



Cycling Cities |



Institute for Transportation
& Development Policy

Making the Economic Case for Cycling



Authors and Acknowledgments

Authors

Dana Yanocha, ITDP
Sarah Mawdsley, ITDP

Reviewers

Mackenzie Allan, ITDP Global
Danielle Hoppe, ITDP Brazil
Jacob Mason, ITDP Global
Carlos F. Pardo, NUMO
D. Taylor Reich, ITDP Global
Li Wei, ITDP China

This research brief was developed with generous support from the Transforming Urban Mobility Initiative (TUMI).

Cover Photo: Areporter via shutterstock

Introduction



Introduction

“Riding bicycles will not only benefit the individual doing it but the world at large.”



— Udo E. Simonis,

economist and global
environmental policy advocate

Unlocking economic benefits of cycling

Cycling has significant economic benefits—for individuals, cities, and society—and functions as a low-cost, high-yield, scalable solution to climate and equity issues. Investments in cycling infrastructure also create jobs and opportunities to expand existing industries or develop new ones. While many cities have seen firsthand the benefits of investing in infrastructure and other street design improvements that support safe, direct, and connected cycling trips, other cities are not convinced that such investments yield enough economic value to equal or exceed the upfront costs. In this brief, we make the economic case for cycling and demonstrate how investments in cycling infrastructure are the key to unlocking economic and other benefits.

In Part 1, we explore how a larger share of trips made by bicycle reduces costs for individuals and society and can generate revenue for cities. We also analyze how increased demand for bicycles and cycling trips creates jobs and economic opportunities. In Part 2, we discuss the type and scale of investment needed to maximize the economic benefits of cycling.

Why now?

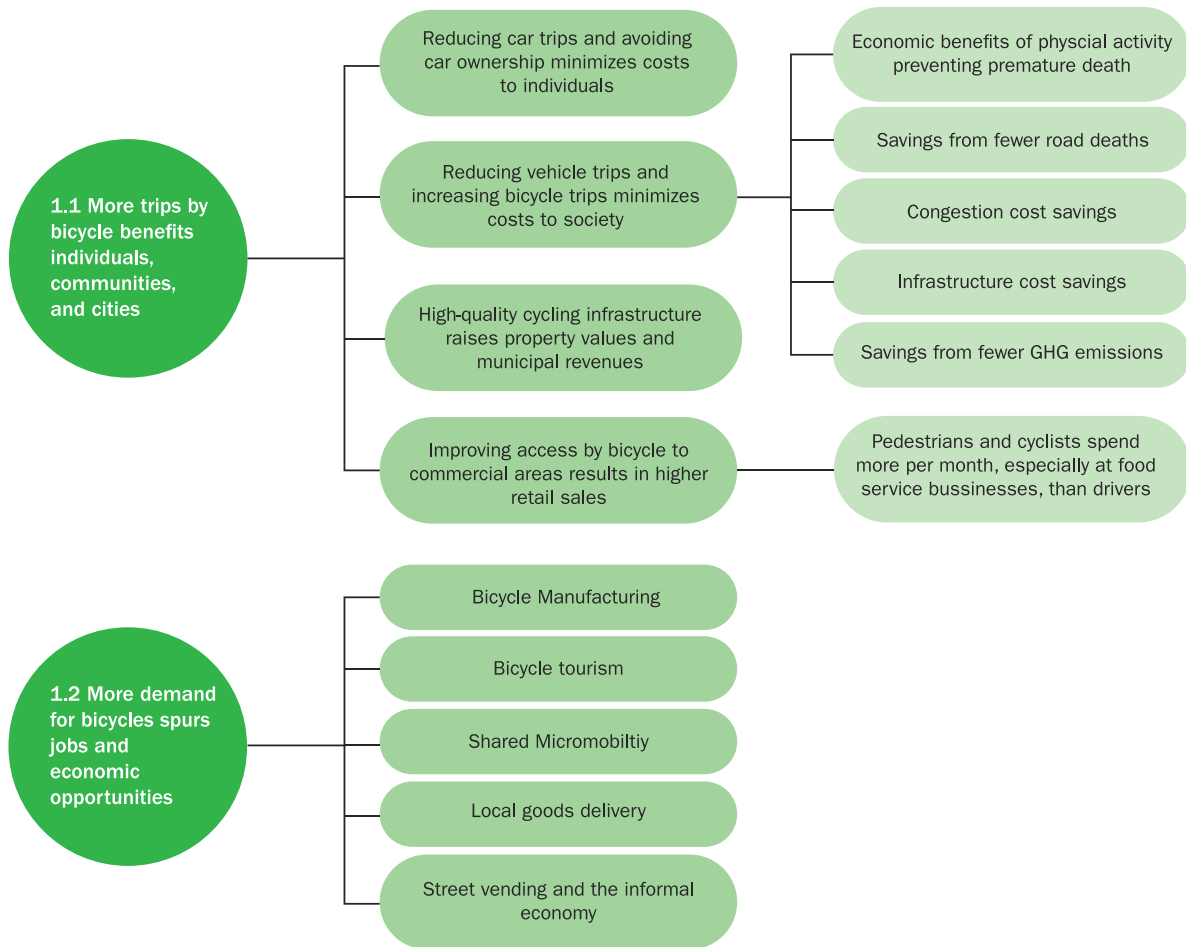
The Sixth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (IPCC), released in August 2021, emphasizes the need for a large-scale system change in how people around the world travel in order to reduce the extreme consequences of climate change. This system change would mean reducing reliance on fossil fuels in the transportation sector to zero. There are indeed technology-based solutions that can support this transition, including electrification of private and public vehicles. However, these solutions are not yet affordable, accessible, or deployable at a large scale in many parts of the world.

Fortunately, we do not have to wait until electrification technology becomes more affordable or the logistics around range and charging infrastructure make widespread uptake of both private and public electric vehicles more realistic.

A significant shift toward cycling would reduce harmful emissions and slow the negative impacts of climate change, but this shift requires coordinated, comprehensive investments beyond what we have seen in the past. Source: cktravels.com via shutterstock



Economic Opportunities from Expanded Investment and Access to Cycling



Instead, we can prioritize and finance the infrastructure and access to bicycles needed to shift a significant share of trips from private vehicles to cycling right now. Unlike electric cars, bicycles are already widely available in most places, and infrastructure to support them can be built quickly and at a much lower cost than vehicle infrastructure. This significant shift toward cycling is essential to reduce harmful emissions and pollutants that threaten human health and to slow the negative impacts of climate change.

This will require sizable investments from national governments, multilateral development banks, philanthropy, and other major stakeholders in a much more coordinated

and comprehensive way than we have seen in the past. These investments would deliver not only the physical infrastructure needed to make cycling and walking safer and more attractive to more people but they would also generate cost savings and returns as a result of improved health outcomes and local economic development. In addition, they have the potential to spark new industries and entrepreneurial opportunities. Most importantly, the scale of investment needed to achieve systemic change and have a real impact on climate change is comparatively small and presents one of the highest returns on investment.

