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CENTER OF EXCELLENCE
on New Mobility and Automated Vehicles

Public-Private Partnerships for Shared Mobility

September 2026

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The Center of Excellence on New Mobility and Automated Vehicles focuses on the impacts of new mobility technologies and highly automated vehicles on the evolving transportation system when deployed at scale. Launched in 2023, the center studies the anticipated long-term impacts of increased new mobility technologies and services on land use, real estate and urban design; transportation system optimization; access to mobility and job participation; and municipal budgets and cost-effective allocation of public resources. Established through a cooperative agreement between the Federal Highway Administration and UCLA, the Mobility COE is made up of five core partners and a community of practice from academia and nonprofit organizations.

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The Mobility Center of Excellence at UCLA acknowledges the Gabrielino/Tongva peoples as the traditional land caretakers of Tovaangar (the Los Angeles basin and So. Channel Islands). As a land grant institution, we pay our respects to the Honuukvetam (Ancestors), 'Ahihirom (Elders) and 'Eyoohiinkem (our relatives/relations) past, present and emerging.

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Public-Private Partnerships for Shared Mobility

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Executive Summary

This report presents the findings of a comparative study of public-private partnership (P3) delivery models for public sector shared mobility services across 26 cases in the United States. Using Qualitative Comparative Analysis (QCA) principles, we examine which combinations of governance structure, revenue model, funding arrangement, access provisions, and contextual factors are associated with three outcomes: service continuity, funding sustainability, and access institutionalization.

The analysis identifies four delivery archetypes, Private Revenue Share (Archetype 1), Public Service Contract Operations (Archetype 2), Consortium/Nonprofit Hybrid (Archetype 3), and Traditional P3 Concession (Archetype 4), and characterizes their governance logic, revenue configurations, and access performance across three modal categories: Active/Micromobility, On-demand/Flexible, and Fixed Route/Rail.

Key Findings

- Dedicated public funding is present in 16 of the 23 operating cases, and absent from every discontinued program. Of the remaining 7 operating cases without dedicated funding, 3 are sustained by private revenue, private funding, and fare revenue.
- Alternative funding diversification, operational commitment, and the absence of a minimum revenue guarantee approach necessity for service continuity.
- Access requirements are less common in on-demand and fixed-route modes than in micromobility modes. Active/micromobility programs (like bikeshare) have a 100% access requirement rating in this dataset, compared with 38% for on-demand/flexible services and 17% for fixed route/rail programs.
- There is no evidence of coexisting guaranteed minimum revenue and access policies. Every access-embedded program in the dataset (n=11) operates without a minimum revenue guarantee, using other financial incentive models to encourage private-sector partnerships.
- Public-Service Contract Operations (SCO) (Archetype 2) delivers the strongest cross-dimensional balance: high service continuity, high dedicated funding, and the highest access institutionalization rate of any archetype.
- On-demand and flexible programs face the most difficult governance challenge. Variable demand, high operational complexity, and short contract terms create conditions in which neither dedicated funding nor access embedding naturally emerges – a finding with direct implications for future deployment of public-sector shared autonomous vehicle services.
- To embed access while reducing demand risk for operators, fixed-fee arrangements can be a good procurement strategy. Fixed management fee arrangements (common in Public-SCO programs) pay the operator a set amount for service delivery regardless of ridership, preserving access obligations without fully transferring demand risk. Performance-linked fee arrangements (also common in Public-SCO programs) adjust the operator's payment based on service quality metrics – reliability, maintenance, customer

satisfaction — creating incentives to improve performance while retaining access requirements as binding contractual obligations.

These findings have direct implications for procurement design, contract drafting, and the governance frameworks being developed for public sector shared autonomous vehicle services, electric vehicle charging hubs, and Mobility as a Service (MaaS) integration. The analysis found that conditions such as service continuity, funding sustainability, and access institutionalization are determined less by technological maturity than by the governance configurations in which a service is embedded. Publicly delivered AV deployments entering the U.S. market will reproduce the outcome patterns of their delivery archetype rather than their technology class.

The analysis yielded four potential procurement design relationships with direct application to publicly delivered AV governance. First, dedicated funding must be institutionalized before pilot termination; AV programs structured as time-limited grants replicate the governance condition most strongly associated with program discontinuation in this dataset. Second, minimum revenue guarantees are often absent when access institutionalization is a program objective; the perfect consistency (csQCA score of 1.0) of the revenue guarantee–access requirement relationship across all 26 cases suggests this as a procurement design relationship. Fee arrangements instead may improve service performance while simultaneously institutionalizing access. Third, access contract templates should be standardized across modal types from program inception; on-demand programs institutionalize access in only 38% of cases, a gap AV on-demand deployment could replicate. Fourth, alternative revenue should be diversified from program inception rather than renewal since AV operating cost structures mirror microtransit more than rail, and farebox recovery is unlikely to cover operational expenditure at scale.

The study contributes systematic comparative evidence on service-based P3 risk allocation, contract levers for access institutionalization, and the relationship between modal type and governance fit in shared mobility services. This establishes a replicable framework that is directly extensible to the procurement of autonomous vehicle services for public agencies.

Introduction

The governance and financing of shared transportation services have evolved substantially over the past two decades. What began as ad hoc partnerships between public transit agencies and emerging technology firms has matured into a diverse array of contractual and institutional models, each with distinct implications for financial sustainability, access outcomes, and resilience to shocks. Shared mobility services — bikeshare, microtransit, demand-responsive transit, carshare, and first/last-mile connectors — represent a growing frontier for public-private collaboration in U.S. transportation.

Early work on mobility-on-demand (MOD) emphasized bilateral agreements, focusing on service integration, asset contributions, or data exchange between agencies and private operators.¹ These typologies highlighted how risk and revenue distribution differ between flexible, service-based partnerships and capital-intensive public-private partnerships (P3s). Yet they largely left unexamined the grant-based, pilot-type, community-led, nonprofit-driven, or hybrid institutional models that have proliferated in recent years.

Subsequent guidance offered valuable decision frameworks for agencies considering outsourcing operations or the provision of technology.² However, these frameworks assume a P3 pathway has already been chosen, leaving open questions about when alternative ownership or cooperative structures may achieve stronger access or fiscal sustainability outcomes, particularly in small or historically underserved markets.

Recent scholarship also highlights gaps in understanding how risk allocation, revenue-sharing formulas, and subsidy arrangements impact the long-term viability of shared mobility. While decades of infrastructure P3 literature have focused on toll roads, bridges, and airports, far less is known about service-based partnerships, where assets may be leased, data are proprietary, and farebox revenues rarely cover costs.³ Governance, policy instruments, and institutional context further complicate these models, as shown in cross-national regulatory studies.⁴

Against this backdrop, this report develops a new taxonomy of delivery model archetypes for shared transportation services. These archetypes synthesize evidence across 26 U.S. cases, spanning bikeshare, microtransit, bus, and rail pilots, and capture the recurring configurations of ownership, risk allocation, funding source, and institutional support that shape project trajectories.

Three gaps motivate this study. First, systematic comparative evidence on how risk is allocated across service-based shared mobility P3s is lacking— who bears demand risk, how performance is defined, and whether public agencies retain meaningful accountability levers. Second, access

¹ Lucken et al., “Three Ps in a MOD.”

² Macek et al., *Public Transportation Guidebook for Small- and Medium-Sized Public-Private Partnerships (P3s)*.

³ Chen et al., “Developing a Conceptual Model for Promoting Risk Management for Public–Private Partnerships Projects”; Narbaev et al., “A Multi-Disciplinary Meta-Review of the Public–Private Partnerships Research.”

⁴ Kriukelyte et al., “Actualizing Sustainable Transport.”

provisions in shared mobility contracts are poorly documented: where they exist, they range from aspirational statements to binding KPIs, and the conditions under which they become contractually embedded are unclear. Third, the emergence of new modal categories — autonomous vehicle shuttles, e-bike and e-scooter systems, demand-responsive microservices — requires a governance taxonomy that can accommodate modal diversity without collapsing important distinctions.

Throughout this report, references to autonomous vehicle services refer to government-contracted or publicly procured AV deployments — demand-responsive shuttles, first/last-mile connectors, and similar services operating under public agency authority — rather than private robotaxi services operating under a commercial permit or without public subsidy. The governance levers identified here (dedicated funding, access contract templates, operational commitment) apply specifically to the contractual relationship between a public agency and a service provider. These include revenue-first private models, public-led subsidized operations, consortium-based hybrids, and traditional concession-style mega-projects.

By systematizing these archetypes, this work provides a framework for understanding not only how different models emerge, but also how they distribute different types of risks and benefits across stakeholders. This framing offers practitioners and policymakers a comparative lens for evaluating which archetypes are most viable under varying market conditions, governance capacities, and access priorities.

Research Questions

This study addresses these gaps through a qualitative comparative analysis (QCA) of U.S. shared mobility P3s, spanning bikeshare, microtransit, bus, rail, and multi-modal systems across nine geographic regions. We developed a four-archetype delivery taxonomy grounded in governance theory and tested it against three policy-relevant outcomes using a systematic configurational method that accounts for causal complexity, equifinality, and limited project diversity, conditions endemic to small-N comparative governance research.

This study addresses three primary research questions:

1. What delivery model archetypes characterize shared mobility P3s in the United States, and how do they differ in governance structure, revenue model, and risk allocation?
2. Which combinations of governance conditions are sufficient to produce service continuity, funding sustainability, and access institutionalization?
3. How does modal type — active/micromobility, on-demand/flexible, and fixed route/rail — mediate governance fit and access outcomes?

Significance

The findings are relevant to three audiences. For public agencies and transit authorities designing shared mobility procurements, the archetype taxonomy provides a structured decision framework for selecting delivery models aligned with service, access, and financial objectives. For policymakers and regulators, the QCA findings identify the specific contractual and governance conditions — dedicated funding, the absence of revenue guarantees, and the spending/fare context — that are necessary or sufficient for access institutionalization. For researchers, the study provides methodological evidence of the applicability of configurational

methods to service-based P3 governance and establishes a replicable framework that is extensible to autonomous-vehicle and MaaS contexts.

Why This Matters to the Future of Mobility

The dimensions developed to build the database — risk sharing, revenue models, funding streams, access provisions, and context—are directly applicable to autonomous vehicles and related innovations such as EVs, MaaS, and curb management and charging hubs. These dimensions serve as an evaluative framework for governing service delivery, and we can learn from established programs to develop AV delivery models for shared services.

Risk sharing, particularly regarding liability and operations, is especially salient for public agencies looking to contract with private operators to deploy AV-based services. Heightened liability for crashes, operating system failures, software uptime, and cybersecurity risks means that contracts must clearly apportion revenue risk versus performance risk. Indicator tracking for elements such as contract type and incentive/penalty regimes will map cleanly to AV uptime and safety compliance.

