

Policy Brief

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Three Transportation Revolutions: Synergies with Transit

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In November 2016, the Institute of Transportation Studies at the University of California, Davis (ITS-Davis) convened leading academic, government, private industry, and public interest stakeholders to explore science-based policies that could steer the three transportation revolutions- shared mobility, electrification, and autonomous vehicles, toward the public interest.

This policy brief reflects the opinions of the authors and not UC Davis. This brief is one in a series that presents a range of policy concepts, recommendations and research needs discussed at the Three Revolutions Conference.

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Summary

The three revolutions in vehicle sharing, electrification and automation have the capacity to enhance or diminish conventional public transportation bus and rail transit services. Because the three revolutions are rapid, disruptive and not wholly under government control, policymakers and researchers must pay close attention to how they integrate into legacy and future transit systems.

Introduction

The three revolutions could offer starkly different futures for transit. One can imagine communities that were once just out of reach of mass transit undergoing economic revitalization as ride-sharing services connect them to city centers. On the other hand, the low cost and convenience associated with the three revolutions could also lead to further degradation of public transit services and infrastructure

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as customers opt out of legacy systems.

The fundamental goals of public transportation – making quality mobility publicly available while minimizing resource consumption and negative externalities – is complementary to the goals underlying the three transportation revolutions. Thus, the future of public transportation and shared, automated and electric mobility are inherently related. In addition, public transportation is synergistic with the three revolutions in that a shared ecosystem of transit options can reduce the impact of their travel and increase their overall accessibility (mobility).

Findings

Just as the three transportation revolutions are anticipated to fundamentally change transportation as we know it – and early evidence suggests that changes are underway – these changes will similarly redefine public transportation. It should be noted that while the three revolutions are proceeding at very different paces, policy direction is needed to ensure that outcomes align to maximize public benefit. People and communities will be impacted both positively and negatively. The revolutions are an opportunity for improved mobility and quality of life; however absent policy intervention, negative or disruptive impacts are less likely to be mitigated.

Early evidence confirms shared services can be both complementary and competitive with traditional public transportation services.

As experience accumulates, a richer understanding of these impacts will need to be developed to support informed policymaking regarding the path forward.

Public transportation has long included a focus on vehicle technologies (bus, light rail, heavy rail, commuter rail, ferry, etc.) and is best known for providing principally fixed route and schedule services for the public. Public transit authorities, and some general purpose governments, also provide paratransit services

for individuals unable to take advantage of traditional services. Opportunities may develop to improve paratransit services and improve cost effectiveness of these services. This is important and timely given the growing number of Seniors in the US.

Going forward, the very definition of public transportation is subject to challenge.

The spectrum of public transportation vehicles and vehicle features will inevitably broaden to include a wider array of vehicle sizes and an enhanced set of technologies to better accommodate passenger needs. Transit vehicles will better assist or ultimately replace the driver, and many agencies are making movement toward transitioning fleets into electric vehicles or installing other clean technology.

Service concepts are similarly expected to broaden.

This will better leverage new communications, logistics platforms, as well as dynamic scheduling and routing capabilities to complement fixed route, fixed schedule services. Broadening service could translate to seamless service delivery on a systemwide level, crossing existing agency and business platforms. Planners and operators will have access to a richer pool of systemwide data. This could translate into better real-time performance metrics, and more effective targeting of public and private investments to address access needs.

Finally, the roles of the public, private sector and government at various levels may change to accommodate a more holistic and flexible framework for delivering mobility.

Collectively the changes are anticipated to reflect a movement toward customer-centric service models and businesses models to deliver service that fully leverages the available resources from the various stakeholders in a manner that optimizes customer satisfaction.

Entities tasked with overseeing mobility – perhaps evolved from traditional transit agencies – may utilize a myriad of mechanisms to deliver mobility. These

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mechanisms may include direct operation, public-private partnerships (P3s), concessions, or facilitated connections with other mobility options. These entities may act as mobility market makers that handle all aspects of the mobility system, including funding, deployments, partnerships, coordination, and oversight of regulatory and policy goals (e.g. disability access, fares, etc.). They also might manage standardization and/or coordination of platforms, including payments, centralized trip planning and booking.

Policy Recommendations

As the three revolutions gain market share, policy guidance may be necessary to ensure benefits are maximized and negative consequences minimized. Unlike large fixed infrastructure investments, digital technologies and business practices are more responsive to policy influence, market changes and government feedback.

Policies of several types may materialize to guide the evolution of public transportation in response to automated, electric and shared vehicles. Among the areas of policy attention might be the following:

Refine transit agency missions and policies to open opportunities for models beyond public ownership and operation.

