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Which Transportation Technologies Do We Want?

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ZONING AND LAND USE PLANNING

Which Transportation Technologies do we want? Review, *New Mobilities—Smart Planning For Emerging Transportation Technologies* by Todd Litman (Island Press 2021)

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When I was growing up in a suburban part of Atlanta, there were only two ways of getting around: my parents' automobiles for most trips within my home city, and airplanes for most trips between cities. Occasionally I could walk to a schoolmate's house, but the absence of sidewalks made this treacherous. Once I left town as a teenager, I discovered denser cities like Washington, where I could feasibly use taxicabs and public transit. All of these transportation modes still exist but over the past decade, new technology has begun to make some of these modes a little more appealing. For example, taxicabs are more convenient thanks to the rise of Uber and its competitors, and bicycles and scooters may be electric and thus faster. In *New Mobilities*, Todd Litman discusses the pros and cons of these and several other new technologies related to transportation.

I. First, A Bit of Background

Litman begins by discussing the status quo. For over a century, American governments at all levels have promoted the use of automobiles, primarily by funding roads designed

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In addition, the absence of sidewalks meant that public transit was impractical; the nearest bus stop was a mile or two away.

for auto use.² As a result, motor vehicle use has accelerated, while the use of other modes has declined. While the average American drives 10,000 miles per year,³ walking and biking declined from three daily miles per capita in 1900 to one-third of a mile in 2000.⁴ Although the growth of automobiles enabled people to drive faster and farther,⁵ it also created a variety of social costs, including:

* The cost of almost-mandatory⁶ auto ownership and use. Most households now spend roughly 20 percent of their budgets on vehicle-related expenses such as the price of vehicles, car maintenance, automobile insurance, and gas taxes.⁷ Because Americans are more likely to need an automobile than Europeans, their vehicle costs are higher: Europeans devote about 11 percent of household budgets for transportation.⁸ And this figure does not include the time spent travelling: because time is money, Americans effectively lose almost an hour of possible income commuting to work.⁹

The cost of public spending on roads and other

² See Milton Garther, *Homeschool: An American History* 86 (2008) (discussing U.S. pattern of heavy federal support for roads, and its contribution to suburban growth). In addition, government at all levels has indirectly encouraged automobile use in a variety of other ways, for example, by using the tax code to subsidize automobile parking, and through zoning policies that made suburbs too thinly populated to support public transit. See Gregory H. Shill, *Should Law Subsidize Driving?*, 95 N.Y.U. L. Rev. 498, 535–55, 569–72 (2020).

³ See Todd Litman, *New Mobilities* 12 (2021).
⁴ *Id.* at 11.

⁵ *Id.* at 9 (automobiles “expanded where we could go”).

⁶ Cf. Michael Lewyn, *Government Intervention and Suburban Sprawl* 20–21 (2017) (car ownership a necessity for many, because not all jobs accessible by public transit).

⁷ See Litman, *supra* note 3, at 15 (“Most households now spend 16 to 18 percent of their budgets on vehicle expenses, plus 3 to 6 percent on indirect vehicle costs such as residential parking and local taxes devoted to roadways.”).

⁸ *Id.*

⁹ *Id.* (average American car commuter spends fifty-two minutes a day getting to and from work). Of course, non-car commuters may also have long commutes. See Tom Actell, *Boston commute times via car and public transit among longest in U.S.*, *Curbed*, April 25, 2019, at <https://boston.curbed.com/2019/4/25/18515568/boston-commute-times-to-from> (in major cit-

automobile-oriented infrastructure. American governments spend over \$200 billion on roadways, only about half of which is paid for by fuel taxes and similar user fees.¹⁰

* The health costs of automobile-oriented development. Where driving is easy and walking is difficult, people walk less, thus adversely affecting public fitness and health.¹¹ In addition, more cars mean more pollution, and tens of thousands of Americans every year die in automobile crashes.¹² Because areas near busy streets are especially polluted, highway construction degrades neighborhoods near highways.¹³

* Automobile-oriented development is inequitable. People too poor to drive have less mobility than they did a century ago,¹⁴ for two reasons. First, the growth of highways has caused development to shift to suburbs that are difficult to access by public transit.¹⁵ Second, as government has

les, average transit commuting times even longer than automobile commuting times). On the other hand, workers can arguably be more productive when a bus or train driver is doing the driving than when they have to drive themselves.

