strenuous activity. Such a binary world of strictly separated work and narrowly defined "leisure" is becoming quickly obsolete for most, even for workers that are still location-bound or work in an environment far away from where they live. For most, the demarcation between work and leisure becomes fuzzier all the time; "leisure" has become more fine-grained and interspersed into the work schedule in smaller increments. Leisure now has its own set of demands from lifelong learning to staying fit. One could say work intrudes into leisure in many ways, but leisure also intrudes into work. Witness the ping-pong tables and pinball machines frequently found in start-up businesses. Meanwhile leisure also has become more like work: Structured, organized, and using the same tools, namely electronic devices.

One result of the new emphasis on leisure is a focus on quality of life.[68] With it comes the trend of selecting a city as "home" not because one was born there or because there is an abundance of work, but because there is a high quality of life. Employers increasingly allocate not where navigable

---

66. Morgan Brennan, *Downtowns: What's Behind America's Most Surprising Real Estate Boom*, FORBES, (Mar. 25, 2013), https://www.forbes.com/sites/morganbrennan/2013/03/25/emerging-downtowns-u-s-cities-revitalizing-business-districts-to-lure-young-professionals/#45df065c23a6.

67. Mark Gorenberg et al., *PCAST Releases Technology and the Future of Cities Report to the President*, THE WHITE HOUSE, (Feb., 2016), https://obamawhitehouse.archives.gov/blog/2016/02/23/pcast-releases-technology-and-future-cities-report-president.

68. Social Security Administration, *Age 65 Retirement*, https://www.ssa.gov/history/age65.html.

69. Myers, Dowell. *Building Knowledge about Quality of Life for Urban Planning* J. OF THE AM. PLAN. ASSOC., (Sept.,1988), https://www.researchgate.net/publication/233102209_Building_Knowledge_about_Quality_of_Life_for_Urban_Planning.

waters or commodities are present, but where a quality workforce resides[69] This provides an entirely new perspective for cities on what it means to have a location advantage. Highly educated workforces are attracted by cities with authenticity, character, walkable, and bikeable neighborhoods (think "walk-score"), excellent cultural offerings, diverse restaurants, good transit, and amenities that allow an active lifestyle[70]

Predictions to what extent automation and artificial intelligence (AI) will reduce the amount of available jobs vary. Some speculate that work will occupy less time and become more intermittent (the so-called gig-economy[71]) so that the division of work and leisure time will dissolve further. There is disagreement whether this means that work will be more self-determined and serving the purpose of making things for one's own basic needs similar to life in the pre-industrial agricultural economy or whether the gig economymeans ramped up exploitation and less income.[72] The trend of hipsters to keep their own chicken[73] points into the direction that increased self-support may be a trend available to the privileged. Urban food farms trying to address food insecurity indicate a chance for disadvantaged communities to self- organize and utilize new technologies such as hydronic farming, but those concepts have not yet had a systemic impact.

Predictions about "the end of work" proved to be mostly wrong in the past when each technological change, which eliminated traditional jobs also created new ones. It remains to be seen if this will also hold true for a future with AI and automation. Regardless, the strict time and space division of work and leisure will become more and more a thing of the past with substantial implication for the spatial organization of the city.

How the city becomes increasingly the space for leisure and work can already be observed. No longer do people routinely flee the city on weekends

70. Smart Growth America, *Core Values: Why Companies Move Downtown*, (June, 2015), https://smartgrowthamerica.org/resources/core-values-why-american-com-panies-are-moving-downtown/.

71. Alan Berube, Natalie Holmes, *The Metro Talent Competition*, BROOKINGS, (Nov. 14, 2016), https://www.brookings.edu/blog/the-avenue/2016/11/14/the-metro-tal-ent-competition-attracting-and-growing-highly-educated-workers/.

72. Larry Alton, *Why the Gig Economy is the Best and the Worst development for Workers Under 30*, FORBES, (Jan. 24, 2018), https://www.forbes.com/sites/larry-alton/2018/01/24/why-the-gig-economy-is-the-best-and-worst-development-for-workers-under-30/#424c076c6d76.