Revenue models and funding streams may mirror microtransit economics, as fares will not cover operational expenditure. Mixed revenue streams, subscriptions, employer passes, sponsorship, data, and integrations with existing transit modes, may be necessary. AVs also require distinct capital expenditures (vehicles, depots, charging, V2X) and operational expenditures (remote operations, maintenance), mirroring microtransit specifically. These indicators can help agencies determine whether to pursue pilot grants or multi-year contracts.

Access provisions are an essential variable for evaluating the long-term success of innovative transportation programs. AVs can create exclusion zones unless explicit guardrails are in place. Low-income programs, cash- or phone-free access, ADA-compliant/adaptive vehicles, service quotas in access zones, and community co-design should be contract requirements and KPIs from the start of service provision. The empirical models in this study point to a possible “fare-free governance paradox,” where full financial subsidization may lead public actors to omit further explicit contractual access requirements. For emerging AV networks, this flags a possible access issue, reducing the embedded access and accountability mechanisms needed to ensure broad-based access.

Context matters. AVs' early fit varies by density, transit connectivity, and regulatory stance. Context indicators, fleet caps, data mandates, and the level of state and local political support could predict where AV models will sustain service and where they will stall.

This study establishes the extent to which successful delivery hinges less on technological maturity and more on governance choices: specifically, how risk is allocated, revenue streams are built, funding is secured, and models are matched to place. By leveraging the identified dimensions and applying QCA, the framework developed here for shared mobility can extend to emerging AV models, ensuring that delivery systems are not only technologically feasible but also accessible, financially sustainable, and resilient to future shocks.

Conceptual Framework

The Evolution of Shared Mobility P3 Models

The governance of shared mobility has evolved through three distinct phases. The first generation (2010–2016) consisted primarily of bilateral arrangements – a city or transit authority contracted a single operator to deploy and manage a bikeshare or carshare system, often with a flat operational subsidy.⁵ The second generation (2016–2020) saw the emergence of community-led models in which nonprofits and community development organizations assumed operational roles to advance access and local capacity goals.⁶ The third generation (2020–present) can be further characterized by commercial scale and modal diversification, with e-scooter, e-bike, and microtransit companies entering markets on negotiated permit terms that blur the boundary between regulation and partnership.

These generational shifts have produced a landscape in which no single governance model dominates. Bikeshare systems range from fully municipally operated (Capital Bikeshare, Washington D.C.) to fully privately financed (Citi Bike, New York City). Microtransit services span public agency-run demand-responsive routes (Direct Connect, Charleston), nonprofit consortium delivery (HOURCAR, Minneapolis), and private-operator permit arrangements (SFMTA Commuter Shuttle, San Francisco). This diversity of observed arrangements motivates a typological rather than comparative-case approach.

Case Selection

Cases were selected to maximize variance across modes, regions, and market contexts while maintaining relevance to the U.S. federal shared mobility investment portfolio. The team cast a broad search, initially identified over 40 cases, but through further analysis and data collection, determined a final set of 26 usable cases (given geography, documentation availability, and overall information collected). The final case set, as summarized in Table 1, includes 26 cases spanning nine geographic regions and three modal categories. Cases range from fully operational programs (n=23) to recently discontinued services (n=3), with the discontinued cases retained to avoid selection bias toward successful programs. Discontinued cases were difficult to identify and find governance documentation on. Further-stage research could expand this dataset and build a more robust picture of discontinued P3 programs in the U.S.

Table 1: Case inventory: U.S. shared mobility P3 cases

Project Name	Mode Type	Region	Status	Archetype
Blue Bikes	Active/Micro	South	Operating	3 - Pub-SCO
Boise GreenBike	Active/Micro	Mountain W	Discontinued	3 - Pub-SCO
Campus Shuttle TX	On-demand	South Central	Operating	Consortium

⁵ Susan Shaheen, *Shared Mobility Policy Playbook*.

⁶ Lucken et al., “Three Ps in a MOD.”

Project Name	Mode Type	Region	Status	Archetype
Capital Bikeshare	Active/Micro	Northeast	Operating	Pub-SCO
CitiBike	Active/Micro	Northeast	Operating	Private-RS
Direct Connect	On-demand	Southeast	Operating	Pub-SCO
Divvy	Active/Micro	Midwest	Operating	Pub-SCO
Eagle P3	Fixed/Rail	Mountain W	Operating	Trad P3
ATL AV Shuttle	Fixed/Rail	Southeast	Operating	Consortium
Hourcar	On-demand	Midwest	Operating	Consortium
KC Streetcar	Fixed/Rail	Prairie	Operating	Consortium
King County Bus	Fixed/Rail	Pacific NW	Operating	Consortium
MetroBike	Active/Micro	South Central	Operating	Private-RS
MovePGH / POGO ^a	On-demand	Northeast	Discontinued	Consortium
NICE Bus	Fixed/Rail	Northeast	Operating	Pub-SCO
Portland Airport MAX	Fixed/Rail	Pacific NW	Operating	Trad P3
Purple Line MD	Fixed/Rail	Mid-Atlantic	Operating ^b	Trad P3
Q-Line Trolley	Fixed/Rail	Prairie	Operating	Consortium
SF Ferry Program	On-demand	Pacific SW	Operating	Pub-SCO
Ride On Flex	On-demand	Mid-Atlantic	Operating	Private-RS
River Rail Streetcar	Fixed/Rail	South Central	Operating	Pub-SCO
SFMTA Com Shuttle	On-demand	Pacific SW	Operating	Private-RS
SFRTA Rail	Fixed/Rail	Southeast	Operating	Pub-SCO
SkyConnect APM	Fixed/Rail	Southeast	Operating	Trad P3
START Bus	Fixed/Rail	Mountain W	Operating	Consortium
Van Go!/Stockton Go!	On-demand	Pacific SW	Discontinued	Trad P3

^a MovePGH/POGOH was a multimodal pilot including e-scooters, bikeshare and mobility hubs, carshare, scooter-charging hubs and kiosks, trip planning/ticketing, and the region's public transit agency. We classified it as "on-demand" because its intent was to provide ubiquitous access to a set of options via an app. ^bThe Purple line under in construction; we chose to include it in the analysis as a point of comparison for traditional transit P3s contractual terms

Case Taxonomy: Establishing Delivery Model Archetypes

Each case was coded across conditions organized into four analytical dimensions: governance and contracting structure, funding model, access provisions, and modal type. The archetype assignment proceeded in two stages.

In the first stage, cases were grouped based on convergent profiles across the four governance dimensions. Each case's funding model, degree of public oversight versus private control, regulatory structure, and institutional context were coded into standardized fields. The grouping produced four primary clusters. Representative anchor cases were identified for each cluster and used to name and characterize each archetype before validation.

In the second stage, the inductive groupings were validated and formalized against the quantitative condition data. Rules are applied hierarchically: Archetype 4 (concession logic) is identified first, followed by Archetype 1 (private dominance), then Archetypes 2 and 3, in order of decreasing public revenue control. Summaries of each archetype are below, followed by a summary in Table 2.

Archetype 1 – Private Revenue Share

Private-RS programs (n=4: Citibike, MetroBike, Ride On Flex, SFMTA Commuter Shuttle) are governed by private operators under permit or concession arrangements with minimal public subsidy. Revenue is primarily user-generated (fares, memberships, corporate passes) supplemented by sponsorship or advertising. The public agency's role is to set regulatory terms, data-sharing requirements, and access conditions rather than operational ones. The private operator bears demand and operational risk in exchange for retaining revenue.

Archetype 2 – Public Service Contract Operations

Public-SCO is the most common archetype in the dataset (n=9: Blue Bikes, Boise GreenBike, Capital Bikeshare, Divvy, Direct Connect, SF Ferry, River Rail Streetcar, SFRTA Rail, NICE Bus). Public or nonprofit entities own the service, dedicated funding is institutionalized, and operational management may be in-house or contracted. Revenue is diversified across farebox, sponsorship, advertising, special district taxes, and federal grants.

Archetype 3 – Consortium/Nonprofit Hybrid

Consortium programs (n=8: Campus Shuttle PV TX, FLM Shuttle, Hourcar, KC Streetcar, King County Bus, MovePGH, Q-Line Trolley, START Bus) are governed by multi-stakeholder coalitions combining public agencies, nonprofits, foundations, employers, and occasionally private

operators. The archetype's central vulnerability is funding stability: without a single anchor funder, programs depend on sustained coalition alignment.

Archetype 4 – Traditional P3 Concession

Traditional P3 programs (n=5: Eagle P3, Portland Airport MAX, Purple Line MD, SkyConnect APM, Stockton Go!) follow the DBFOM/DBOM concession model standard in fixed-asset infrastructure, with long-term contracts (34–85 years) and availability payments or development rights as the primary revenue source.

Table 2: Public sector delivery archetypes across governance, revenue, access, and risk dimensions

Archetype	Governance	Revenue Model	Access Provisions	Risk Allocation	Key Cases
Private Revenue Share	Private dominant; user fees + sponsorship	High farebox; zero- to low public subsidy	Referenced or aspirational only	In-kind permitting; no revenue guarantee	MetroBike, SFMTA Shuttle, Ride On Flex, CitiBike
Public Service Contract Operations	Public/nonprofit ownership; operational contract	Mixed: farebox + BID/district tax + sponsorship	Referenced to binding; access clauses contractual	No revenue guarantee; dedicated multi-year	Blue Bikes, Capital Bikeshare, Divvy, SF Ferry, NICE Bus
Consortium	Coalition governance: public + nonprofit + private + philanthropy	Grant + sponsorship + fares; no dominant funder	Variable: Hourcar binding; others aspirational	Operational commitment high; dedicated funding	Hourcar, KC Streetcar, ATL Shuttle
Traditional P3	DBFOM/DBOM concession; long-tenor availability payments	Availability payments or dev rights; no farebox	ADA baseline only; no access KPIs	Revenue guarantee to private operator; 34–85 yr tenure	Eagle P3, Portland MAX, Purple Line MD, Van Go!/Stockton Go!