Part I: Economic Benefits of Cycling



1.1 More trips by bicycle benefits individuals, businesses, and cities

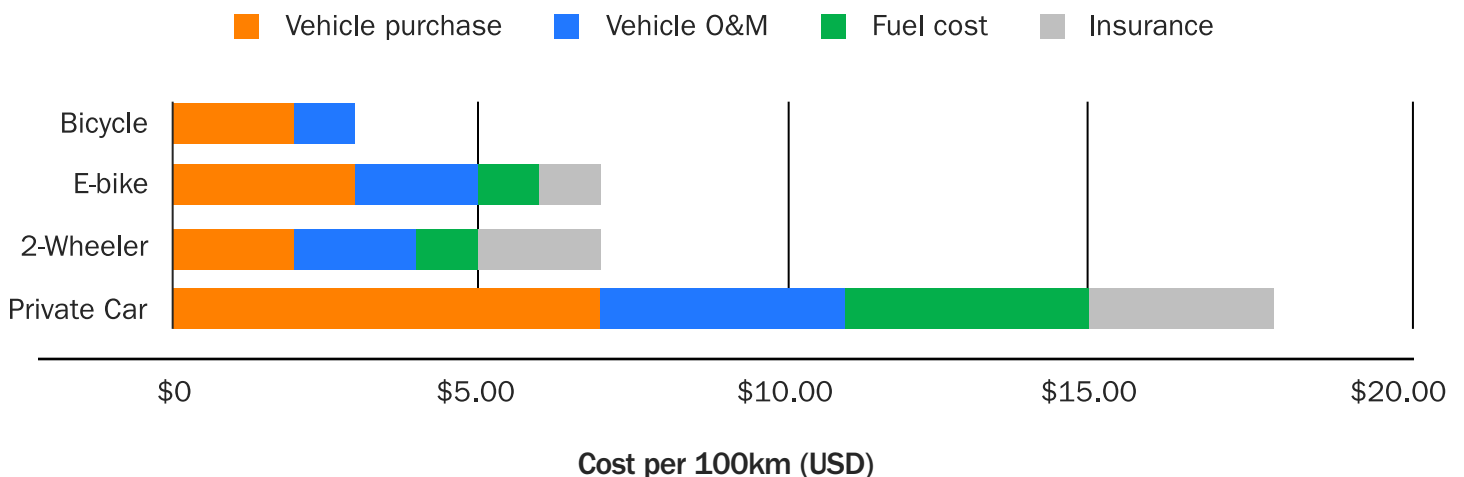
Investments in cycling infrastructure contribute to cost savings for individuals and society. They also generate local economic development that benefits governments (through increased property values and municipal revenues) and businesses (increased commercial retail sales).

1.1.1 Reducing car trips and avoiding car ownership minimizes costs to individuals

Average household spending on transportation in lower-density, car-centric neighborhoods is twice as much as spending on transportation in walkable and bikeable neighborhoods, according to the US Department of Housing and Urban Development.¹ Owning a vehicle entails more costs for individuals than just the purchase price: It presents recurring expenses like maintenance, fuel, parking, and insurance, but it can also lead owners to believe that using the vehicle for more trips is the best way to maximize their investment.

Because the majority of vehicle ownership costs are paid upfront (purchase) or on a scheduled basis (insurance, loan, or lease payment) and are not tied to the actual use of the vehicle, the marginal cost of each trip is low, which creates an incentive to maximize the benefit of those initial expenditures by using the vehicle more often. In most parts of the world, a new car costs more than the average annual household income; bicycles and even electric bicycles (e-bikes), on the other hand, cost less than 6% of annual income to purchase.² While bicycles do involve some maintenance costs, they are significantly less expensive than vehicle maintenance, and fuel, parking, and insurance costs are relatively low or even zero (in the case of pedal bicycles). Purchase, operations and maintenance, fuel, and insurance costs for a bicycle total approximately \$3.00 per 100km traveled; a private car is six times more expensive, at approximately \$18.00 per 100km.³

Total Cost per 100km Traveled



1. [Creating Walkable & Bikeable Communities.](#)

2. [The Electric Assist.](#)

3. [The Compact City Scenario—Electrified.](#)

In addition to saving money, individuals can also save time when shifting trips from vehicles to bicycles, especially during peak commute times when vehicle traffic congestion is highest, and where protected cycle lanes and other bicycle-friendly streets separate cyclists from vehicle traffic. This creates more reliable, virtually traffic-free trips for cyclists. In Mexico City, cycle lanes save users 11.5 minutes and 5.40 pesos per trip on average compared to using a different transport mode.⁴



In Patna, India, a 15% increase in trips made by bicycle would reduce premature mortality by 755 lives per year, and save the city \$166 million. Source: arun sambhu mishra via Shutterstock

1.1.2 Reducing vehicle trips and increasing bicycle trips minimizes costs to society

Replacing vehicle trips with bicycle trips improves health outcomes, reduces air pollution and greenhouse gas emissions, reduces congestion, and yields other societal benefits, most of which can be quantified:

A dramatic increase in cycling worldwide could save society \$24 trillion cumulatively between 2015 and 2050.⁵

- Every kilometer cycled generates €0.16 (\$0.18) in economic gains to society, and every kilometer driven costs society €0.15 (\$0.16), according to a cost–benefit analysis framework developed in Copenhagen, Denmark. This includes 6 costs (and benefits) associated with air pollution, climate change, noise, congestion, trip time, traffic crashes, health, vehicle and infrastructure operation and maintenance, and tourism.

Evaluations of the return on investment (ROI) of cycling infrastructure and other factors that increase cycling mode share demonstrate overall societal cost savings and increased economic productivity across several sectors, as discussed below.⁷ Some of these benefits are nonlocal, which suggests that regional or even national strategies aimed at reducing demand for vehicles and expanding bicycle use may be effective.⁸

► Savings from fewer premature deaths

Physically inactive lifestyles are a major cause of death: noncommunicable diseases associated with lack of exercise are increasingly prevalent in modern society. By promoting moderate everyday physical activity, cycling infrastructure contributes major benefits to public health, reducing premature mortality among the cycling population. This effect is especially meaningful among people older than 50, who are typically less likely to cycle without protected infrastructure.⁹

4. ITDP internal report. Project Evaluation: Mexico City Bike Lanes.

5. [ITDP A global high shift cycling scenario.](#)

6. [Transport transitions in Copenhagen: Comparing the cost of cars and bicycles.](#)

7. [Is the widespread use of urban land for cycling promotion policies cost effective? A cost-benefit analysis of the case of Seville.](#)

8. [Cost-benefit of bicycle infrastructure with e-bikes and cycle superhighways.](#)

9. [NACTO, Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities.](#)

The World Health Organization's [Health Economic Assessment Tool \(HEAT\)](#) can be used to predict the economic impacts of increased walking or cycling on reductions in premature mortality. Of course, public health improvements from increased cycling will also have benefits in reduced healthcare costs and increased quality of life, but the HEAT model does not include those effects.

- In Patna, India, a 15% increase in bicycle mode share equates to 755 lives saved per year due to increased physical activity and \$166 million per year in savings from premature mortality reductions.¹⁰
- In Toledo, Spain, a 5% increase in cycling mode share would contribute \$250,000 per year to the economy as a result of lives saved from noncommunicable disease.¹¹

Cost savings from the health sector also include fewer premature deaths as a result of better air quality.¹² Vehicles with internal combustion engines produce smog and soot that is harmful to human health, and they emit greenhouse gasses that contribute to climate change. Outdoor air pollution is a serious concern, especially in low- and middle-income countries, which account for 91% of premature deaths from air pollution.¹³ The World Health Organization recommends expanding cycling and walking networks as a key strategy to reducing air pollution and the associated burden of disease.

- The global cost of air pollution as a result of premature mortality, disability from chronic diseases, preterm births, and sick leave is estimated at \$2.9 trillion, or 3.3% of global GDP.¹⁴

- Air pollution costs Indian businesses at least \$95 billion, or about 3% of GDP,¹⁵ which could be reduced with fewer vehicle trips and more trips by bicycle.