¹⁰See Litman, *supra* note 3, at 16 ("in 2016, governments spent \$219 billion on roadways in the United States, of which only \$111 billion was funded by user fees").
¹¹*Id.* at 17-18. Cf. Vasudha Lathey et al., The Impact of Subregional Variations in Urban Sprawl on the Prevalence of Obesity and Related Morbidity, 29 J. Planning Education & Research 127, 137, 139-41 (2009) <http://jpe.sagepub.com/content/29/2/127.full.pdf+html> (finding that lack of "walkability . . . is the strongest predictor of disease prevalence" and citing numerous other studies); Lewyn, *supra* note 6 at 21 (width of American streets often makes walking difficult and dangerous).

¹²See Litman, *supra* note 3, at 18 (motor vehicles "are the single largest cause of US air pollution deaths, resulting in an estimated fifty-three thousand annual fatalities" and cause "about a third of total climate change emissions"); Alexa Lardieri, Traffic Deaths Increased in 2020 Despite Fewer People on Roads During Pandemic, U.S. News, June 4, 2021, at <https://www.usnews.com/news/health-news/articles/2021-06-04/traffic-deaths-increased-in-2020-despite-fewer-people-on-roads-during-pandemic> (38,680 Americans died in motor vehicle crashes in 2020).

¹³See Litman, *supra* note 3, at 18-19.

¹⁴*Id.* at 19.

¹⁵See Gaither, *supra* note 2 at 86 (highway spending shifts development to suburbs); Litman, *supra* note 3, at 19 (sprawling development

widened streets to accommodate automobile traffic, walking has become more difficult and dangerous.¹⁶

In evaluating new modes of transportation, Litman focuses on not just on whether those modes make travel faster, but also on whether they can correct the negative effects of automobile-oriented policies.

II. The New Mobility

After discussing the "old mobility" of auto-oriented planning, Litman goes on to discuss the "new mobility": a wide variety of transportation technologies. These technologies will be discussed below.

A. Micromobility

Although bicycles have existed for even longer than automobiles, they nevertheless have played a minor role in U.S. transportation planning.¹⁷ In recent years, some vehicles have blurred the difference between bicycles and cars; these "micromobility vehicles,"¹⁸ such as electric scooters and bicycles, can travel faster and further than traditional bicycles on human feet.¹⁹

Litman notes that these vehicles make biking easier; for example, he mentions a Dutch survey finding "that people who purchase an e-bike significantly increased the distances they travel by bicycle, and reduced their automobile travel about 10 percent."²⁰ He also notes that micro modes are cheaper than automobiles; for example, an electronic scooter or bicycle costs \$400 to \$2000,²¹ far less than most vehicles.²² It follows that micromobility may encourage some commuters to reduce automobile use, thus reducing auto-related congestion and pollution.

pattern has made transit less efficient, and thus led to reduced transit service).

¹⁶ See *supra* note 10 (discussing degraded pedestrian environment).

¹⁷ See Litman, *supra* note 3, at 47 (biking and walking "have been considered slow and inefficient . . . to be replaced by faster motorized modes where possible.").

¹⁸ *Id.* at 48.

¹⁹ *Id.*

²⁰ *Id.* at 50.

²¹ *Id.* at 52.

²² See *supra* note 6.

Litman accordingly suggests that cities encourage micro-mobility by expanding bike-sharing programs to electric bikes and scooters.²³ However, these programs might require government subsidies, or special paths to prevent conflicts between micro modes and pedestrians.²⁴ He correctly points out that cities should develop "appropriate regulations that define where these modes should operate and park, their maximum speed, and under which circumstances they are required to yield to other facility users."²⁵ He does not, however, address in detail what such "appropriate" regulations would look like.

B. Carsharing

In the 20th century, if you wanted to drive a car temporarily, you had to rent it for at least a full day from a car rental company such as Avis or Hertz. But since 2000 (when carsharing firm Zipcar began to operate)²⁶ commercial carsharing has given renters more flexibility; if your neighborhood is served by Zipcar, you can rent cars by the hour.²⁷ As Litman mentions, carsharing is most successful in dense urban areas where people can easily live within walking distance of rental cars.²⁸ But Zipcar has penetrated into not-so-dense cities as well; for example, sprawling Sun Belt cities such as Dallas, San Diego and Houston have some Zipcar service.²⁹

Litman writes that the major advantage of carsharing is that it limits car use; because car renters have an incentive

²³ See Litman, *supra* note 3, at 118.