Risk Allocation in Service-Based P3s

The infrastructure P3 literature has developed a widely accepted framework for understanding risk allocation in design-build-finance-operate-maintain (DBFOM) and design-build-operate-maintain (DBOM) contracts. Within this literature, risk is often categorized

as primarily construction risk, usage or demand risk, and operational risk.⁷ However, service-based shared mobility P3s do not fit this framework cleanly. While the capital investment for shared mobility projects (non-AVs) are less intensive (vehicle fleets, charging infrastructure, software platforms) than fixed-asset P3s (which frequently span \$300 million to over \$2 billion for a single major corridor improvement project), the contract timelines are shorter (2–10 years vs. 30–99 years), and the revenue sources are more diverse – combining user fares, sponsorship, advertising, interagency agreements, and public subsidy. For AVs, only the costs are comparable, with billions being spent on vehicles, R&D, and operations. Future public service deployments will be less intensive under public procurement because the public sector faces a limited capital cost burden. The political economy of demand risk also differs; for infrastructure P3s, political risk from community engagement can influence funding decisions and ultimately derail a project before it occurs, but agencies rarely face continued pressure post-investment.⁸ Transit and transportation agencies are more accountable to ridership constituencies than highway concessionaires, creating pressure to retain demand risk rather than transfer it to private operators.⁹

This study extends the risk-allocation literature to service-based P3s by examining how the presence or absence of revenue guarantees, farebox-recovery expectations, and operational-commitment structures correlate with observed outcomes. We hypothesize that risk configurations in service P3s follow archetype-specific logics that are distinct from the infrastructure P3 typology.

This study distinguishes three primary risk types from the traditional P3 literature and defines them to reflect how they function differently across the identified shared mobility archetypes. *Ridership demand risk* refers to the financial exposure that follows when actual ridership or usage falls below projected levels. When a public agency retains demand risk, it absorbs any revenue shortfall if ridership underperforms; the operator is paid regardless, for example, through availability payments or fixed management fees. When demand risk is transferred to the private operator, the operator's revenue depends directly on ridership, creating a financial incentive to grow usage but also exposing the operator to loss if demand is weak.

Operational/Performance risk is the risk that the service fails to meet reliability, safety, or quality standards; this risk primarily rests with the private operator across all archetypes, though penalty severity varies. *Capital risk* – covering vehicles, depots, and charging infrastructure – is distributed differently by archetype: Traditional P3 concessions place it with the concessionaire, while Public-SCO and Consortium programs typically place it with the public agency or divide it across coalition partners. In these arrangements, private concessionaires typically bear construction and lifecycle risk in exchange for revenue streams—either availability payments from the public agency or direct user tolls/fares. Table 3 summarizes risk allocation by archetype.

Access Provisions in Shared Mobility Governance

For the purposes of this study, access institutionalization means access requirements—including service coverage in underserved areas, low-income fare programs, ADA and language accessibility, and community engagement obligations—that are embedded in a

⁷ “FHWA - Center for Innovative Finance Support - Fact Sheets.”

⁸ McCarthy et al., “Understanding Project Cancellation Risks in U.S. P3 Surface Transportation Infrastructure.”

⁹ Henly et al., *Exploring Shared Mobility Public-Private Partnerships*.

binding contract or regulatory instrument with enforceable performance standards. A program with institutionalized access has obligations that survive staff turnover, contract renewals, and budget pressure; they exist as contractual commitments rather than aspirational language or voluntary commitments. This definition is distinct from geographic service coverage alone: a program may serve underserved areas without institutionalized access if those coverage requirements are not contractually enforceable. Access provisions in shared mobility contracts range from aspirational language to binding contractual requirements with measurable KPIs.¹⁰ Research shows that about 62% of shared mobility programs have at least one stated access requirement, but fewer than a third embed these in enforceable contract terms.¹¹ The conditions under which fairness moves from aspiration to binding obligation remain poorly understood.

Table 3: Risk Allocation by Archetype

Archetype	Demand Risk	Operational Risk	Capital Risk	Basis
Private Revenue Share	Private operator (user revenue drives returns)	Private operator; permit penalties apply	Private operator	Safety liability and software uptime risk would also sit with operator; cybersecurity exposure unspecified
Public Service Contract Operations	Public agency; operator earns service fee	Private operator; binding KPIs with penalties	Public/nonprofit ownership	Most compatible with access embedding; AV safety liability should be contractually assigned to operator
Consortium	Distributed across coalition; no single bearer	Operator; variable enforcement	Coalition-funded; grant-dependent	Distributed accountability creates gaps in liability assignment — problematic for AV safety risk
Traditional P3	Public agency (availability payments cover operator)	Private operator; availability payment deductions	Private concessionaire (DBFOM)	Revenue guarantee insulates operator from demand; same structure precludes access institutionalization

This study tests three hypotheses informed by this literature. First, access requirements are more likely in programs serving higher-density markets where advocacy communities can hold

¹⁰ Brown and Howell, “Mobility for the People.”

¹¹ Brown and Howell, “Mobility for the People.”

agencies accountable. Second, the provisions require stable funding as a precondition — programs with precarious or pilot-only funding cannot credibly commit to community-based fairness mandates that require sustained operational investment. Third, revenue guarantees create adverse incentive structures for access by insulating private operators from the consequences of potentially serving lower-demand markets only in name but not effective practice, reducing the financial motivation to comply with access requirements.

Modal Governance Fit

A neglected dimension in the shared mobility governance literature is the relationship between service mode and governance structure. Active mobility modes (bikeshare, e-scooter) have low capital intensity, high visibility, and high substitutability — users can switch to other options if service degrades. On-demand and flexible modes (microtransit, demand-responsive transit) have higher operational complexity, variable demand profiles, and serve populations with fewer alternatives. Fixed-route modes (bus, light rail, streetcar) have the highest capital intensity and the strongest public accountability.

We hypothesize that these modal characteristics create systematic governance fit constraints: active mobility modes are compatible with private-revenue and public-SCO archetypes because their revenue potential supports partial or full private financing; on-demand modes require more intensive operational subsidy because demand uncertainty is high; and fixed-route modes cluster in Traditional P3 and Public-SCO archetypes because their capital requirements demand long-term contractual security. The mode type variable introduced in this study (Active/Micro, On-demand/Flex, Fixed Route/Rail) captures this governance fit hypothesis.

Methodology

Qualitative Comparative Analysis

We employ crisp-set Qualitative Comparative Analysis (csQCA) as the primary analytical method.¹² QCA is a set-theoretic method designed for medium-N comparative research that is characterized by causal complexity — where multiple combinations of conditions can produce the same outcome (equifinality), where conditions interact in combination (conjunctural causation) rather than independently, and where the absence of a condition may matter as much as its presence (causal asymmetry). These properties are endemic to P3 governance research: no single contractual feature determines program outcomes, and the same archetype can succeed or fail depending on the broader configuration of funding, commitment, and access conditions in which it is embedded.

In csQCA, each condition and outcome is coded as a crisp binary: either fully in the set (1) or fully out of it (0). The method then applies set-theoretic logic, specifically the Boolean relationships of necessity and sufficiency, to identify which conditions, or which combinations of conditions, are consistently associated with the presence or absence of the outcome across cases. Unlike regression analysis, which estimates the average marginal effect of each variable across all cases while holding others constant, csQCA identifies the specific configurations that produce the outcome and is indifferent to conditions that are irrelevant to a particular causal pathway.

The choice of csQCA over fuzzy-set QCA (fsQCA) and multi-value QCA (mvQCA) reflects the measurement properties of the condition data and the study's analytical objectives.¹³ The conditions in the codebook were originally calibrated as fuzzy scores on a [0, 1] scale, but the 0.5 crossover threshold — the point at which a case is conceptually more in the set than out of it — is theoretically defined for each condition and corresponds to a meaningful governance boundary rather than an arbitrary midpoint. Binarizing at this crossover converts the fuzzy calibration into a crisp set-membership determination without discarding the substantive content of the original calibration exercise. All conditions in this revised analysis have been resolved to crisp binaries; the full truth table is available in Appendix B.

All analyses were conducted on the full N=26 dataset using a custom R implementation and the R QCA package. Necessity and sufficiency are computed using the standard set-theoretic consistency and coverage formula.¹⁴

A condition is treated as “necessary” if its necessity consistency score is ≥ 0.90 ; scores between 0.80 and 0.89 are noted as approaching necessity. A configuration pathway is treated as “sufficient” if its sufficiency consistency score is ≥ 0.90 and it covers at least three cases.

¹² Ragin, “Redesigning Social Inquiry.”

¹³ Ragin, “Redesigning Social Inquiry.”

¹⁴ Ragin, “Set Relations in Social Research.”

Service continuity is coded 1 if the program was operating at the point of observation. Funding sustainability is coded 1 if the program's fuzzy score exceeds 0.5 for dedicated funding (DEDICATED, see Appendix B). Access institutionalization is coded 1 if the program's access requirements (ACCESSREQ) are contractually binding rather than merely referenced or aspirational.

Condition Variables and Calibration

Conditions in the codebook are calibrated as crisp binaries. For dedicated funding (DEDICATED), 0 = no institutionalized public-agency funding (pilot or short-term only, or funding sourced primarily from private/user revenue); 1 = multi-year or permanent public-agency-sourced funding. Case study archetype (ARCHETYPE) and mode type (MODETYPE) are treated as categorical grouping variables throughout and are not entered into the csQCA as conditions.

Alternative funding streams (ALTFUND) are coded 1 for any case with at least one documented non-public revenue stream (advertising, sponsorship, fees, or grants) beyond direct public operating subsidy; public funds are denoted by OPCOMMIT; taxes and the complete absence of alternative streams are coded 0.

Outcomes

Three binary outcomes are analyzed. These outcomes are not treated as fully independent. They represent sequential governance thresholds: dedicated funding (DEDICATED) is a near-necessary precondition for service continuity, and service continuity (OPERATE) is a precondition for the political and operational conditions in which access institutionalization (ACCESSREQ) typically emerges. Treating them as analytically separate outcomes is justified not by independence but by the fact that they are actionable at different points in the procurement cycle and by different actors. Funding sustainability (DEDICATED) largely depends on program inception, budget decisions, and grant structures. Service continuity (OPERATE) is an ongoing operational outcome shaped by contract management and political commitment over time. Access institutionalization (ACCESSREQ) is a decision embedded in contract drafting that can be made at inception or retrofitted at renewal. The QCA, therefore, asks a staged question: what conditions allow a program to pass each threshold, and do those conditions differ across thresholds even when the thresholds are causally ordered?

Each outcome is either directly coded as crisp or derived from a fuzzy condition binarized at the 0.5 crossover threshold:¹⁵

- Service continuity (OPERATE) is coded 1 if the program was operating at the point of observation and 0 if discontinued. Three cases scored 0: Boise GreenBike, MovePGH/POGOH, and Van Go!/Stockton Go!
- Funding sustainability (DEDICATED) is coded 1 if the program has institutionalized public-agency dedicated funding. Sixteen of 26 cases scored 1
- Access institutionalization (ACCESSREQ) is coded 1 if the program's access requirements are contractually binding. Eleven of 26 cases scored 1.

¹⁵ Cases with a funding sustainability (DEDICATED) fuzzy score of exactly 0.5 — representing a multi-year commitment without a permanent budget line — are treated as non-members (coded 0) in the csQCA computation following the standard binarization rule.