► Savings from fewer road deaths

Traffic crashes involving cyclists and vehicles also contribute to premature mortality and disability, which present economic costs to society. Segregated cycle lanes and intersections that separate cyclists from vehicle traffic help to reduce serious crashes and associated economic costs, even as cycling makes up a larger share of all trips. For example, in Bogotá, Colombia, despite a significant increase in bicycle use from 0.2% of trips in 2000 to 7% in 2019, the city's cycle lane network decreased cycle-related deaths by 34% and injuries by 8%. An analysis of 16 European countries conducted by the International Transport Forum (ITF) shows that higher rates of cycling are associated with lower cyclist fatality rates.¹⁷

[10. Quantifying Health & Economic Benefits of Bicycle Superhighway: Evidence from Patna.](#)

[11. Spain: Toledo uses HEAT to calculate benefits of new cycle path.](#)

[12. Dutch cycling: Quantifying the health and related economic benefits.](#)

[13. Ambient \(outdoor\) air pollution.](#)

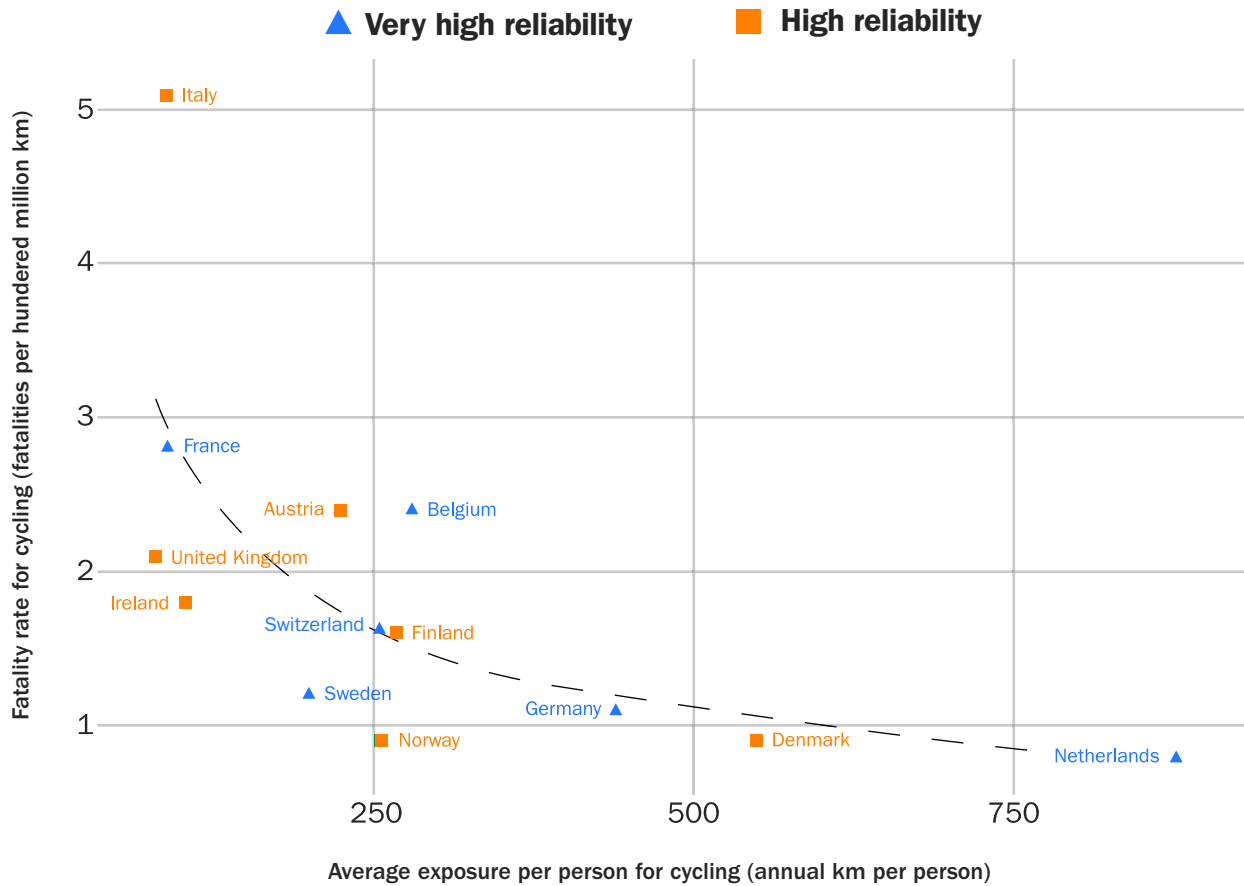
[14. Quantifying the Economic Costs of Air Pollution from Fossil Fuels.](#)

15. Upadhyay, Reecha. "Air Pollution and its Impact on Business and the Economy".

16. Cyclist Safety: An Information Resource for Decision-Makers and Practitioners.

[17. Exposure-Adjusted Road Fatality Rates for Cycling and Walking in European Countries.](#)

Rate of Cyclist Fatalities by Annual KM Cycled



*From the ITF's ["Exposure-Adjusted Road Fatality Rates for Cycling and Walking in European Countries"](#)

- Fatalities and serious injuries caused by inadequate cycling and walking facilities in African cities cost \$49 billion, approximately 2% of Africa's total GDP
- Reducing road crash mortality and morbidity by 50% over the course of 24 years would increase GDP by as much as 7% in Tanzania and the Philippines, 14% in India, 15% in China, and 22% in Thailand, according to an analysis by the World Bank.¹⁸

► Savings from fewer greenhouse gas emissions

- Cycling, including e-bike use, could feasibly increase worldwide from its current roughly 5% share of urban passenger trips to 18% by 2050. This increase, along with proportionate increases in walking and public transit, would reduce CO₂-equivalent emissions by about two gigatonnes annually which is more than half of the sector's emissions in 2015.¹⁹ At the current global social cost of carbon, this reduction would be valued at \$836 billion annually.²⁰

18. [The High Toll of Traffic Injuries.](#)

19. [The Compact City Scenario - Electrified.](#)

20. [Country-level Social Cost of Carbon explorer.](#)

- Achieving 15% of passenger miles traveled (PMT) by e-bike would reduce daily car PMT by 3.4 million and CO₂ emissions by 12%, according to a model for Portland, Oregon, US. An average reduction of 225 kg CO₂ emitted per year—valued at \$94—could be achieved by each individual e-bike.²¹
- The cost of air pollution and CO₂ for every 10 kilometers driven by car is €0.30, nearly 10 times the cost per 10 kilometers cycled, at €0.04.²²

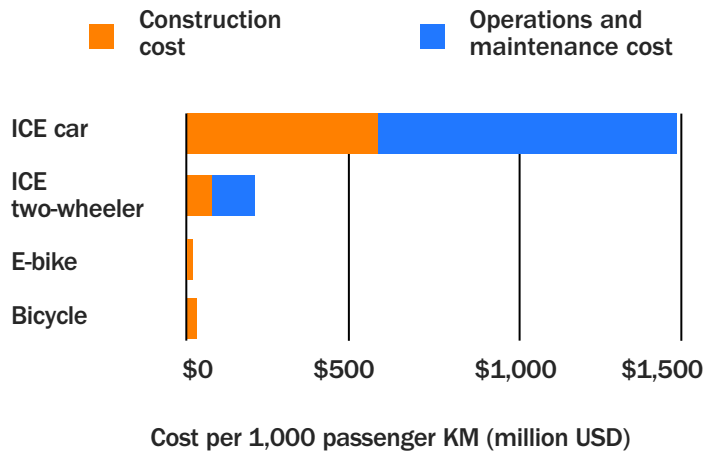


► Savings from reduced congestion

The major costs to society posed by traffic congestion are delays and lost time for both private and freight vehicles, which reduce economic productivity. Urban traffic congestion costs the US freight sector approximately \$66 billion annually,²³ and major US cities like New York City and Los Angeles lost \$11 billion and \$8 billion, respectively, due to traffic congestion (including private vehicles) in 2019.²⁴ Similarly, in Egypt, the estimated direct congestion costs for the Greater Cairo metropolitan area is between EGP13 and EGP14 billion (US\$827–\$890 million).²⁵ Congestion also contributes to air pollution (due to vehicles idling) as well as noise pollution and traffic crashes. While studies evaluating the direct impacts of increased cycling and walking on traffic congestion are minimal, improving facilities for cycling and walking is a low-cost, quick-to-implement approach to reducing congestion compared to alternatives like installing intelligent transportation systems (ITS) or expanding public transport capacity or service.²⁶ Impacts on congestion are anticipated to be greater when cycle lanes and pedestrian facilities are implemented together, offering more benefits as a network that can support trips between many different origins and destinations.