²⁴ *Id.* at 116-17.

²⁵ *Id.* at 117.

²⁶ *Id.* at 54.

²⁷ See Zipcar, a car, at <https://my.zipcar.com/book/search> ("Zipcar Book").

²⁸ See Litman, *supra* note 3, at 54.

²⁹ See Zipcar Book, *supra* note 27. Cf. The Transport Politic, Travel Mode Shares in the U.S., at <https://www.thetransportpolitic.com/databook/travel-mode-shares-in-the-u-s/> (over 80 percent of commuters in all three cities drive or carpool to work, as opposed to under 40 percent in New York and San Francisco, and under 60 percent in Seattle, Philadelphia and Chicago).

to minimize time spent traveling in order to save money,³⁰ carsharing reduces vehicle-related congestion and pollution compared to day-by-day renting or car ownership. And because renting a car for an hour or two may be less expensive than renting a car for a full day, carsharing is more affordable for some people.³¹ However, some drivers may find carsharing less appealing than car ownership, because a carsharer spends more time accessing a vehicle than a car owner. Car owners can often reach their vehicles by walking out their doors, while someone who rents a vehicle may have to walk to the vehicle or even use public transit.³²

Despite this disadvantage, Litman concludes that government should support carsharing (and bikesharing as well); he notes that shared vehicles "can be given preferred use of public parking spaces"³³ and suggests that where government requires private businesses to build parking spaces, the number of spaces required can be reduced in buildings that are near shared vehicles.³⁴

C. Ride-Hailing Another form of temporary car use is the taxicab. Technology has made this particular form of car use more convenient, due to the rise of ride-hailing companies like Uber and Lyft, which allow riders to use smartphone applications to find a vehicle.³⁵ Although more convenient cabs make it easier to live without a car, Litman is ambivalent about this technology because better taxis may increase automobile use by shifting riders away from public transit and other

³⁰See Litman, *supra* note 3, at 54–55. Litman adds that bikesharing can achieve similar goals. *Id.* at 55.

³¹*Id.* ("Carsharing is generally cost effective for people who drive less than about five thousand annual miles" and thus "can help achieve social equity goals").

³²*Id.* at 88 (carsharing slower than auto ownership "due to the additional time required to access vehicles.").

³³*Id.* at 117.

³⁴*Id.*

³⁵*Id.* at 56.

nonmotorized travel.³⁶ However, Litman does not suggest restricting ridehailing, except through regulations that might be applicable to other taxicabs as well.³⁷

D. Electric cars

Although only 2 percent of new vehicles are currently electric, their market share is growing.³⁸ Electric cars tend to be politically popular, because they are quieter and less polluting than traditional automobiles.³⁹

However, electric cars are not perfect. Electric vehicle fuel is cheaper than fuel for gasoline-powered cars.⁴⁰ As a result, the variable costs of electric vehicles are lower than those of traditional cars, which in turn encourages electric car owners to travel more miles,⁴¹ which in turn may lead to more car crashes and traffic congestion. And because electric cars tend to be heavier due to the weight of their batteries, their tires may create pollution caused by bits of tires on the roads.⁴² Litman accordingly suggests that if government wants to support electric vehicles, it should balance out those cars' negative effects by discouraging auto traffic in other

³⁶Id. at 57 (one study suggests that about 40 percent of ridehailing users would otherwise have walked, biked or used public transit). He also groups microtransit (that is, using vans and small buses to provide transportation) with ridehailing. Id. at 56-57. But there is nothing new about microtransit, so it is not clear to me why this is a "new mobility" in any sense. Cf. Aaron Reiss, New York's Shadow Transit, at <https://projects.newyorker.com/story/nyc-dollar-vans/> (New York City has had "dollar vans" since 1980).

³⁷He notes, for example, that ridehailing should be subject to "vehicle and driver safety standards, requirements to accommodate passengers with disabilities . . . [and] tolls on congested roads," id. at 119, but does not suggest that traditional taxis should be treated differently from Uber or Lyft.

³⁸Id. at 58.

³⁹Id. (noting that many jurisdictions "offer electric vehicle purchase incentives"). In addition, some transit agencies have electric buses. Id.

⁴⁰Id. at 59.

⁴¹Id.