Methodological Limitations

The analysis proceeds in two steps for each outcome. First, we test each governance condition individually to identify necessary conditions consistently present wherever the outcome appears. Second, we test combinations of two or three conditions to identify sufficient pathways – combinations that consistently produce the outcome. Rather than testing every mathematically possible combination of conditions, we test only the combinations that theory and the case evidence give us reason to examine. We report a pathway if it holds in at least 90% of cases in which the combination is present (consistency ≥ 0.90) and achieves at least 70% coverage.

Comparative Analysis Results

Archetype and Modal Outcome Profiles

Table 4 and Table 6 present mean outcome scores by archetype and modal category; Table 5 shows the mean condition scores by archetype. Values represent the proportion of cases in each group that score positively on the binarized outcomes of continued operation (OPERATE), access requirements (ACCESSREQ), and dedicated funding (DEDICATED).

Tables 4, 5, and 6 reveal a consistent divergence across three dimensions of program performance: operational continuity, funding sustainability, and access requirements. Public-SCO and Traditional P3s both achieve strong funding (DEDICATED) of .778 and .800, respectively, but only Public-SCO pairs this with meaningful access requirements (.667 ACCESSREQ); Traditional P3s combine near-universal dedicated funding with low access institutionalization, reinforcing that funding stability and access are governed by distinct mechanisms rather than co-occurring by default. Private-RS shows perfect service continuity (OPERATE) with low dedicated public funding; its stability derives entirely from commercial viability rather than institutional backing (see the DEDICATED coding note under Methodology: this archetype's private, user-generated revenue is captured separately under ALTFUND rather than DEDICATED).

Table 4: Mean outcome scores by archetype

Archetype	N	OPERATE	ACCESSREQ	DEDICATED	Profile Summary
Private-RS	4	1.00	0.500	0.250	Maximize operations, minimally dedicated public funding
Public-SCO	9	0.889	0.667	0.778	Dedicated funding with access requirements
Consortium	8	0.875	0.375	0.500	Moderate funding, low access requirements
Traditional P3	5	0.800	0.00	0.800	Long-term funding, low access requirements

Green shading = strong performance; red shading = low performance relative to cross-group average.

Table 5: Mean condition by archetype

Archetype	N	ALTFUND	OPCOMMIT	~REVGUAR	LIFA	CAPOP	Summary
Private-RS	4	0.750	1.000	1.000	0.750	1.000	Full operational engagement, minimal public funding
Public-SCO	9	0.778	0.889	1.000	1.000	0.667	Balanced funding and access
Consortium	8	0.875	0.500	1.000	1.000	0.875	Alternative funding and fare-free programs, weakest long-term sustainability
Traditional P3	5	1.000	0.800	0.200	0.800	0.400	Strong funding and continuity

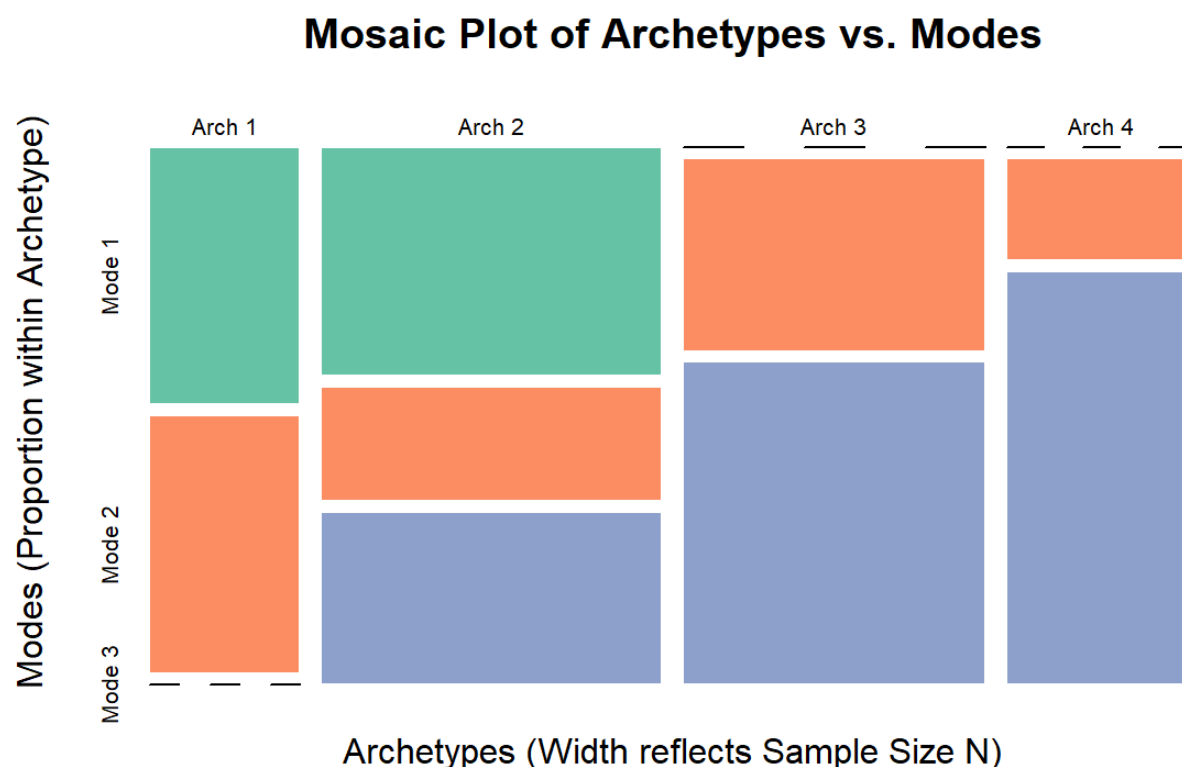
Table 6: Mean outcome by mode

Mode Category	N	OPERATE	ACCESSREQ	DEDICATED	Profile Summary
Active/Micro	6	0.833	1.000	0.500	Maximum access requirements
On-demand/Flex	8	0.750	0.375	0.500	Lowest overall scores across all outcomes
Fixed Route/Rail	12	1.000	0.167	0.750	High dedicated funding but minimal access

If we match across archetypes and modes, we also find patterns that may reinforce possible successful alignments between modes and archetypes. Archetype 1 contains only active transportation, micromobility, and on-demand services (Modes 1 and 2). Nearly half of the members of Archetype 2 are active transportation or micromobility services (Mode 1). Archetype 3 is mostly fixed route or rail service (Mode 3), and Archetype 4 is also predominantly fixed route and rail (Mode 3). This is illustrated in Figure 1.

The modal findings reinforce this pattern: Fixed Route/Rail programs achieve operational continuity but only meet access requirements in 17% of cases, while Active/Micromobility programs achieve a 100% access institutionalization rate alongside more moderate funding sustainability.

Figure 1: Mosaic Plot of Archetypes vs Modes



Outcome Analysis

Necessity Analysis

Table 7 presents the necessity analysis. A condition is treated as necessary where its consistency score is ≥ 0.90 ; scores between 0.80 and 0.89 are noted as approaching necessity. Coverage rates are also important to note; while there are no agreed-upon thresholds, this analysis looks to coverage of greater than .70 to make an agreement of a critical condition compared to a trivial (ubiquitous) one. An analysis of necessity was conducted across the three target dimensions: OPERATE, ACCESSREQ, and DEDICATED. The analysis revealed distinct necessity configurations across the three outcomes.

For the service operations outcome (OPERATE, $n=23$), a low fare or fare-free program (LIFA) is formally necessary (Cons = 0.913, Cov = 0.875). Additionally, alternative funding diversification (ALTFUND), operational commitment (OPCOMMIT), and the absence of a minimum revenue guarantee (~REVGUAR) all strongly approach necessity with identical consistency scores of 0.870. Crucially, while dedicated funding (DEDICATED) does not meet the necessity standards (Cons = 0.696), it achieves a perfect coverage score of 1.000. This indicates that while DEDICATED is not a prerequisite for operation, it functions, unsurprisingly, as a perfectly sufficient standalone driver, with every case featuring dedicated funding resulting in successful operations.

For the funding sustainability outcome (DEDICATED, n= 16), operational commitment (OPCOMMIT) emerged as the single most robust, non-trivial necessary condition in the analysis, achieving a consistency of 0.938. Of the 16 cases that achieved a DEDICATED outcome, 15 also had strong operational commitment scores (both = 15). Its high coverage score (0.750) suggests its empirical relevance, demonstrating that operational commitment (OPCOMMIT) is a binding constraint and potentially an essential foundation for securing long-term sustainable funding. Conditions ALTFUND and LIFA also approach necessity for this outcome (both scoring 0.875), while ~REVGUAR approaches it at 0.812.

Table 7: Necessity analysis: consistency and coverage scores for all conditions tested against three outcomes

Condition (N _{total} = 26)	OPERATE (n=23)		ACCESSREQ (n=11)		DEDICATED (n=16)	
	Cons	Cov	Cons	Cov	Cons	Cov
DEDICATED (n=16)	.696	1.000	.545	.375	– (outcome)	
ALTFUND (n=22)	.870 ^b	.909	.909 ^a	0.455	0.875 ^b	.636
OPCOMMIT (n=20)	.870 ^b	1.000	.727	.400	.938^a	.750
~REVGUAR (n=22)	.870 ^b	.909	1.000 ^a	.500	.812 ^b	.591
LIFA (n=24)	.913^a	.875	1.000 ^a	.458	.875 ^b	.583
CAPOP (n=19)	.696	.842	.818 ^b	.474	0.563	.474

Superscript “a” indicates a necessary condition (≥ 0.90); superscript “b” indicates a condition approaching necessity (0.80–0.89). Dedicated funding is the operationalization of the Funding Sustainability outcome and is therefore not tested as a condition in that column. Bolded indicates both Cons = consistency and Cov = coverage thresholds are met. N=number of cases where both outcome and condition are present

Note: this table reflects the six conditions (DEDICATED, ALTFUND, OPCOMMIT, ~REVGUAR, LIFA, CAPOP) as noted in (Appendix B). Additional conditions referenced in the original codebook (Appendix A) include performance standards, private investment ratio, revenue share, population density, and regulatory support.

For the access institutionalization outcome (ACCESSREQ, n=11), the data show that three conditions meet formal necessity thresholds: ~REVGUAR (Cons = 1.000), LIFA (Cons = 1.000), and ALTFUND (Cons = 0.909). No case in the data set achieves institutionalized access without a revenue guarantee and alternative funding (LIFA is a component of access and shows perfect consistency across the ACCESS dimension). However, we temper these findings with the following caveat: ALTFUND and ~REVGUAR are present across many of the cases (n = 22 out of 26), and low coverage rates of 0.500 and 0.455 suggest that, given these conditions, they may be somewhat trivial or, rather, ubiquitous conditions, acting as baseline selective determinators, not primary drivers of the outcomes. Finally, an operationally weighted CAPEX/OPEX balance condition (CAPOP) also approaches necessity for access institutionalizations with a moderate coverage rating (Cons = 0.818, Cov = 0.474).