*In Jakarta, a city known for its congestion, protected cycle lanes give people an alternative to losing time sitting in traffic.
Source: ITDP Indonesia*

Infrastructure construction and maintenance costs by mode



- In Washington, DC, Capital Bikeshare reduces neighborhood traffic congestion by 4%, which is valued at approximately \$120,000 in lost time saved.²⁷

21. [The E-Bike Potential: Estimating regional e-bike impacts on greenhouse gas emissions.](#)

22. Buehler and Pucher, 2021. *Cycling for Sustainable Cities*. p.151.

23. [Bottlenecks/ Congestion/ Infrastructure Funding.](#)

24. [Global Traffic Scorecard.](#)

25. [Cairo Traffic Congestion Study.](#)

26. [The Role of Walking and Cycling in Reducing Congestion.](#)

27. [Bicycle infrastructure and traffic congestion: Evidence from DC's Capital Bikeshare, Inrix 2020 Global Traffic Scorecard.](#)

► Savings from less car Infrastructure

Car-specific infrastructure like parking garages, surface parking lots, signals, etc., presents construction and maintenance costs as well as societal costs, such as sprawl.

When it is not necessary to build and maintain new roads, car parking, and other vehicle supportive infrastructure, that frees up budget for other uses.

- Infrastructure construction and maintenance for cars costs nearly \$1.5 billion per 1,000 passenger kilometers (PKM) globally, compared to bicycles at \$10.4 million per 1,000 PKM.²⁸



*Less car infrastructure can open spaces for social recreation.
Source: ITDP Brazil*

1.1.3 High-quality cycling infrastructure raises property values and municipal revenues

Residential property values have been used to signal preference for amenities such as parks and green space, showing that current and potential homeowners are typically willing to pay more to live near these amenities. Similarly, the presence of cycling infrastructure in urban neighborhoods has been shown to impact property values. A study conducted using home values in Tempe, Arizona, in the US found that areas with a higher density of bicycle infrastructure also have higher home sale prices.²⁹

In that study, proximity to cycle infrastructure that separates cyclists completely from vehicle traffic, such as off-street trails, was associated with higher home values compared to proximity to on-street cycle lanes. Studies from Portland State University, the University of Cincinnati, and the University of Delaware show that **property values rise the closer homes are to high-quality cycle infrastructure networks and that the density of infrastructure is linked to higher values for all property types** (not just residential).³⁰

This benefits homeowners by increasing the value of their home, but it also generates more property tax revenue for cities, which is especially beneficial when such revenue supports public services like education, water, and sewage services.

However, increased property values do not positively impact all groups—renters and some long-time homeowners lose out, for example. Cities that assess property taxes typically do so based on property value, and these taxes can become unaffordable if property values rise too much, too quickly. This can lead to displacement, particularly of vulnerable groups like renters. However, this does not mean that installing bicycle infrastructure leads to displacement: A study published in 2021 of 29 US cities found no significant relationship between the presence of bicycle lanes and socioeconomic or demographic changes to neighborhoods, leading researchers to suggest that installing cycle lanes is not linked to displacement.³¹

[28. The Compact City Scenario - Electrified.](#)

[29. The Association between Residential Housing Prices, Bicycle Infrastructure and Ridership Volumes.](#)

[30. Liu & Shi, Impact of bike facilities on residential property prices; Karadeniz, Exploring active transportation investments and associated benefits for municipal budgets: a scoping review; Racca & Dhanju, Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas.](#)

[31. Bicycling facility inequalities and the causality dilemma with socioeconomic/sociodemographic change.](#)

1.1.4 Improving access by bicycle to commercial areas results in higher retail sales

Pedestrians and cyclists spend more per month, especially at food service businesses, than drivers do. In fact, cyclists have been found to spend more per trip and to make shopping and dining trips more often than drivers.³² Shared e-scooter programs in cities have been linked to statistically significant increases in unplanned spending (at a rate of more than \$900 per e-scooter) by riders at local quick-serve restaurants and stores that sell food and beverages.³³ This is contrary to the perception of many local business owners that customers who drive (and park close) to their businesses account for the highest percentage of their sales.³⁴ It is also contrary to the perception that reducing access to local businesses by car, such as by reducing or removing vehicle parking, will translate to financial losses.³⁵

Data from corridor improvement projects in several US cities and Toronto shows that both the number of customers and customer spending increase (or there is no significant impact) as a result of adding bicycle lanes in commercial areas.³⁶ Similarly, in Seoul, South Korea, after Yonsei-ro, once a heavily congested four-lane road, was redesigned as a pedestrian-priority and bus-only corridor, commercial businesses saw an 11% increase in revenue-generating transactions and a 4% increase in total revenues compared to when the street was designed for cars.³⁷ Cities in Germany, Denmark, France, and the United Kingdom have also reported retail sales increasing after pedestrianization and cycle-supportive redesigns.³⁸ It is important to note, however, that other variables aside from the street design may have contributed to reported changes in retail sales. Still, it appears that costs incurred from reallocating space from cars to cyclists and pedestrians are, for the most part, outweighed by more sustainable transport trips that generate equivalent or higher revenues compared to car trips.



Cyclists are good for business - they make more frequent shopping and dining trips, and spend more per trip, compared to drivers. Source: Shawn Goldberg via Shutterstock

Increased retail sales are not only beneficial for local businesses but also for governments that rely on revenue from consumption taxes (which includes value added tax and sales tax). Consumption taxes make up approximately one-third of the total revenue raised on average by countries with free-market economies (OECD countries), but they can make up a much larger share of total revenue raised, as is the case in Chile, where consumption taxes account for 53% of federal revenue.³⁹ Therefore, investments in cycle infrastructure can be helpful in growing national budgets, especially when those budgets are linked to revenues from consumption.

[32. Bicyclists as Consumers: Mode Choice and Spending Behavior in Downtown Davis, California.](#)

[33. Wheels to Meals: Measuring the Economic Impact of Micromobility on the Local Economy.](#)

[34. Reallocation of road space.](#)

[35. The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling.](#)

[36. Liu & Shi; Volker & Handy; Arancibia et al.](#)

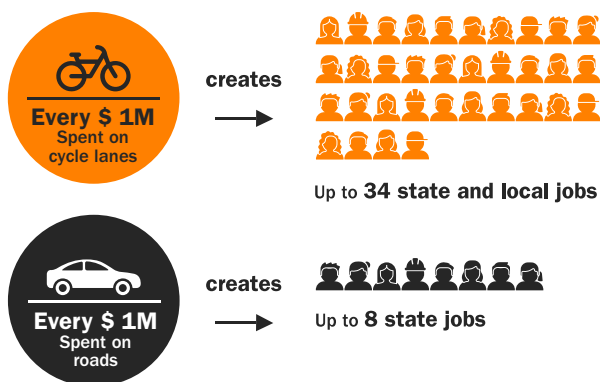
[37. Yonsei-ro, Seoul's First Transit Mall.](#)

[38. The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling.](#)

[39. Income Taxes in Chile.](#)

1.2 More demand for bicycles spurs jobs and economic opportunities

Bicycle-related industries provide jobs, especially in regions where demand for cycling is relatively high. Jobs in the cycling sector can be grouped into the following categories: bicycle and parts manufacturing; retail, including sales, repair, and services; infrastructure, including shared micromobility; and bicycle tourism. In Europe, where data on bicycle industries is widely available, bicycle tourism makes up the largest share of cycling sector jobs, accounting for approximately four out of every five bicycle-related jobs.⁴⁰ The bicycle tourism sector has grown in places where bicycle-friendly environments (i.e., connected, protected cycle lanes) and positive attitudes toward—and demand for—cycling have been achieved.⁴¹ Higher demand for and use of bicycles as a result of cities building high-quality cycle infrastructure can also cultivate new markets and economic growth. Indeed, there are currently an estimated 1.8 billion bicycles in use globally, serving an urban population of 3.9 billion. There is certainly potential to expand this market.⁴²



Demand for bicycles fuels market growth and creates jobs in these and related industries. Economic impact analyses show that investments in cycling infrastructure generate employment opportunities, but the extent of these vary significantly by project type and location. Estimates from the US suggest 10 to 23 jobs at the state level and 8 to 11 at the municipal level could be

generated for every \$1 million spent on cycling and walking infrastructure projects. The International Energy Agency (IEA) presents similar estimates: between 8 and 24 jobs per \$1 million invested in cycling and pedestrian infrastructure.⁴³ Comparatively, for every \$1 million spent on road projects, an average of eight state-level jobs are created. For bicycle infrastructure projects, a large portion of the budget is spent on labor-intensive planning and design work carried out by engineers and construction workers, while road project budgets focus more on construction equipment and materials, like asphalt or concrete.