73. Lester Spence, *Knocking the Hustle: Against the Neoliberal Turn in Black Politics*, PUNCTUM BOOKS, (2015).

74. Amber Daugherty, *Urban chickens increasingly being abandoned by 'hipster farms,' advocacy groups says*, THE BOSTON GLOBE, (MAY 11, 2018), HTTPS://WWW.THEGLOBEANDMAIL.COM/LIFE/THE-HOT-BUTTON/URBAN-CHICKENS-INCREASINGLY-BEING-ABANDONED-BY-HIPSTER-FARMERS-ADVOCACY-GROUP-SAYS/ARTICLE13087283/.

for the beach or the mountains or in the summer for a road trip to another place. The city itself has become a destination for tourists. In some ways the city is becoming a perpetual playground that has to cater to a whole new set of expectations. Furthermore, back breaking labor has moved into a distant past for most, more physical activity has become an attraction for leisure time throughout the week and the year, creating a demand for space where those activities can occur on a regular basis. Free time is no longer the fruit of the struggles of the labor movement, but it is what productivity consultants advise to provide as play opportunities inside the workplace. Increasingly, people chose their home by the "lifestyle" choices they are offered rather than strictly jobs that are available and not by their profession but by their personal interests. In the new work-play lifestyle entertainment plays a dominant role. Thus, cities become lifestyle centers which are much less defined by production, work, and distribution and more by entertainment and the quality of their setting.

Physical manifestations of those shifts are numerous: ever bigger, more elaborate and more numerous museums, concert halls, sports arenas, and convention centers; the proliferation of ethnic restaurants, brew-pubs, food-halls, boutique hotels, and festivals of all kinds. Trails, marathons courses, sailing schools, climbing, and whitewater rafting are no longer the domain of the open landscape, but have their urban representation, often indoors, sometimes in re-purposed industrial facilities. When it comes to providing "lifestyle experience", the list of possibilities is endless. Outdoor activities are often moved right into the middle of cities by uncovering urban streams, creating green-ways, linear parks, or even city beaches, changing the appearance and functionality of the city in the process. Urban festivals are the perfect destination for the new fun culture that can be injected into the schedule with a day-trip here and there. Jetting to festivals, conventions, concerts, or just a day at in the city, sometimes all across the continent, has become common for those with the necessary discretionary dollars.[74] The *South by Southwest* festival may have defined Austin as a destination more than that the Dell headquarters which are also located there. Similarly, Nashville's recent boom is driven by its reputation as a music city. San Diego is no longer just a navy base or biotech center, but a lifestyle magnet for its beaches, surfing, and hang-gliding opportunities. Denver may have once thrived because of its military installations, but it wouldn't be one of the fastest growing cities

---

75. Bill Cary, *Hudson, N.Y., From Industrial City to Tourist Destination*, THE WALL STREET JOURNAL, (Oct. 7, 2016), https://www.wsj.com/articles/hudson-n-y-from-industrial-city-to-tourist-destination-1475832600.

in America[75] without the Rockies, skiing, and the active lifestyle that has made Colorado the healthiest state in the nation.

The transformation of traditionally cramped and unhealthy urban spaces includes entirely new forms of landscape architecture. New parks like the New York Highline, Chicago's Millennium Park, or Seattle's Olympic Sculpture Park have become internationally famous. But they have not benefitted the very real and deplorable state of American urban ghettos. The rejuvenation of legacy parks through new activities in Central Park (Manhattan), Prospect Park (Brooklyn), Druid Park (Baltimore) City Park (Denver) or Rock Creek Park (DC)[76] serves broad parts of society but is nothing but a small beginning of a better distribution of benefits.

Established legacy cities like Detroit, Buffalo, Baltimore, or Cleveland are still in danger of being perceived as places of industrial grime, cold weather, grayness, and dour attitudes, unless they enter the race with the sunbelt cities to prove otherwise. Legacy cities can use their historical grit, their established educational institutions, and their historic architecture as a springboard in this competition and instantly have a leg up when it comes to "authenticity", a decisive advantage in a time when globalization has homogenized airports, malls, and shopping districts to a point where they become indistinguishable. The bike-sharing, Uber-hopping, latte-sipping millennials cherished by mayors and the subject of Richard Florida's book"The Rise of the CreativeClass"[77] draw scorn from civil rights and labor activists, but they are not the new ruling class, subjected to what has been named the *gig economy*.[78] They are themselves frequently in positions without power, without the support of organized labor, and with little else than their education standing between them and a jobless laborer. Their fun-loving lifestyle may make them look like first cousins of the bourgeois leisure class[79] of old, an Old World phenomenon from a time before work became the only ethic. Regardless of how one judges the "creative class" and the "gig economy", there is no question both have already begun to shape cities.

New technologies of production could exacerbate inequity, a view

76. United States Census, *County and Metro Area Population Estimates*, (Mar. 22, 2018), https://www.census.gov/newsroom/press-kits/2018/metro-county-popestimates.html.