Thus, these findings suggest that institutionalizing access into the architecture of shared mobility services requires not only funding security, given the absence of a revenue guarantee, but also a fare structure and funding balance oriented toward service operations rather than capital investment. Access can then be considered a second-order governance feature – it emerges after a service has established its operational and financial foundations – the conditions that enable it are more complex than population density or other social factors.

Sufficiency Analysis

Sufficiency pathways for service continuity highlight the strength of institutionalized funding combined with operational commitment as a conjunctural governance configuration. The pathway (DEDICATED & OPCOMMIT) produces service continuity with a consistency of 1.000 and coverage of approximately 65% of all operating cases (15 of 23). While this falls short of universal coverage, the consistency score exceeds the 0.90 sufficiency threshold, and the pathway appears across all archetypes and modal categories, suggesting an underlying governance pattern rather than an archetype-specific finding. Given the limited number of non-operating cases in this dataset, expanding the case set to include additional discontinued programs remains a priority for future research.

Table 8 presents sufficiency pathways for access institutionalization (ACCESSREQ). The Active/Micromobility pathway is confirmed sufficient (consistency = 1.000); all six cases have access requirements. A second distinct pattern is the fare-structure / funding relationship: dedicated public funding combined with an opex-weighted funding balance and fare-free service is associated with an absence of contractual access institutionalization, a negative and potentially exclusionary finding.

Table 8: Sufficiency pathways for access institutionalization

Pathway	Consistency	Coverage	N	Interpretation
Active/Micromobility mode	1.000	0.500	6	All 6 Active/Micro programs have access institutionalization (ACCESSREQ). High political visibility, permit-based access mandates, and community advocacy drive the embedding of universal access.

Pathway	Consistency	Coverage	N	Interpretation
DEDICATED & LIFA	0.429	0.545	14	Falls well below sufficiency. This confirms that while LIFA is a necessary condition, it is structurally trivial; paired with dedicated funding, it fails to reliably predict access institutionalization because it is present in both successful and unsuccessful cases.
DEDICATED & LIFA & CAPOP	0.500	0.364	8	Adding CAPEX/OPEX balance improves consistency somewhat but remains below the sufficiency threshold.
~REVGUAR & LIFA	0.524	1.000	21	Broad pathway covering most of access-positive cases. But remains below the .90 sufficiency threshold overall.
~REVGUAR alone	0.500	1.000	22	Necessary but not sufficient: half of cases with ~REVGUAR achieve access institutionalization.
On-demand/Flex & ~REVGUAR & DEDICATED	0.250	0.091	4	On-demand programs with dedicated funding and no revenue guarantee achieve access in a minority of cases – confirming the modal access gap.
DEDICATED & CAPOP & FREE -> ACCESSREQ	0.000	0.000	3	A negative and potentially exclusionary finding. This suggests a 'Fare-Free Governance Paradox': when systems are completely structurally subsidized to be free at the point of service, public entities routinely omit explicit, contractually binding access mandates, viewing them as redundant. Consequently, absolute price-dropped public models structurally sacrifice formal access accountability architectures.
DEDICATED & CAPOP (Alone)	0.444	.364	9	Removing the FREE condition collapses the negative effect, confirming that fare-free status – not funding or capital structure alone – carries the discriminating power.

Sufficiency pathways for access institutionalization (ACCESSREQ = 1, n=11). The modal pathway and the funding-and-price pathway represent partially distinct causal mechanisms. ~indicates the absence of the variable.

The on-demand access gap appears to be a governance and operational misfit rather than a resource constraint: programs in the On-demand/flexible category achieve access institutionalization (ACCESSREQ) in only 38% of cases (Table 5). Unlike active micromobility models, which show major structural variance across projects, on-demand programs face more volatile operational costs and short-term pilot timelines, creating environments that may be incongruent with long-term access institutionalization.

The funding sustainability (DEDICATED) outcome, as shown in Table 9, is the most broadly testable of the three: multiple conditions and combinations consistently link to dedicated funding. This reflects that funding consistency is a precondition that the U.S. shared mobility governance system has largely met for programs that survive their pilot period. The dominant finding for funding sustainability is the conjunction of operational commitment and diversification of alternative funding, which achieves a consistency of 0.765, covering 81% of all dedicated-funding programs. Alternative funding (ALTFUND) independently approaches the sufficiency threshold of 0.875.

Table 9: Sufficiency pathways for funding sustainability

Pathway	Consistency	Coverage	N _{total}	N _{Outcome}	Interpretation
DEDICATED & OPCOMMIT ~ OPERATE	1.000	0.652	15	15	Perfect sufficiency: every case combining dedicated funding and operational commitment is operating, covering 65.2% of operating
OPCOMMIT & ALTFUND ~ DEDICATED	0.765	0.813	17	13	Broadest Coverage Baseline: Strong configuration mapping funding sustainability, capturing 81.3% of all funded programs

Cross-Outcome Synthesis and Discussion

The Governance Logic of Shared Mobility Sustainability

Comparing findings across all three outcomes, and summarized in Table 10, reveals a coherent governance logic: shared mobility programs are sustained not by risk transfer to private operators but by the quality of public institutional commitment. Macroeconomic theory widely accepts that incomplete contracts predict private operators will have stronger incentives to control costs and deliver quality performance.¹⁶ Dedicated funding is the practical floor for service continuity – present in more than two-thirds of operating cases and absent from every discontinued program. Operational commitment, in conjunction with dedicated funding, forms the primary sufficiency pathway for service continuity (consistency = 1.000), covering approximately two-thirds of operating cases; the remainder achieve continuity through archetype-specific configurations. For access institutionalization, the analysis potentially identifies three necessary conditions: the absence of a revenue guarantee (1.000), a low-income or fare-free fare program (1.000), and alternative funding diversification (0.909). Revenue guarantees, a primary instrument of private risk transfer in the infrastructure P3 toolkit, appear only in Archetype 4 and are absent from all access-institutionalized cases in the set.

Table 10: Summary of Key Governance Pathways

Outcome	What Consistently Works	What Consistently Fails or Is Absent
Service Continuity	• Steady funding <i>plus</i> active day-to-day agency engagement keeps programs running – not just funding alone • "Fully backed" model: dedicated funding + engaged agency + no revenue guarantee + low fares (e.g., Blue Bikes, Capital Bikeshare, NICE Bus) • "Lean" model: engaged agency + capital-heavy funding structure substitutes for dedicated funding (e.g., CitiBike, MetroBike, Ride On Flex) • Both models are equally reliable	• Partial commitment doesn't work • Agency engagement or diversified funding <i>alone</i>, without the rest of the supporting pieces, doesn't reliably sustain a program

¹⁶ Hart et al., "The Proper Scope of Government: Theory and an Application to Prisons."

Outcome	What Consistently Works	What Consistently Fails or Is Absent
Access Institutionalization	• Bikeshare-type programs build in access requirements almost every time • Only two other programs succeed, via opposite funding paths: Hourcar (strong funding, weak engagement) and MovePGH (almost no institutional backing) • Both share <i>low agency engagement</i> – suggesting that's the more decisive factor, not funding level • Three near-universal ingredients: no revenue guarantee, a low-income fare program, diversified funding	• On-demand/flexible services rarely embed access requirements (~1 in 3), regardless of funding • Publicly funded + capital-heavy + fully fare-free programs never formally embed access requirements – "free for everyone" seems to substitute for targeted access commitments
Funding Sustainability	• Long-term funding security tracks with capital intensity, not transit mode • Programs anchored in durable, capital-heavy assets secure sustainable funding regardless of mode (Blue Bikes, SF Ferry, SFRTA Rail, King County Transit, Portland Airport MAX) • Broadest pattern overall: agencies that stay engaged <i>and</i> diversify funding cover 13 of 16 sustainably funded programs	• Programs lacking either steady engagement or diversified funding struggle • Coalition-run programs are especially vulnerable without a clear single fiscal anchor

The analysis highlights multiple pathways to ensure service continuity (OPERATE). Pathway 1 (DEDICATED * ALTFUND * OPCOMMIT * LIFA), Pathway 2 (DEDICATED * OPCOMMIT * ~REVGUAR * LIFA), and Pathway 3 (OPCOMMIT * ~REVGUAR * LIFA * CAPOP) collectively span all four archetypes. Pathways 1 and 2 above are dominated by Archetype 2 (Public-SCO) cases, with Archetype 3 and 4 cases also represented; Pathway 3 is distinctive in capturing the Archetype 1 (Private Revenue Share) cases – CitiBike, MetroBike, Ride On Flex – that the other two pathways do not, showing that even fully privately financed systems reach service continuity through the same lean, capital-balanced governance logic as their publicly anchored counterparts.

In contrast to service continuity (OPERATE), access institutionalization (ACCESSREQ) is a highly constrained and insular governance outcome. Overall solution coverage is 0.182, validating the hypothesis that formalizing contractual access is a second-order feature. Absolute sufficiency is isolated to two distinct single-case pathways, illustrating causal equifinality (where different initial conditions lead to the same result). Both pathways share the same logic: the absence of

an operational commitment and a revenue guarantee ($\sim\text{OPCOMMIT}$, $\sim\text{REVGUAR}$), a low-income fare program (LIFA), and an opex-weighted funding balance (CAPOP), but diverge sharply on public funding. Hourcar reaches the outcome through the pathway $\text{DEDICATED} * \text{ALTFUND} * \sim\text{OPCOMMIT} * \sim\text{REVGUAR} * \text{LIFA} * \text{CAPOP}$ ($\text{covS} = 0.091$): it has both dedicated public funding and diversified alternative revenue but lacks sustained day-to-day operational commitment from its public partners. MovePGH reaches the same outcome through the inverse configuration: $\sim\text{DEDICATED} * \sim\text{ALTFUND} * \sim\text{OPCOMMIT} * \sim\text{REVGUAR} * \text{LIFA} * \text{CAPOP}$ ($\text{covS} = 0.091$): it lacked dedicated public funding, alternative funding, and operational commitment altogether. For Hourcar, a nonprofit consortium structure and mission-driven grant funding are substituted for consistent public operational commitment; for MovePGH, the same absence of institutional backing ultimately contributed to the program's discontinuation. Together, the two pathways suggest that operational commitment – not funding presence or absence per se – is the more decisive lever for access institutionalization in consortium-governed programs.