Bicycle infrastructure projects also yield more direct jobs (as opposed to indirect or induced jobs) than roads and even pedestrian and trail projects.⁴⁴ Additionally, there is potential for employment as a result of increased retail spending on cycling-related products, parts, and services. An estimated 11 to 26 jobs at the state level could be generated for every \$1 million in revenue from bicycle-oriented businesses.⁴⁵

1.2.1 Bicycle manufacturing

Investment in cycle infrastructure and services expands the market for bicycle manufacturing. In the European Union, a doubling in bicycle mode share would increase jobs in bicycle manufacturing and wholesale by 42%.⁴⁶ This presents an economic opportunity for national economies, in terms of job creation and also revenue from product sales and exports. Markets for bicycles, e-bikes, and cargo bikes, in particular, are growing. Industry forecasts estimate that the value of the global bicycle market could reach \$34.6 billion by 2027, up from \$29.2 billion in 2020.⁴⁷ Growing markets lead to higher sales revenues, which in turn create jobs. Furthermore, jobs manufacturing “durable goods”—like bicycles and any other goods with a life span of more than three years—help generate additional jobs in the supply chain, as well as indirect jobs supported by the re-spending of income.⁴⁸

[40. Economic Benefits of Increased Cycling](#)

[41. Urban cycling mobility: Management and urban institutional arrangements to support bicycle tourism activities—case study from Curitiba, Brazil.](#)

[42. The Compact City Scenario—Electrified.](#)

[43. Employment multipliers for investment in the transport sector.](#)

[44. Pedestrian and Bicycle Infrastructure: A National Study Of Employment Impacts.](#)

[45. Brown et al., Economic Impacts of Active Transportation in New Jersey; Economic impact of bicycling and walking in Vermont; Venegas, Economic Impact of Recreational Trail Use in Different Regions of Minnesota.](#)

[46. Economic benefits of increased cycling.](#)

[47. Bicycles—Global Market Trajectory & Analytics.](#)

[48. Updated employment multipliers for the US economy.](#)



Source: Bamboocycles

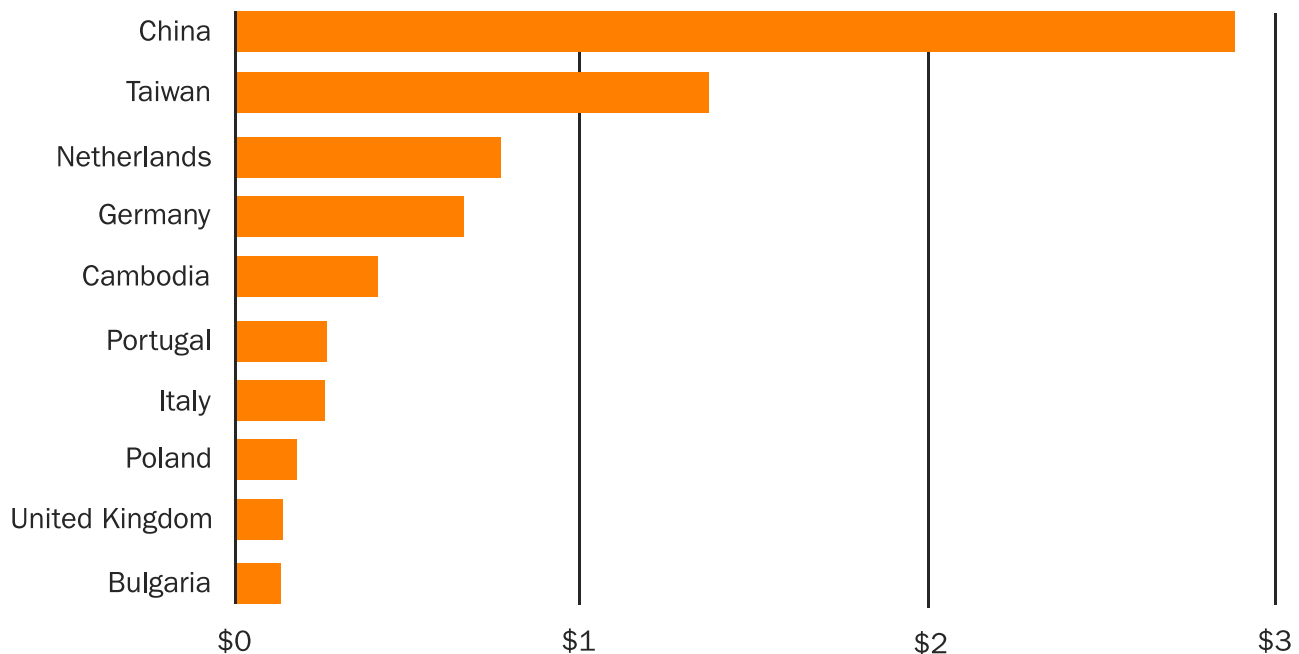
In 2018, the global market for bicycle imports and exports, not including bicycle parts or accessories, was \$9 billion; the market was less than \$4 billion in 2000.⁴⁹ China and Taiwan, the top two bicycle exporters in the world, generate nearly \$3 billion and \$1.3 billion in bicycle exports, respectively.⁵⁰

Brazil produces 2.5 million bicycles per year, which makes it the largest producer in Latin America.⁵¹ The industry generated \$379 million in revenue in 2017 (1.8% of GDP), and it is forecast to generate nearly \$410 million per year by 2023.⁵²

In Europe, bicycle and e-bike sales as a whole have remained relatively stable over the past decade, hovering around 20 million units per year. In recent years, however, e-bikes have been making up a larger share of overall bicycle sales, reaching 17% of bicycle sales and surpassing 3 million sold between 2018 and 2019.⁵³

In 2020, demand for bicycles and accessories was the highest it has been in decades due to restrictions on other travel modes as a result of the COVID-19 pandemic. In fact, demand for bicycles in Europe during the first half of 2020 increased more than 50% compared to the same period in 2019. Bicycle sales skyrocketed to the point where retailers were struggling to meet demand. Caloi, a bicycle manufacturer based in Brazil, saw record numbers of orders.⁵⁴

Value of Bicycle Exports (in billions), 2019



49. Access to Affordable Bicycles: Summary of the Findings from the Literature Review and Key Informant Interviews.

50. UN Comtrade.

51. Dados do Setor 2021.

52. Forecast: Industry revenue of “Manufacture of bicycles and tricycles, not motorised” in Brazil 2011–2023.

53. A New Era for Cycling in the Post Covid-19 Outbreak.

54. Inside The Call: Dorel Sees Heightened Interest In Cycling as the “New Normal.”

Demand for bicycles was further supported by local and national policies that offered financial subsidies or stipends toward the purchase of a new bicycle or e-bike, or even bicycle maintenance.⁵⁵ In some cities, bicycle retail and repair businesses were categorized as essential, allowing them to remain open during the public health emergency when other businesses were forced to close. Temporary cycling infrastructure that facilitated safe, direct, uncrowded trips further encouraged demand. Electric cargo bikes, built to carry goods or additional passengers, also saw an uptick in sales, especially in Europe.⁵⁶



The increased demand for bicycles also presents opportunities for jump-starting local bicycle manufacturing. Since bicycles require fewer parts and are less complicated to assemble, production is notably less expensive than for other modes, specifically cars. The cost to manufacture a \$300 bicycle (the average purchase price of a new bicycle) ranges from \$80 to \$100 (up to 33% of the purchase price), while manufacturing a \$50,000 automobile could cost anywhere from \$35,000 to \$40,000 (up to 80%).⁵⁷