⁴²See Emissions Analytics, Tyres not Tailpipe, at <https://www.emissionsanalytics.com/news/2020/1/28/tyres-not-tailpipe> (heavy tires contribute "to microplastic marine pollution, as well as air pollution from finer particles").

ways—for example, by increasing taxes on other polluting vehicles.⁴³

E. Self-Driving Cars

Autonomous vehicles (also known as “self-driving” or “robotic” vehicles) are those that can operate without a human driver.⁴⁴ It is not clear when such vehicles will be common; Litman suggests that they will not become widely affordable until the 2040s or 2050s.⁴⁵

The most obvious advantage of self-driving cars is that they will be more comfortable for passengers than existing cars, allowing them to rest or work while traveling.⁴⁶ In addition, self-driving cars will increase mobility for people who are physically unable to drive a car on their own.⁴⁷ Although buses and taxis may also become autonomous, Litman thinks that they are unlikely to be popular because riders may prefer a human driver to provide passenger assistance, and to prevent other riders from engaging in vandalism and other forms of misbehavior.⁴⁸

But because self-driving cars are so convenient, they are likely to create a wide variety of negative side effects. Because they make driving easy, people will be willing to drive more,⁴⁹ thus creating more congestion and pollution.⁵⁰ Motorists may direct their cars to go home while they are not present, thus adding additional “empty vehicle miles.”⁵¹

⁴³See Litman, *supra* note 3, at 120 (“The best way to encourage electric vehicle use is to increase fuel and carbon taxes so that they become more affordable compared to driving fossil fuel vehicles.”).

⁴⁴*Id.* at 60.

⁴⁵*Id.* at 62.

⁴⁶*Id.*

⁴⁷*Id.*

⁴⁸*Id.*

⁴⁹*Id.* at 63 (with current policies, autonomous vehicles are likely to increase affected vehicle travel by 10 or 30 percent).

⁵⁰*Id.* at 64–65 (“If they increase total vehicle travel, autonomous vehicles are likely to increase total traffic congestion, infrastructure costs and pollution emissions.”).

⁵¹*Id.*

Litman suggests that government can limit these negative impacts with incentives to drive less, such as road tolls.⁵²

F. Telecommuting

Because of the COVID-19 pandemic, telecommuting has become more common.⁵³ As Litman notes, telecommuting is convenient for workers, when the technology works; however, teleworkers do experience less human interaction than they would if they were in an office.⁵⁴ Telecommuting may be less desirable for people who lack a suitable workspace.⁵⁵

From an environmental perspective, it is unclear whether telecommuting does more good than harm. On the positive side, telecommuting obviously reduces work-related travel. On the other hand, workers may make additional errand trips from their homes that might not otherwise have been made, or use additional energy at home.⁵⁶ And because telecommuters no longer need to live near their office, they might move further from those offices; if a telecommuter's new home is in a more car-dependent environment than their first home, the telecommuter may drive more than before the move, thus increasing congestion and pollution.⁵⁷ Litman believes that on balance telecommuting is desirable; however, because of its potential to increase total travel, Litman believes that it should be combined with other policies that increase compact, pedestrian-friendly development.⁵⁸ In addition, telework should not be mandatory, because some workers may lack suitable workspaces.⁵⁹

G. Long-Distance Travel

Most of Litman's discussion addresses technologies that can be used for intracity trips. However, he also discusses

⁵²Id.

⁵³Id. at 70-71.

⁵⁴Id. at 71.

⁵⁵Id. For example, my wife and I just moved from a one-bedroom apartment to a two-bedroom apartment, partially because she did not feel that the first apartment provided her with a suitable workspace.

⁵⁶Id. "Noise might reduce noise and air pollution." Litman, *supra* note 3, at 66-70; however, I have not discussed either of these issues in as much detail as those discussed above.

⁵⁷Id. "Construction is likely to impose significant external costs such as traffic and noise." Litman, *supra* note 3, at 66-70; however, I have not discussed either of these issues in as much detail as those discussed above.