Finally, the dominant configuration for funding sustainability (DEDICATED) is $\text{OPCOMMIT} * \sim\text{REVGUAR} * \text{LIFA} * \sim\text{CAPOP}$ ($\text{covS} = 0.312$), covering five cases: Blue Bikes, SF Ferry, SFRTA Rail, King County Transit, and Portland Airport MAX. This pathway is capital-intensive rather than modally exclusive—three of the five cases (SFRTA Rail, King County Transit, Portland Airport MAX) are Fixed Route/Rail programs, but Blue Bikes (Active/Micromobility) and SF Ferry (On-demand/Flex) also fit the same configuration. What unites these cases is not mode but funding structure: all combine strong public operational commitment, absence of a minimum revenue guarantee, a low-income fare program, and a capital-heavy funding balance ($\sim\text{CAPOP}$). This suggests that funding sustainability in this pathway depends less on modal category than on whether a program is anchored in durable public infrastructure investment—capital-heavy assets or fleets that require sustained capital planning regardless of whether the underlying service is rail, ferry, or bikeshare.

Interestingly, this governance logic appears to be mode-sensitive. Active/micromobility programs (bikeshare) achieve universal access institutionalization (Table 8), potentially because they offer the best overall balance: their high density, high visibility, and low capital intensity create a natural alignment between commercial viability, public accountability, and access pressure.

Beyond this finding, only two non-Mode 1 (Active/Micromobility Services) services, per the formal Boolean solution, reach access institutionalization: Hourcar (Carshare) and MovePGH (multimodal-on-demand). Their equifinality is striking because it runs counter to the modal pattern of on-demand services otherwise found. Hourcar reaches the outcome through dedicated public funding and diversified alternative revenue, but with weak day-to-day operational commitment. MovePGH reaches the same outcome with none of that institutional backing. Both share the absence of sustained operational commitment, suggesting that within the on-demand category, access institutionalization is achievable but rare and depends more on active agency engagement than on funding volume. However, the two cases diverge sharply on long-term operations: Hourcar remains operational as of the publication of this report, sustained in part by its diversified alternative revenue, while MovePGH's lack of institutional backing across every dimension ultimately contributed to its discontinuation.

On-demand/flexible programs face the most difficult governance challenge overall: variable demand, high operational complexity, and short contract terms create conditions in which neither dedicated funding (DEDICATED) nor access (ACCESSREQ) naturally emerges.

Fixed-route/rail programs achieve operational reliability through long-term contracts but sacrifice access requirements, possibly relying on other mechanisms to support access.

Finally, funding sustainability appears to depend on capital intensity rather than mode. Programs anchored in durable, capital-heavy assets and infrastructure (~CAPOP) achieve robust funding sustainability regardless of modal category – a pattern that spans Blue Bikes (Active/Micromobility), SF Ferry (On-demand/Flex), and three Fixed Route/Rail cases (SFRTA Rail, King County Transit, Portland Airport MAX) alike. However, a major governance trade-off is uncovered when these capital-heavy systems are made entirely free to the public. Under the configuration DEDICATED * CAPOP * FREE, every case in this dataset results in no contractual access requirements. This suggests that when public models drop user fees entirely, governance actors treat specific access requirements as redundant, effectively reducing structural accountability frameworks in favor of general affordability.

Funding Operations of Shared Mobility P3s

The access findings offer an interesting, policy-relevant contribution. Across the dataset, minimum revenue guarantees do not appear to incentivize operators as much as service fees, private revenue shares, or performance-based fees. Minimum revenue guarantees, often used in infrastructure P3s, serve as a financial safeguard in which one party (typically the public owner) contractually promises to compensate the other party if revenue falls below a specific threshold. For example, because building a road requires high upfront capital, tolls and fares are collected to repay the private operator's investment. When revenues fall short, the government compensates the private partners for the difference. Because service P3s do not require the same level of upfront capital investment by the public agency, it's not surprising that these contracts rarely include minimum revenue guarantees.

A revenue guarantee arrangement backstops the private operator's revenue floor regardless of ridership or use, which could reduce service quality, including the operator's financial incentive to serve lower-income, lower-demand communities. Unconditional revenue guarantees can insulate an operator and thus do not actively incentivize alignment with demand. With a guarantee, operators are made whole whether they serve hard-to-reach populations or not. Access provisions in such contracts are effectively unenforceable once the concession is operational, because the operator faces no financial consequences for non-compliance that are not offset by the guarantee.

A possible alternative to incentivize private-partner profits and institutionalize access is often a service fee or a performance-linked payment structure: the public agency provides dedicated, multi-year operational funding at an agreed-upon cost that covers service delivery, and/or the operator earns a fixed fee or a performance-linked payment. This is seen most frequently in Archetype 2, Public-SCOs, and to some extent in Archetype 1, Private-RS.

These two payment structures are worth distinguishing in this context. Fixed management fee arrangements pay the operator a set amount for service delivery regardless of ridership, thereby preserving access obligations without transferring demand risk. Performance-linked fee arrangements (common in Public-SCO archetypes) adjust the operator's payment based on service-quality metrics—reliability, maintenance, and customer satisfaction—creating incentives to improve performance while retaining access requirements as binding contractual obligations. The co-necessity of dedicated funding and population density for access policies establishes

that access is a second-order feature of governance. Programs must first secure funding and ensure demand before access provisions become credible commitments. However, this has a temporal implication: access provisions written into the initial contract terms are more likely to be upheld than those added at renewal, because the pre-renewal period is when program funding is most precarious and key performance indicators (KPIs), such as ridership, are scrutinized.

The findings also present a pattern worth examining further. Consider fare-free status alongside funding structure. Three cases (Campus Shuttle TX, River Rail Streetcar, KC Streetcar) all lack access requirements (ACCESSREQ) but have dedicated public funding (OPCOMMIT) and a CAPEX/OPEX split (CAPOP) balance with universal fare-free service (FREE). This suggests that fare-free status and formal access institutionalization function as substitutes, rather than complements, addressing access through affordability and not requiring further formalization of access requirements in their governing contracts, whereas those without fare-free policies are more likely to embed access requirements in their contracts. Removing the fare-free (FREE) condition from the combination collapses the effect (consistency = 0.444), suggesting further that fare-free status, not funding or capital structure, carries a strong explanatory effect.

The modal access gap — on-demand/flexible services averaging 38% access rates versus 100% for active/micromobility services — reflects a possible governance misfit. On-demand services are often justified as more flexible and able to serve populations not served by fixed-route transit (i.e., those in need of access), but they are governed by contract forms least conducive to embedding access.

Archetype-Specific Implications

The archetypes present four distinct governance profiles, suggesting different intervention strategies. For Private-RS (Archetype 1), access is permit-condition-driven; the most effective lever is service-area requirements and low-income membership mandates written into the permit terms at the outset. For Public-SCO (Archetype 2), the benchmark archetype, programs that have not yet achieved alternative funding may pursue business improvement district integration, corporate sponsorship, or interagency service agreements. For Consortium (Archetype 3), formalizing coalition agreements, creating dedicated fiscal agents, and establishing access KPIs as coalition-level commitments could strengthen outcomes. Traditional P3s (Archetype 4) could incorporate access KPIs into the initial availability payment structures, with financial penalties for non-compliance.

Public-SCO (archetype 2) achieves the best balance across all outcomes: operate = 0.89, dedicated funding = 0.78; access requirements = 0.67; Low-income Fare Allocation (LIFA) = 1.00 ; and alternative funding = 0.78. However, Archetype 3 (Consortium) approaches had the most frequent representation of fare-free (FREE) programs in the dataset (consistency = .625)

Implications for Autonomous Vehicles and Emerging Mobility

The governance implications discussed in this section apply specifically to publicly procured or contracted AV services — demand-responsive AV shuttles, AV first- and last-mile connectors,

and similar services operating under public agency authority and subject to public procurement frameworks. They do not describe private robotaxi services operating under commercial permits without public subsidy, for which governance levers such as dedicated funding, operational commitment, and access contract templates do not directly apply. The QCA findings show that service continuity, funding sustainability, and access institutionalization depend less on technological maturity than on the governance configurations in which a service is embedded. This analysis is based on the hypothesis that as shared public AV deployments enter the U.S. market, they will reproduce the outcome patterns of their archetype rather than those of their technology class.

The On-Demand Governance Problem Is Reproduced in AV Deployment

The finding that on-demand and flexible programs face the most difficult governance challenge – variable demand, high operational complexity, and short contract terms – creates conditions in which neither dedicated funding nor access embedding naturally emerges, with direct implications for AV services. Most near-term and prospective public AV pilots will likely mirror that of demand-responsive or on-demand services; fixed-route AV is an exception. Yet the dataset demonstrates that on-demand modal governance achieves access institutionalization in only 38% of cases, regardless of funding configuration. AV on-demand services may inherit this access deficit unless procurement frameworks begin to depart from the contract forms that gave rise to it.

The governance mechanism is not incidental. On-demand services typically enter markets under short-term pilot authorizations or private operator permit arrangements that are incompatible with the multi-year operational commitments and funding institutionalization identified as necessary for funding sustainability (approaching necessity at consistency = 0.875) and demonstrate sufficiency for service continuity (DEDICATED & OPCOMMIT, consistency = 1.000).

Revenue Guarantees and Access

The perfect consistency between the lack of a minimum revenue guarantee and the presence of an access-requirement relationship across all 26 cases suggests a procurement design relationship directly applicable to AV concession models. AV services structured under availability payment concessions, or under demand guarantees that backstop private operator revenue floors, could structurally preclude access institutionalization by the same mechanism observed in Traditional P3 cases, unless explicitly written into the contract: when private operators are insulated from demand risk, there is no financial incentive to provide accessible service in high operational cost areas and access provisions not written into initial contract terms are effectively unenforceable once the concession is operational.

This finding calls into question the appeal of Traditional P3 concession models for AV deployment. Archetype 4 achieves near-perfect service continuity (operate = 0.80) and strong performance standards but records the lowest access outcomes in the dataset, with no evidence of contractually required access requirements across all five cases, beyond ADA baseline compliance. If AV services are procured under long-term concession logic – as their capital intensity and infrastructure requirements may invite – access KPIs should be included in the initial concession terms, with financial penalties for non-compliance.

The CAPEX/OPEX Structure of AV Services Mirrors Microtransit, Not Rail

The funding dimension of AV governance does not map cleanly onto the P3 framework for fixed-asset infrastructure. AV services combine high capital intensity — vehicles, depots, charging infrastructure, and vehicle-to-infrastructure integration — with operational cost structures that more closely resemble those of microtransit than of rail concessions. Farebox recovery in microtransit and on-demand programs is low across the dataset, with many (65%) operating for free; the QCA shows that programs with low or zero farebox recovery face categorically different fiscal sustainability pressures than those with meaningful cost recovery. Shared, publicly-funded AV service fares are unlikely to cover operational expenditure at scale, a condition that the sufficiency analysis identifies as requiring alternative funding diversification from program inception.