1.2.2 Bicycle tourism

Expanded infrastructure supporting cycling and access to bicycles also cultivates new economic opportunities like bicycle tourism, which is typically recreational in purpose and features multiday trips where noncompetitive cycling is a fundamental part of the trip.⁵⁸ In the Outer Banks of North Carolina in the US, a coastal area known for its beaches, a one-time investment of \$6.7 million into cycling infrastructure generates roughly \$60 million in economic activity each year through cycle tourism.⁵⁹ Cycle tourism has similarly become popular in Europe: The cycle tourism sector is worth €44 billion per year, which is 16% more than the European cruise sector.⁶⁰

Amateur cycling races become touristic events for the hosting cities. Source: Raul Dominguez via Flickr

Infrastructure to support cycle tourism is key to unlocking this market. For example, the EuroVelo initiative, a network of 17 long-distance cycle routes connecting the whole European continent and spanning more than 90,000 kilometers, supports over 2.3 billion cycle tourism trips each year.⁶¹ Notably, most cycle tourism happens outside of urban contexts—traveling long distances across several cities or countries—however, there is growing interest in urban cycle tourism as a unique way to experience cities.⁶² Safe cycle infrastructure combined with placemaking and lively public space initiatives can draw tourists as well as support everyday cycling for local residents.

The cycle tourism industry has had a positive impact in both the United Kingdom and France. In the UK, the industry contributes 650 million annually to the economy and generates almost 36,000 jobs. The country's cost-benefit ratio for investing in cycle infrastructure is 13:1, largely as a result of cycle tourism.⁶³ Meanwhile, in France, bicycle tourists spend on average €68 a day, which is €13 more than other tourists.

55. [Bernhard, A. The great bicycle boom of 2020.](#)

56. [European Cargo Bike Industry Survey Results 2021.](#)

57. Internal calculations conducted by authors.

58. [Cycle Tourism Information Pack.](#)

59. [Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure.](#)

60. [Economic benefits of cycling in EU 27.](#)

61. [Discover Europe by bike!](#)

62. [Urban bicycle tourism: path dependencies and innovation in Greater Copenhagen.](#)

63. [Cycling UK, Economic Benefits of Cycle Tourism.](#)

This generates €5.1 billion per year, which is an increase of 46% over the last 10 years as new cycling infrastructure has been added.⁶⁴ Cities like Curitiba in Brazil have also begun to invest in cycle tourism as a way to attract new tourists and raise awareness around everyday cycling in the city.⁶⁵

As cycle tourism becomes more popular, cities are seeing greater demand for supportive industries too, like long-term bicycle rentals. In France, it is estimated that the market for tourist bicycle rentals is €178 million per year.⁶⁶ Both cycle tourism and long-term bicycle rentals could expand as cities invest in local and even regional cycle lane networks.

1.2.3 Private investment in shared micromobility

Shared micromobility is a rapidly growing industry where private companies operate a fleet of bicycles (or other small, lightweight vehicles like electric scooters [e-scooters]) that residents and tourists alike can rent for a single trip, a day, a week, or more. Bikeshare has been referred to as “the fastest growing mode of transportation” in history⁶⁷ since experiencing widespread uptake starting in 2011. E-scooter share also experienced swift adoption by users following its arrival in cities in 2017, faster than carshare and station-based bikeshare.⁶⁸ Currently there are more than 1,800 bikeshare programs worldwide,⁶⁹ and that number is growing in every region. In 2021, Kigali, Rwanda, launched its first bikeshare program, with other African cities like Cairo looking to do the same in the near future.⁷⁰

In 2017, a new business model for shared micromobility emerged: operation of shared fleets by private “startup” companies supported financially by significant amounts of venture capital.



In Kigali, residents participate in a Car Free Day by riding shared bicycles from Guraride, a Rwanda-based bike- and scooter-share operator. Source: Rwanda Walk & Cycle Campaign

This meant that companies could spend a lot upfront to gain users and market share without worrying about generating revenue. Several companies quickly achieved valuations of over \$1 billion. More shared micromobility vehicles on city streets meant more people riding shared bicycles and e-scooters—total rides taken on e-scooters has grown by 140% each year, presenting a significant opportunity for growth, especially as new models and vehicle types are introduced to the market.⁷¹ And while venture capital investment in shared micromobility has waned, particularly following widespread and severe drops in ridership due to COVID-19 travel restrictions,⁷² the industry rebounded faster than other transportation modes like public buses and metros, and it is still growing. In fact, it is estimated that the global market potential for shared micromobility could reach \$500 billion by 2030.⁷³

64. [Impact économique et potentiel de développement des usages du vélo en France en 2020.](#)

65. [Urban Cycling and Mobility.](#)

66. [Impact économique et potentiel de développement des usages du vélo en France en 2020.](#)

67. [Bike Sharing Goes Global](#)

68. [The Micromobility Revolution: The Introduction and Adoption of Electric Scooters in the United States.](#)

69. [The Meddin Bike-Sharing World Map.](#)

70. [Rwanda Launches Africa's First Bike-Share Transport System](#)

71. [The future of micromobility. How VCs and e-scooters kicked off the future of micromobility.](#)

72. [The future of micromobility: Ridership and revenue after a crisis.](#)

73. [Sizing the micro mobility market.](#)

The shared micromobility industry has also spurred job creation at city agencies, operating companies, equipment suppliers, etc. Approximately 5,000 full-time-equivalent jobs are attributed to the micromobility industry in North America, or one job for every 30 vehicles.⁷⁴

Investments in cycle infrastructure can help attract existing shared micromobility operators to offer their services, but it can also encourage private investment in locally based shared micromobility companies. Cities with established cycle infrastructure can provide safe, comfortable riding environments for people using shared micromobility, and especially users who may not cycle regularly. By expanding their cycle infrastructure, cities in nascent shared micromobility markets like Africa could capitalize on investment interest in the micromobility industry. Infrastructure expansions could also expand domestic manufacturing to meet demand for shared and personal bicycles.⁷⁵



*E-bikes can deliver packages at 50% fewer miles traveled per package compared to delivery vans.
Source: David Fuentes Prieto*

1.2.4 Improved logistics for local goods delivery

Improving cycle infrastructure can help support and expand viability for local goods delivery while also reducing emissions and road safety concerns posed by large, fossil fuel-powered delivery vehicles. Local deliveries are typically carried out using trucks or vans, which contribute inequitably to congestion, air pollution, and unsafe streets for cyclists and pedestrians. The “last mile” in urban freight delivery often poses the highest delivery costs and is where delays in shipping typically occur.

E-bikes and cargo bikes, with or without electric pedal-assist, are growing in popularity in dense urban areas as replacements for both high volume (such as mail and large commercial deliveries) and low-volume (such as food or small goods deliveries) delivery vehicles. In France, La Poste (the postal service) has invested in 30,000 e-bikes for last-mile deliveries.⁷⁶ Meanwhile, pilot projects in Croatia, Italy, and the United States have found e-bikes to be significantly more efficient and cost effective than traditional delivery by van. A pilot in Seattle, Washington found e-cargobikes delivered packages at 50% fewer miles traveled per package, and one e-cargobike mile replaced 1.4 delivery truck miles.⁷⁷ Efficiencies and cost savings free up capital to hire more employees, contributing further to the local economy.⁷⁸ This could also be particularly impactful with adapting to the rise in e-commerce. The global same-day delivery service market is anticipated to increase to \$11.43 billion by 2025, up from \$4.49 billion reported in 2020.⁷⁹

On the low-volume side, Asian and Latin American cities are experiencing more local deliveries by bicycle and e-bike. Across Chinese cities, more than 10 million people are employed as food or goods delivery workers, and many of them are using bicycles or e-bikes.