⁵⁸Id. "Government should encourage the transportation modes that are most efficient." Litman, *supra* note 3, at 66-70; however, I have not discussed either of these issues in as much detail as those discussed above.

some technologies that may be more comparable to long-distance aircraft than to automobiles, including pneumatic tubes, drones and air taxis.⁶⁰

1. Tubes

Litman notes that Hyperloop Transportation Technologies has proposed "a network of pneumatic tubes that transport passengers between cities in pressurized capsules traveling at approximately the speed of sound."⁶¹ If Hyperloop is successful, its tubes will reduce the number of air travel trips.⁶² Although Hyperloop has built prototype tubes, it has not yet shown that it can operate them profitably.⁶³ Litman doubts that these tubes will be comfortable for most passengers, because they will be in underground confined spaces;⁶⁴ on the other hand, the same could be said for subways. On the positive side, such tubes might reduce pollution from air travel, but it is not yet clear whether they will be less environmentally disruptive than aircraft.⁶⁵ Because it is not clear whether pneumatic tubes will be safe or efficient, Litman does not have a position on their usefulness.⁶⁶

⁶⁰ He also mentions tunnel roads; *id.* at 72, and supersonic jets. *Id.* at 75. However, there is nothing new about these technologies; New York City has tunnel roads, and supersonic jets have existed since the 1970s. See *British Airways Bd. v. Port Authority of New York and New Jersey*, 564 F.2d 1002, 10 Env't. Rep. (Cas. (BNA)) 1753, 7 Env't. L. Rep. 120772 (2d Cir. 1977) (describing litigation involving first supersonic jet); Timothy M. Mulvaney and Brian Weeks, "Waterlocked": Public Access to New Jersey's Coastline, 34 Ecology L.Q. 579, 588 (2007) (tunnel roads from New Jersey to New York have existed since 1920s). So I am not sure why Litman mentions these travel modes in a book focused on newer technologies. Litman also mentions public transit innovations and "mobility as a service." See Litman, *supra* note 3, at 66-70; however, I have not discussed either above, because he does not discuss any particular innovation in these categories in as much detail as those discussed above.

⁶¹ *Id.* at 72.

⁶² *Id.* at 74.

⁶³ *Id.* at 73.

⁶⁴ *Id.*

⁶⁵ *Id.* at 74 (tubes might "reduce noise and air pollution" from air travel, but construction "is likely to impose significant external costs" such as "infrastructure and habitat disruption, noise, dust etc.").

⁶⁶ *Id.* at 124 (government should encourage tube transport only if it "proves to be safe and efficient").

2. Drones

Drones are small, unmanned aircraft capable of delivering light packages.⁶⁷ Delivery drones are not yet operating on a large scale; Litman notes that their costs are difficult to predict.⁶⁸ He also suggests that drones will increase overall vehicle-miles of travel, because a drone is likely to carry just a single parcel while existing postal services may carry many pieces of mail in the same vehicle.⁶⁹ Drones also look down on homes, possibly intruding on privacy,⁷⁰ and are as loud as a lawnmower.⁷¹ Thus, it is not clear whether large-scale commercial drone use is either economically viable or environmentally desirable.

3. Air Taxis

Air taxis are small, autonomous, electric-powered aircraft which can fly up to 60 miles at a time.⁷² These aircraft are not yet commercially available,⁷³ and they may never be: air taxis are so small that they are likely to be more crowded than cars.⁷⁴ Air taxis might travel at higher speeds than automobiles, but if passengers have to summon them from a central terminal, the time spent waiting might outweigh time savings from a faster trip.⁷⁵ Because this technology is still in an early phase, it is still too early to predict its ultimate costs and benefits. Litman writes that governments should define safety standards for services such as drones and air taxis, but does not suggest how stringent these standards should be.⁷⁶

⁶⁷Id.

⁶⁸Id. at 76.

⁶⁹Id. at 75.

⁷⁰Id. at 76.

⁷¹Id. at 77.

⁷²Id. at 74.

⁷³Id. at 75.

⁷⁴Id.

⁷⁵Id. at 76.

⁷⁶Id. at 125 (governments "should define the specific performance and safety standards that [air taxis and drones] must meet" and should establish "fees to compensate for their negative impacts").

III. Conclusion

Of the new technologies discussed in Litman's book, some are likely to be similar to automobiles, in that they increase commuting speed, such as pneumatic tubes, self-driving cars, and air taxis.⁷⁷ If the U.S. repeats the policies of the 20th century, it will support these modes rather than more affordable or more environmentally friendly modes. Litman argues that policymakers should consider other values as well, such as affordability and reduction of pollution. Thus, government should favor cheaper modes such as micromobility and vehicle sharing,⁷⁸ as well as less polluting technologies such as electric vehicles.

⁷⁷Id. at 130 (in Table 8-1, placing these technologies in a list of services that "increase vehicle travel speeds").

⁷⁸Id. at 89 (in Table 6-4, placing these technologies in a list of services that "provide significant savings and affordability benefits").