The conjunction of operational commitment and alternative funding diversification, the strongest identified pathway for funding sustainability in this dataset (consistency = 0.765), suggests that public agencies need to make credible multi-year budgetary commitments alongside service-level obligations and maintain diversified revenue streams from program inception. The three discontinued cases, Boise GreenBike, MovePGH/POGOH, and Van Go!/Stockton Go! share the absence of institutionalized funding and operational commitment as a common governance antecedent. AV pilot programs that do not transition to multi-year operational frameworks during their pilot period could face the same risk of discontinuation.

Archetype Choice as a Governance Decision

The four-archetype taxonomy developed in this study is directly extensible to shared, publicly funded AV service procurement. We predict that a Consortium AV program will face the same coalition fragility risks as a Consortium microtransit program: distributed accountability, grant-dependent funding without a fiscal anchor, and access outcomes that vary with the commitment levels of individual coalition partners. A Private-RS AV program will achieve service continuity through permit-based operations but will produce access requirements only where they are written as binding permit conditions at program inception. A Public-SCO AV program — modeled on the governance configurations that produce the strongest cross-dimensional balance in this dataset (DEDICATED = 0.778, ALTFUND = 0.778, LIFA = 1.000) offers the strongest template for public agencies seeking to balance operational durability with access institutionalization.

The core recommendation that emerges from the QCA is a governance design applicable to any new shared mobility technology entering the U.S. market: institutionalize funding before pilot termination; avoid minimum revenue guarantees where access is a program objective or make access a direct contract condition for the operator to receive the revenue guarantee; standardize access contract templates across modal types rather than confining access provisions to high-visibility service categories; and diversify revenue from program inception rather than at renewal. Archetype choice is a governance decision, not a technical one, and its consequences for access and financial sustainability will persist throughout the contract terms in which it is embedded.

Limitations and Future Research

Several limitations bound the interpretation of these findings. First, the sample size ($N=26$) is at the lower end of the range for reliable QCA inference. Limited diversity – configurations that are theoretically possible but empirically unobserved – constrains the generalizability of pathway findings. Expanding to 45–60 cases and targeting underrepresented configurations (rural Archetype 1, suburban Archetype 2, multi-state Archetype 3) would strengthen the analysis. The research team attempted to be as unbiased as possible and to sample from a wide range of projects, but identifying and collecting cases suitable for analysis was time-consuming and difficult, as shared mobility services are relatively new and contract documentation is difficult to define and locate. The final dataset included those with sufficient data across all conditions to allow analysis.

Second, the dataset captures conditions and outcomes at a single point of observation. A panel design tracking condition changes over time would enable longitudinal causal inference that cross-sectional QCA cannot provide. For example, some projects stopped and restarted over time because they were pilots or had temporary permits. It would be insightful to include and track these in the dataset to understand how governance shifts upon reauthorization could reinforce or alter the outcomes of this analysis.

Future research could pursue two extensions: (1) QCA incorporating AV, EV charging, and MaaS cases as they accumulate; and (2) qualitative process tracing within archetype-pathway pairs to identify the mechanisms linking governance conditions to outcomes, a level of causal depth that QCA identifies but cannot explain.

Conclusions

This study makes four primary contributions to the literature on public sector-funded new mobility and autonomous vehicle services and governance. Each evaluated threshold has distinct necessary and sufficient conditions, and the conditions that produce access institutionalization are not simply those that produce service continuity plus additional requirements. Instead, they reflect qualitatively different governance choices about contract form, payment structure, and modal positioning.

First, this study provides systematic comparative evidence on service-based P3 risk allocation across a diverse set of U.S. shared mobility programs, showing that U.S. shared mobility governance is characterized by public risk retention rather than private risk transfer—a finding that challenges the standard infrastructure P3 framework.

Second, the analysis identifies governance conditions necessary or sufficient for service continuity, funding sustainability, and access institutionalization.

- **Service Continuity (OPERATE):** Dedicated funding functions as the practical floor for service continuity. When paired with operational commitments (OPCOMMIT), it produces service continuity at a level of sufficiency necessary for funding sustainability, covering half of all operating cases (DEDICATED * OPCOMMIT * ~REVGUAR * LIFA). An alternative pathway (OPCOMMIT * ~REVGUAR * LIFA * CAPOP), which retains risks and budgets for operations, also reveals a leaner operating model, suggesting systems can maintain operations without dedicated revenue if public agencies maintain operational commitments and support operational budgets.
- **Access institutionalization (ACCESSREQ):** The analysis uncovered extreme causal equifinality shaped by a resource paradox. Access requirements are contractually embedded and present in both scenarios.
- **Fare-free programs** present an interesting caveat to access requirements. Cases that operate a free system have a 0.000 consistency with ACCESSREQ, suggesting that since the service is free to all, specific location- or income-based service requirements are not needed. This could be problematic if the service is deemed too expensive to run without fares and reverts to a paid system, with no precedent for access requirements in the operating contracts and no funding incentives for the private operator to serve low-income or other underserved groups or locations.
- **Fee arrangements** can incentivize performance while simultaneously embedding access requirements. This addresses a shortcoming that arises when procurements include only minimum revenue guarantees, which often lack performance incentives and do not institutionalize access, a relationship that holds across all 26 cases.
- **Active/micromobility modes** achieve 100% access rates while on-demand programs average approximately 38%, revealing a modal access gap that procurement design must address.

Third, it introduces a mode-type governance fit typology — Active/Micromobility, On-demand/Flex, Fixed Route/Rail — as a theoretically grounded and empirically validated way

to incorporate modal diversity into shared mobility governance research without collapsing distinctions that matter for access and funding outcomes.

Fourth, it provides a directly extensible framework for emerging mobility governance. The four archetypes, conditions, and three outcome logics identified here apply directly to procuring publicly funded, privately operated autonomous vehicle services. The study's core prescription—institutionalize funding, identify fee arrangements that incentivize performance while embedding access, standardize access templates across modal types, and diversify revenue from day one—is governance elements applicable to any new shared mobility service technology entering the U.S. market.

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Appendix

Appendix A: Core Conditions

The following table presents the full set of condition variables used in the QCA, organized by analytical dimension, with their definitions, variable types, and calibration rules.

Variable	Common Name	Dimension	Definition	Calibration
ARCHETYPE	Archetype	Governance	Partnership model (1 – scale → 4 dummies)	Pub-SCO =1 Consortium=1; Private-RS/Pub-RS=1; Trad P3=1
PRIVHIGH	Private Investment	Governance	Private investment ratio	0=<33%; 1=≥33%
REVGUAR	Revenue Guarantee	Governance	Revenue/demand guarantee present	0=absent; 1=present
PERFSTD	Performance Standard	Governance	KPI/SLA clarity	0=none; 1=binding
FARERECOV	Farebox Recovery	Funding	Farebox recovery level	1=present (high/med) 0 = not present or low
REVSHARE	Revenue Share	Funding	Revenue allocation to agency	1=agency; 0=operator
DEDICATED	Dedicated Funding	Funding	Funding stability from public agencies	0=pilot/short-term; 1=multiyear/permanent
ALTFUND	Alternative Funding	Funding	Alternative non-public funding streams	1=ads/sponsorship/fares/fees/grants 0= none (or taxes)
OPCOMMIT	Operational Commitment	Funding	Operational commitment	0=none;/short 1=ongoing/dedicated
CAPOP	Capital vs. operating balance	Funding	Capital vs. operating balance	0=capital-heavy; 1=opex-heavy
ACCESSREQ	Access requirements	Access	Contractual access requirements	0=none/aspirational; 1=binding/strong evidence
LIFA	Low-Income fare	Access	Presence of a low-income fare or free fare program	0=none; ; 1=present
FREE	Free service for all riders	Access	Indicates fare free program	0=no; 1=yes

MODETYPE	Mode Type	Mode	Governance-fit modal category	1=Active/Micro; 2=On-demand/Flex; 3=Fixed/Rail
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Appendix B: csQCA Calibrated Dataset

Case	Arch.	ALT FUND	OP COMMIT	~REV GUAR	LIFA	FREE	CAPOP	OPERATE	DEDICATED	ACCESSREQ
Archetype 1 – Private Revenue Share (n=4)										
CitiBike	1-PRS	1	1	1	1	0	1	1	0	1
MetroBike	1-PRS	1	1	1	1	0	1	1	0	1
Ride On Flex	1-PRS	0	1	1	1	1	1	1	0	0
SFMTA Commuter Shuttle	1-PRS	1	1	1	0	0	1	1	1	0
Archetype 2 – Public Service Contract Operations (n=9)										
Blue Bikes	2-SCO	1	1	1	1	0	0	1	1	1
Boise GreenBike / Vall-eBike †	2-SCO	1	0	1	1	0	1	0	0	1
Capital Bikeshare	2-SCO	1	1	1	1	0	1	1	1	1
Divvy	2-SCO	1	1	1	1	0	1	1	1	1
Direct Connect	2-SCO	1	1	1	1	0	1	1	0	1
SF Ferry	2-SCO	0	1	1	1	0	0	1	1	0
NICE Bus	2-SCO	1	1	1	1	0	1	1	1	1
River Rail Streetcar	2-SCO	0	1	1	1	1	1	1	1	0
SFRTA Rail	2-SCO	1	1	1	1	0	0	1	1	0
Archetype 3 – Consortium / Nonprofit Hybrid (n=8)										
MovePGH / POGO †	3-Con	0	0	1	1	0	1	0	0	1
Campus Shuttle, Prairie View TX	3-Con	1	1	1	1	1	1	1	1	0
Hourcar	3-Con	1	0	1	1	0	1	1	1	1
ATL FLM Shuttle Service	3-Con	1	0	1	1	1	1	1	0	0
Q-Line Trolley	3-Con	1	0	1	1	1	1	1	0	0
START Bus	3-Con	1	1	1	1	1	1	1	0	0

Case	Arch.	ALT FUND	OP COMMIT	~REV GUAR	LIFA	FREE	CAPOP	OPERATE	DEDICATED	ACCESSREQ
King County Transit Bus Electrification P3	3-Con	1	1	1	1	0	0	1	1	1
KC Streetcar	3-Con	1	1	1	1	1	1	1	1	0
Archetype 4 – Traditional P3 Concession (n=5)										
Van Go! / Stockton Go! †	4-P3	1	0	0	1	0	1	0	0	0
Eagle P3	4-P3	1	1	0	0	0	0	1	1	0
Portland Airport MAX	4-P3	1	1	1	1	1	0	1	1	0
Purple Line MD	4-P3	1	1	0	1	0	1	1	1	0
SkyConnect APM	4-P3	1	1	0	1	1	0	1	1	0