[74. Shared Micromobility State of the Industry Report: 2020.](#)

[75. Rwanda Launches Africa's First Public Bike-Share Transport System.](#)

[76. Pro E-Bike, A New Move for Business: Electric Cycle Logistics in European Cities.](#)

[77. The Seattle Neighborhood Delivery Hub Pilot Project: An Evaluation of the Operational Impacts of a Neighborhood Delivery Hub Model on Last-Mile Delivery.](#)

[78. Economic Analysis of Cargo Cycles for Urban Mail Delivery.](#)

[79. Rapid Expansion of the Ecommerce Industry Drives the Same-Day Delivery Services Market as per the Business Research Company's Same-Day Delivery Services Global Market Report 2021.](#)

In Guangzhou, 60% of e-bike riders use their e-bikes to deliver food or goods locally.⁸⁰ In Rio de Janeiro, cargo bikes have had a huge impact on the economy. A survey of cargobike use in the Copacabana neighborhood of Rio de Janeiro showed that 372 businesses used cargo bikes for local deliveries, with each business supporting at least two full-time cycle delivery workers making around 30 trips per day.⁸¹ Business owners expressed that cargo bikes were crucial to the profitability and viability of their businesses.⁸² In addition to cost savings, replacing delivery trucks and vans with cargo bikes enables faster delivery times, especially where there is infrastructure to support cycling. Businesses and individuals also benefit from expanding the employee pool beyond those who have access to a vehicle.⁸³ Additionally, decreased congestion and fewer serious injuries or fatalities from crashes with cyclists and pedestrians yields economic benefits ([see section 1.1](#)).



*Bicycle-supported street vending enables vendors to maximize revenue by moving to different locations throughout the day.
Source: PradeepGaur via Shutterstock*

1.2.5 Street vending and the informal economy

Finally, cycling infrastructure and access to bicycles, especially traditional and electric cargo bikes and tricycles that can hold large, heavy goods, supports the street vending economy in cities where informal vending is prevalent. It is difficult to estimate the size of informal vending sectors or to what extent they contribute to local and national economies; however, the number of street vendors tends to be higher in places where trading accounts for a significant portion of the economy. In Lima, Peru, 9% of the urban employed population are street vendors; in Hanoi, Vietnam, the share is 11%, and in Dakar, Senegal, it is 13%. In these cities and others, street vending is dominated by women.⁸⁴

In Mexico City, street vendors often use carts and bicycles to move goods to their vending location or to different sites throughout the day

to maximize revenue, some even selling directly from their bicycles.⁸⁵ Safe cycle infrastructure would encourage more vendors to transport their goods via bicycle as opposed to using vehicles, which present high purchase and maintenance costs, parking challenges, and lost time due to traffic. Government subsidies to purchase cargo bikes and e-cargo bikes,⁸⁶ which are typically more expensive and difficult to find compared to road or commuter bicycles, could also encourage a shift to cycle-based informal vending. In India, replacing older tricycles used for deliveries with electric cargo bikes could boost supply chains and logistics businesses run by small-time vendors.⁸⁷ Enabling safe, comfortable bicycle transport for street vending not only benefits the vendors themselves but ensures that vulnerable groups like the urban poor and those who are food insecure continue to have access to food outlets provided by informal vendors, which are more affordable than grocery stores.⁸⁸

80. Data gathered internally by ITDP China.

81. [The Benefits of Cargo Bikes in Rio De Janeiro: A Case Study.](#)

82. [The Benefits of Cargo Bikes in Rio De Janeiro: A Case Study.](#)

83. [E-Bikes Are Changing the Way Companies do Business.](#)

84. [Street vendors and cities.](#)

85. [Insights from Mexico City: The Right to Mobility and Work in Public Space.](#)

86. [A database of financial incentives to purchase bicycles in European countries is available at: <https://ecf.com/resources/financial-incentives>.](#)

87. [Potential of E-Cargo Bikes in India.](#)

88. [Street vendors and cities.](#)

Part II: Unlocking the economic benefits of cycling

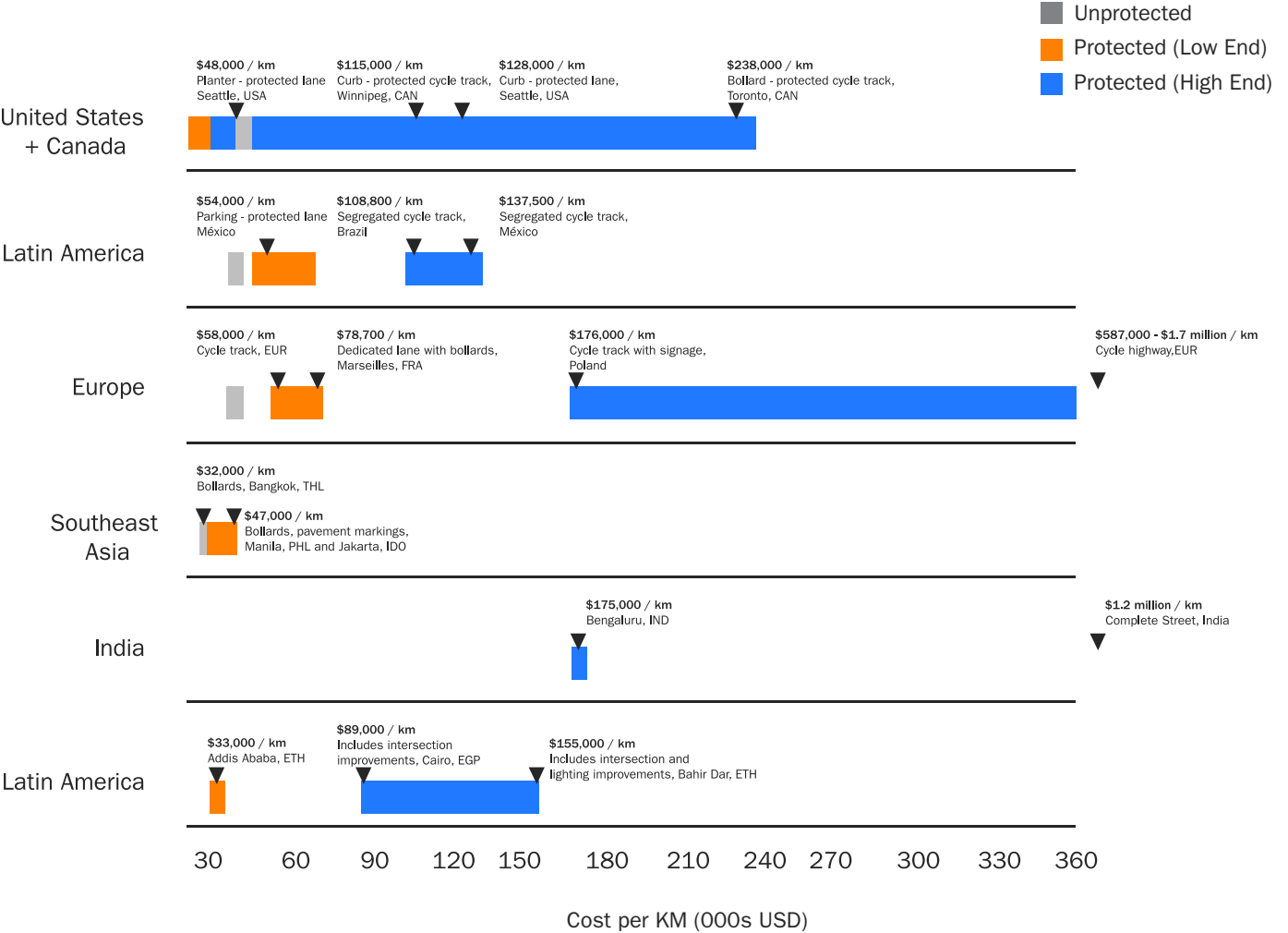


To realize the benefits described in Part I, cities must dedicate funding to build and maintain a connected network of cycle infrastructure or seek investment from external sources like development banks or philanthropy to do so. Some infrastructure projects, like cycle highways or building out a cycle lane network, require significant investment, and other projects require more targeted, tactical funding. While some investments will be more impactful than others, the return on investment for a network of safe and convenient bicycle infrastructure is high.