77. Eric Jaffe, *How Parks Gentrify Neighborhoods, And How to Stop it*. FASTCOMPANY (Oct. 15, 2014), https://www.fastcompany.com/3037135/how-parks-gentrify-neighborhoods-and-how-to-stop-it.

78. Richard Florida, *The Rise of the Creative Class*, HARPER BUSINESS (2002).

79. Diana Mulcahy, *The Gig Economy*, AMACON, (2016).

80. Thorstein Veblen, *The Theory of the Lesiure Class, Rockville: Arc Manor*, DOVER PUBLICATIONS, (1899).

author Richard Florida now stresses in his new book "Urban Crisis"[80] But technology can also provide solutions to what seem to be intractable problems of equity in the modern city. The gig economy for services, the maker movement, and the creatives making a living with entertainment, the *sharing economy*[81] and with new technology production could be seen as *proof of concept*[82] experiments testing new ways of making a living. Doing what one likes to do and doing it without the huge capital investments of past industrial production thanks to technologies such as 3-D printers, self-publishing, and online apps, expands the small circle of those who could "own" production in the old industrial system.

There is plenty critique of the suggestion that these neo-liberal ideas of mass entrepreneurship could solve the modern urban equity crisis of sharply divided assets and ethnicities. Still, there are promising elements: the lower entry threshold into making and creating has not yet become an open door for the masses, but its widespread production for one's own needs has become thinkable thanks to 3-D printers, computers, robots, vertical farming, and almost universal Internet access.

The geospatial urban manifestation of such production is just beginning to become visible. Once again, the city could become truly mixed use with clean, small scale production making the industrial age separation of uses obsolete, instead allowing a seamless integration of production into the urban fabric. It isn't hard to imagine how this type of production could utilize the spaces freed by the introduction of fleet based AVs in which parking garages are converted to urban farms and surface parking lots become filled with live-work units, which in turn further reduce the need for the hyper mobility that has characterized cities to date.

## V. CONCLUSION

The shift in how work is organized combined with the onset of the autonomous vehicle will change the city drastically, but it isn't clear whether the question of purpose and outcome is asked often enough.Much of how AI, AVs, drones, and robots will shape the future city is not yet predictable. The possibility that cities become large playgrounds has already been met with

---

81. Richard Florida, *Urban Crisis*, BASIC BOOKS, (Apr., 2017).

82. April Rinne, *What exactly is the sharing economy?* WORLD ECONOMIC FORUM (Dec. 13, 2017), https://www.weforum.org/agenda/2017/12/when-is-sharing-not-really-sharing/

83. InvestorWords, *Proof of Concept*, http://www.investor-words.com/3899/proof_of_concept.html

criticism, from possible loss of identity, authenticity to the laments about corporate power, displacement, and gentrification. Evidence that those fears are justified can be observed in San Francisco, Irvine, Denver, Boston, or DC where many residents have been displaced by rising costs of living,[83] but neither fear nor blind optimism should be the driver of urban planning.

Almost any larger US city today looks cleaner, more attractive, and livelier than 25 or 30 years ago and certainly healthier than 50 or 100 years ago. Cities were never as livable as today, especially not at the heights of industrialization when legacy cities boomed, but were polluted and grimy, including occasionally burning rivers. Continued technological change will likely continue this trend resulting in cities competing over how much experience and quality of life they can offer. Additionally, though, there is the potential that new technologies contribute towards overcoming the current divisions in American society if they lower the thresholds of participation across all races and classes. To date there is little evidence that this potential has been tapped or that decision makers are aware of it.

The American city will only have true quality of life if and when the large swaths of disinvested communities common even in thriving cities can participate in an urban renaissance. Legacy cities must combine the two goals of being welcoming to newcomers and serving their own disadvantaged communities. Legacy cities will be well advised to be leaders in using new technologies to create more equity and at the same time take advantage of those who seek out the old industrial centers for their affordability, authenticity, and their tradition of making that is still so much part of their fabric. The legacy's city more compact shape is more sustainable and economical than the thriving sunbelt cities and ideally suited for the transportation revolution that comes with the shared AV. The legacy city's older institutions and more diverse population with broad cultural roots and a long history from which to learn are all great ingredients for the transformation into a new "post-work" American city.

84.  Markus Moss et al., *Planned for Mixed Use: Affordable for Whom?*, J. OF THE AM. PLAN. ASSOC., (2018).