This may include several elements such as:

- Working with industry groups to facilitate partnerships in developing standard contracting terms regarding items such as confidentiality, public records, indemnification, and insurance.
- Refining transit governance and procurement processes to allow for more operational models (P3, concession, etc.).
- Drawing greater distinctions between planning, oversight and operations to accommodate

the integration of new business models and allow transportation providers opportunities to develop unique relationships with transit entities that better match the needs of their customers

- Restructuring performance metrics to be agnostic to service providers or technologies and to focus on customer outcomes, instead.
- Exploring opportunities for serving as an integrating or centralized resource for fundamental aspects of mobility provision such as trip planning, trip scheduling, and revenue collection, where a centralized portal offers customer value.
- Exploring strategies that enable or encourage evolving services to be integrated within public transit performance assessment and funding eligibility programs.

Initiate policy actions to ensure mobility opportunities are available for traditional transit customers.

Including actions such as:

- Guaranteeing that mobility remains affordable for people with disabilities, older adults, and low-income passengers who have benefited from subsidized public transit services. These passenger groups may require additional programs to ensure mobility remains affordable in an environment where private sector providers and mobility services play a more substantial role.
- Ensuring mobility remains accessible for individuals without smart phone technology or banking relationships, and supporting efforts to provide banking and technology access to those without (addressing the digital divide).
- Working to make sure mobility options are available to serve those with disabilities.
- Preventing collective systems of mobility

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opportunities from disadvantaging people based on geography, race and ethnicity, income, and other characteristics.

- Utilizing a portfolio of transportation mobility options such that service delivery strategies can be optimized to address specific market needs, and all market needs are met.
- Reform tax and fee policies for private transportation companies (e.g. Uber, Ford, etc.) to increase available funds for public transit operations and investments.

Utilize policy initiatives and resource programming to incentivize behaviors that improve the overall efficiency and effectiveness of transportation services.

Examples of actions include:

- Seeking out opportunities to standardize or integrate key systems such as customer information, fare payment, customer eligibility, data and information exchange to enhance connectivity.
- Using incentives, such as access to curb space, parking, vehicle recharge services or right-of-way, to prioritize high load and resource-efficient services.
- Considering third-party data brokers such as universities to facilitate aggregation and analysis of privately generated data to enable better service planning without compromising intellectual property or competitiveness.

Opportunities for Future Research

While there is a consensus that the technology revolution will continue to impact transportation, much remains to be seen regarding the pace and consequence of coming changes. A strong research agenda will support both public and private sector policies and actions to ensure

these changes deliver positive benefits. Research on a variety of fronts will support the refinement and deployment of these technologies, and the evolution of policies, programs and governance to serve the public good.

A multitude of research initiatives are possible including those noted below. Possible research initiatives are clustered into thematic areas. These areas go beyond looking exclusively in public transit to focus on the total mobility system.

Identifying best practices and experiences for deploying emerging mobility services.

- How have transit agencies utilized first-mile, last-mile complementary services?
- How have transit agencies or social service agencies leveraged emerging mobility services to provide paratransit and special market services?
- What are best practices for procurement of emerging mobility services?
- What are the economic and financial considerations associated with public sector involvement in emerging mobility services?
- How have new services integrated with institutional structures for planning, funding, and operating transportation facilities and services?
- What barriers to deploying mobility services have been identified and what opportunities exist for mitigating these impediments? For example, how have customer information systems, fare collection systems, and management monitoring and reporting systems been modified to accommodate integrated services?
- How are labor issues, both the need for a technology savvy work force and the prospect of the declining need for transit vehicle operators, best addressed?

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- Tracking the transportation impact of innovative or emerging mobility services.
- How will customers respond to new mobility choices?
- How will other travel options and choices be affected?
- How will service affect cost, productivity, energy use and emissions, safety, and congestion?
- How will innovation impact mobility for various demographic markets?
- How will innovation influence total travel, vehicle ownership, and household location decision-making?
- What customer feedback has been gathered to influence the physical and service design, administration and operation of mobility services?
- Understanding how the revolution in transportation affects quality of life.
- How will fundamental mobility, safety, transportation costs, the environment, and energy use be affected as the technology revolution plays out across the transportation system?
- How could land use change as a result of substantial deployment of the revolutions in transportation?
- How will site and facility design be modified to accommodate a post-transit revolution era?
- How will the revolution in transportation influence core urban, suburban, and rural areas differently, with respect to their economic competitiveness and quality of mobility?
- In a world with automated electric vehicles and sustainable power generation, how important will larger vehicles, and vehicle sharing, support dense development for purposes of minimizing land consumption, capturing other resource efficiencies or enabling agglomeration economies of high density?

Conclusion

The ease or difficulty of addressing these research questions varies greatly by context. Policymakers and researchers may also struggle to keep up with the speed of change as these technologies disrupt transit systems. The three transportation revolutions will redefine public transportation as we know it and it is critical that practitioners begin anticipating changes and working to inform decision-making for the benefit of consumers and communities.