It is also important to note that in addition to high-quality cycle lanes, supportive infrastructure and policies that expand access to bicycles will be needed to maximize benefits. The upfront purchase cost of a bicycle is, in many cities, a significant barrier to cycling, especially in countries

where domestic manufacturing of bicycles is limited and imported bicycles are subject to high value added taxes (VAT).⁸⁹ Not knowing how to ride a bicycle, which is especially prevalent among women, is also a major barrier regardless of cost. Investments in supportive infrastructure like bikeshare can help to reduce these barriers to accessing a bicycle as well as eliminate the need to purchase accessories like a helmet or lock. Bikeshare also shifts both the cost and responsibility for maintenance from the individual to the system operator. Analyses of public bikeshare systems in Europe show that every euro invested generates health and economic gains valued between €1.37 and €1.72.⁹⁰ Furthermore, financial subsidies to individuals to help bring down the cost of purchasing a bicycle can also help encourage more everyday cycling.

Cycle Lane Costs per Kilometer, by Type and Region



89. View of Bicycling in Addis Ababa, Ethiopia: Opportunities and challenges.
 90. The Economic Impact of Bike Sharing in European Cities.



A temporary cycle lane installed in response to the COVID-19 pandemic in San Luis Potosi, Mexico provides minimal protection for cyclists from vehicular traffic. Source: Mirell Betanzo

The costs of building cycling infrastructure vary significantly across regions, largely due to differences in the cost of materials and labor. Unprotected cycle lanes—those with no physical separation between cyclists and vehicle traffic—are the least expensive to implement, simply requiring paint and relatively minimal labor to install. However, unprotected lanes do not provide enough safety and comfort for most people who cycle, and thus they do not convince enough people to cycle for everyday trips.⁹¹ In other words, while the cost to implement is low, the return on investment is also low: Installing unprotected bicycle lanes can be counterproductive, costing cities more in public backlash and political capital when there is no visible increase in the number of people using the infrastructure and/or no fewer traffic crashes involving cyclists.

A study conducted in Victoria, Australia, showed that the passing distance between vehicles and cyclists was closer (and therefore cyclists were at higher risk) on streets with unprotected cycle lanes than on streets with no cycle infrastructure at all.⁹²

Installing and maintaining cycling infrastructure is much less expensive compared to other transport infrastructure like roadways (at least \$1 million/lane km), metros (at least \$50 million/km),⁹³ or even bus rapid transit (at least \$700,000/lane km).⁹⁴ However, a network of high-quality, protected bicycle lanes can be a significant investment especially when considering supportive infrastructure and comprehensive street redesigns. Tying investments in bicycle parking improvements and bikeshare to a cycle lane network build-out addresses related security and access barriers in addition to providing safe spaces to ride. Secure parking infrastructure, especially for more expensive e-bikes, is particularly important since riders are less likely to purchase a bicycle and cycle regularly if they fear their bicycle will be stolen. Therefore, designated and secure bicycle parking is crucial to support the large-scale uptake of e-bikes needed to achieve the improved health and climate outcomes described in Part 1.

Including intersection improvements and redesigning key streets within the cycle lane network as Complete Streets—ones that shift priority away from motorized vehicles and reallocate space to transit, cycling, walking, and public space—also require significant investment. In some cases, Complete Streets redesigns require relaying or diverting utility (including stormwater, drainage, sewage, electricity, etc.) lines, which presents additional costs.⁹⁵

[91. Diversifying and normalising cycling in London, UK: An exploratory study on the influence of infrastructure.](#)

[92. How much space do drivers provide when passing cyclists? Understanding the impact of motor vehicle and infrastructure characteristics on passing distance](#)

[93. Comparison of Capital Costs per Route-Kilometer in Urban Rail.](#)

[94. BRT Planning Guide Sample Operator Contract and Infrastructure Cost Calculator.](#)

[95. Complete Streets Best Practices | Complete Streets Toolkit: Volume VII, p. 25.](#)



*Complete Street in Quito, Ecuador.
Source: Ecuadorpostales via Shutterstock*

For example, in India, “completing” a street by adding a dedicated cycle track, pedestrian space, signage, lighting, and other public space elements costs approximately \$1.2 million per kilometer, compared to the estimated \$175,000 per kilometer cost to install a dedicated cycle lane.

While this type of comprehensive approach to implementing cycling infrastructure poses high upfront costs, the return on investment is much higher than smaller one-off or low-quality cycle lane projects. Protected cycle lanes can be double the cost per kilometer of unprotected lanes, but they provide much more safety and comfort. An analysis of Seville, Spain’s protected cycle lane network, installed in 2006 at a cost of approximately €17 million, shows a net value of €557 million and an internal rate of return (the annual growth rate of an investment) of more than 130% by 2032.⁹⁶ Copenhagen, Denmark’s cycle superhighway network plan is expected to have an internal rate of return of up to 23%.⁹⁷ Lima, Peru’s cycling infrastructure plan, estimated to

cost \$313,000 to implement, is expected to generate \$5.56 million in benefits by 2050.⁹⁸ These rates are high compared to large roadway projects, which have rates of return between 8% and 10%.⁹⁹

Cost-benefit analyses of cycle lanes often include a future scenario where cycling mode share increases significantly and benefits grow as a result. This is because a network of cycle lanes provides access for many people to many different destinations, compared to disconnected lanes that only provide access for a few people to a few destinations. Thus, the return on investment for cycle infrastructure projects increases with more connections and greater use. Protected, connected, and direct cycle lanes present the highest potential for use, and these can generate significant increases in cycling, as was seen during the COVID-19 pandemic when cities implemented temporary cycle lanes.



*Beijing’s bicycle expressway is elevated above the street and features stairs with wheel ramps at entry points.
Source: ITDP China*

[96. Is the widespread use of urban land for cycling promotion policies cost effective? A cost-benefit analysis of the case of Seville.](#)

[97. Cost-benefit of bicycle infrastructure with e-bikes and cycle superhighways.](#)

[98. What would happen if the bike was used more in Lima?](#)

[99. Meta-analysis of rate of return on road projects.](#)

Streets designed to be accessible by mode in Mexico City



Cars, two-wheelers, cabs



Bicycles

In Jakarta, pop-up protected cycle lanes on Sudirman-Thamrin Street, a main thoroughfare that also supports the TransJakarta BRT, helped increase cyclist counts by 46% at the Dukah Atas station and 28% at the Karet station.

The temporary protected lane on Av. Insurgentes in Mexico City supported a 275% increase in cyclists during the pandemic and is being made permanent.¹⁰⁰ In addition to Bogotá's existing 550 km network of cycle lanes, 75 km (47 miles) of temporary lanes implemented over the course of a few days early on in the pandemic encouraged Transmilenio BRT riders to shift to cycling to reduce crowding, and they supported about 400,000 daily bicycle trips (down from more than 880,000 before the pandemic).¹⁰¹ Investing in cycling infrastructure is an investment in the resiliency of the transportation system.

Unanticipated health, climate, and natural disasters threaten the ability to travel by car and by public transportation if damage blocks key roadways and power and telecommunications systems are disrupted. We saw this most recently with the COVID-19 pandemic, but cities have experienced these types of disruptions before: Notably, following the earthquake in Mexico City in 2017, bicycles served not only as a mobility option but as a way to quickly deliver medicines and other essential goods and to survey damage before cleanup equipment and crews arrived.¹⁰² Bicycles are an adaptable, flexible transport mode when other modes fail, keeping people and commerce moving and minimizing costs associated with an economic standstill. Cycling is both a means to avoid the worst climate impacts and a means of adapting to these impacts. We can unlock the economic, climate, and health benefits of cycling by strategically investing in cycling now.

[100. SEMOVI to Install Permanent Bike Lane on Insurgentes.](#)

[101. To Tame Traffic, Bogotá Bets Big on Bike Lanes.](#)

[102. Parks and Bicycles Were Lifelines After Mexico City's Earthquake.](#)