Appendix C: Comprehensive Boolean Sufficiency Solutions

Target Outcome & Causal Pathways	inclS	PRI	covS	covU	Empirical Cases Covered (N _{total} = 26)
Outcome 1: SERVICE CONTINUITY (OPERATE)					(Overall Solution Coverage = 0.913)
Path 1: DEDICATED * ALTFUND * OPCOMMIT * LIFA (n=11)	1.000	1.000	0.478	0.043	Blue Bikes ; Capital Bikeshare ; Divvy ; NICE Bus ; SFRTA Rail ; Campus Shuttle, Prairie View TX ; King County Transit Bus Electrification P3 ; KC Streetcar ; Portland Airport MAX ; Purple Line MD ; SkyConnect APM
Path 2: DEDICATED * OPCOMMIT * ~REVGUAR * LIFA (n=11)	1.000	1.000	0.478	0.043	Blue Bikes ; Capital Bikeshare ; Divvy ; SF Ferry ; NICE Bus ; River Rail Streetcar ; SFRTA Rail ; Campus Shuttle, Prairie View TX ; King County Transit Bus Electrification P3 ; KC Streetcar ; Portland Airport MAX
Path 3: OPCOMMIT * ~REVGUAR * LIFA * CAPOP (n=11)	1.000	1.000	0.478	0.217	CitiBike ; MetroBike ; Ride On Flex ; Capital Bikeshare ; Divvy ; Direct Connect ; NICE Bus ; River Rail Streetcar ; Campus Shuttle, Prairie View TX ; START Bus ; KC Streetcar
Path 4: DEDICATED*ALTFUN D*OPCOMMIT*~NRE VGUAR*~CAPOP (n=2)	1.000	1.000	0.087	0.043	Eagle P3 ; SkyConnect APM
Path 5: DEDICATED * ALTFUND * OPCOMMIT * ~REVGUAR * CAPOP (n=6)	1.000	1.000	0.261	0.043	SFMTA Commuter Shuttle ; Capital Bikeshare ; Divvy ; NICE Bus ; Campus Shuttle, Prairie View TX ; KC Streetcar
Path 6: DEDICATED * ALTFUND * ~REVGUAR * LIFA * CAPOP (n=6)	1.000	1.000	0.261	0.043	Capital Bikeshare ; Divvy ; NICE Bus ; Campus Shuttle, Prairie View TX ; Hourcar ; KC Streetcar
Outcome 2: ACCESS INSTITUTIONALIZATION (ACCESSREQ)					(Overall Solution Coverage = 0.182)
Path 1: DEDICATED * ALTFUND * ~OPCOMMIT *	1.000	1.000	0.091	0.091	Hourcar

~REVGUAR * LIFA * CAPOP (n=1)					
Path 2: ~DEDICATED * ~ALTFUND * ~OPCOMMIT * ~REVGUAR * LIFA * CAPOP (n=1)	1.000	1.000	0.091	0.091	MovePGH / POGOH
Outcome 3: FUNDING SUSTAINABILITY (DEDICATED)					(Overall Solution Coverage = 0.562)
Path 1: ALTFUND * OPCOMMIT * REVGUAR * LIFA (n=2)	1.000	1.000	0.125	0.062	SkyConnect APM; Purple Line MD
Path 2: ALTFUND * OPCOMMIT * REVGUAR * ~CAPOP (n=2)	1.000	1.000	0.125	0.062	Eagle P3, SkyConnect APM
Path 3: OPCOMMIT * ~REVGUAR * LIFA * ~CAPOP (n=5)	1.000	1.000	0.312	0.312	Blue Bikes ; SF Ferry ; SFRTA Rail ; King County Transit Bus Electrification P3 ; Portland Airport MAX
Path 4: ALTFUND * OPCOMMIT * ~REVGUAR * ~LIFA * CAPOP (n=1)	1.000	1.000	0.062	0.062	SFMTA Commuter Shuttle

Key: ~ indicates the absence of the condition. inclS = Solution Consistency; PRI = Proportional Reduction in Inconsistency; covS = Raw pathway coverage; covU = Unique pathway Coverage. All paths achieve a perfect consistency threshold of 1.000.

Appendix D: Case Summaries

This section provides brief narrative summaries of the projects selected for further analysis in the study. They are grouped here by region and have not yet been assigned archetypes. As stated above, these summaries and proposed archetypes are the product of the first phase of research, which aims to establish trends and data to facilitate a more rigorous exploration of the state of public-private partnerships in shared and new mobility.

Archetype 1 — Private Revenue Share

Private-RS programs (n=4: Citibike, MetroBike, Ride On Flex, SFMTA Commuter Shuttle) are governed by private operators under permit or concession arrangements with minimal public subsidy. Revenue is primarily user-generated (fares, memberships, corporate passes) supplemented by sponsorship or advertising. The public agency sets regulatory terms, data-sharing requirements, and access conditions rather than operational ones. The private operator bears both demand and operational risks in exchange for retaining revenue.

This archetype achieves strong service continuity and diversified alternative funding, but only moderate institutionalization of access. Access provisions, where present, permit conditions imposed by the public agency rather than contractual commitments from the operator.

Citi Bike, (New York City, New York)

Citi Bike, launched in 2012, is the largest bikeshare program in the United States. The City of New York, through the Department of Transportation (DOT), contracts exclusively with a private operator, initially Alta Bicycle Share, later Motivate, and since 2018, Lyft, to own, operate, and maintain the system. Unlike most other large bikeshare programs, Citi Bike has never received public operating subsidies, relying entirely on user fees, advertising, and long-term corporate sponsorships to sustain operations. The City contributes in-kind support by allocating street and sidewalk space for stations and retains contractual oversight authority.

The operating agreement includes financial penalties for service lapses, such as low bike or dock availability, slow response to complaints, and failure to meet reporting requirements, but enforcement has been inconsistent. Independent analysis of real-time data in summer 2023 revealed over 11,000 instances where stations remained empty or full for at least an hour, with service reliability issues disproportionately concentrated in outer-edge neighborhoods with higher shares of Black, Latino, and low-income residents.¹⁷ Although these violations could have resulted in fines totaling \$812,000 for the summer of 2023 alone, the city did not impose penalties.¹⁸ Historic data also indicate a significant drop in rebalancing activity: from over 100 annual rebalancing moves per bike (2014–2019) to just 26 in 2022, with even fewer in 2023.¹⁹

Citi Bike's revenue model is built on a mix of annual and monthly memberships, short-term passes, and per-minute surcharges for e-bikes, supplemented by advertising and sponsorship agreements. In 2023, the program generated \$133.2 million in revenue, yielding a modest profit after direct operating expenses of \$131.4 million, despite having run a deficit the previous year.²⁰

¹⁷ Bharadwaj et al., "Riding Forward: Overhauling Citi Bike's Contract for Better, More Equitable Service." 5

¹⁸ Bharadwaj et al., "Riding Forward: Overhauling Citi Bike's Contract for Better, More Equitable Service." 5

¹⁹ Bharadwaj et al., "Riding Forward: Overhauling Citi Bike's Contract for Better, More Equitable Service." 4

²⁰ New York City Department of Transportation, "2023 Report on Bike Share Financial Data."

The system offers a \$5 monthly membership for NYCHA residents and SNAP recipients, an affordability measure that is significantly cheaper than the standard \$205 annual pass, but challenges persist.²¹ Stations in outer-borough neighborhoods with greater concentrations of disadvantaged residents experience more frequent unusable conditions, limiting the practical benefit of discounted memberships.

Despite these operational challenges, Citi Bike's scale, ridership volume, and zero-subsidy operating model have positioned it as a distinctive outlier among U.S. bikeshare systems. The model demonstrates that large-scale bikeshare can operate without direct taxpayer funding under favorable demand conditions but also illustrates the tension between profit-driven operations and the public sector's goals for fair and reliable service distribution.

MetroBike (Austin, Texas)

MetroBike, launched in December 2013 as Austin B-cycle, is the City of Austin's bikeshare system. The system began with \$1.5 million in federal startup funding and \$500,000 in private matching funds raised by the nonprofit Bike Share of Austin (BSA), installing 44 stations and bikes downtown. Early expansion relied on additional federal and local funding.²² In 2015, the City of Austin contributed 80% of the \$1.25 million capital budget through surplus Capital Metro sales tax funds, while BSA secured the remaining 20% through sponsorships and grants.²³

In 2020, the system was rebranded as MetroBike as part of a formal partnership among Capital Metro, the City of Austin, and Bike Share of Austin. Under this arrangement, the city owns the assets, Capital Metro oversees system planning, branding, and operations, and BSA manages day-to-day system operations. That same year, operations were formally consolidated under Capital Metro, with BSA employees transitioning into agency staff. By 2024, Austin announced a significant expansion through a partnership with PBSC Urban Solutions to replace and expand 80 MetroBike stations, 1,000 docks, and 800 bicycles—tripling the size of the system.²⁴ This \$20.6 million expansion was partially supported by a \$11.3 million Transportation Alternatives Set-Aside (TASA) federal grant.²⁵

The system integrates with Capital Metro's fare structure and app, allowing multimodal riders to bundle bikeshare with bus and rail service. Passes range from \$15 for a Local Day Pass, which covers both transit and bikeshare, to \$120 for a monthly commuter package. Meanwhile, bikeshare-only memberships, such as Local365 (\$86.60 annually), offer more flexible options. In addition, MetroBike had prioritized affordability through access programs: the "BCycle for All" pass offers low-income riders a \$5 annual membership, UT Austin students and staff can access discounted memberships at \$12, and Huston-Tillotson University affiliates receive free yearly memberships.²⁶

System operations are primarily sustained through rider revenue, which accounts for roughly 90% of the annual budget.²⁷ However, federal and local funding has been critical for capital expansion, most recently through Proposition A (Project Connect), which will add

²¹ Bharadwaj et al., "Riding Forward: Overhauling Citi Bike's Contract for Better, More Equitable Service." 10

²² McFadden, "Austin B-Cycle Expansion Proposal."

²³ McFadden, "Austin B-Cycle Expansion Proposal."

²⁴ Clifton, "Cap Metro Looks Forward to New Electric Era for City's Bike-Share System."

²⁵ Hollingsworth et al., "MetroBike Strategic Expansion Plan."

²⁶ Hollingsworth et al., "MetroBike Strategic Expansion Plan."

²⁷ McFadden, "Austin B-Cycle Expansion Proposal."

high-frequency bus and new rail service, and Proposition B, which dedicated \$80 million for urban trails and \$40 million for bikeways to achieve an 80% All Ages and Abilities network by 2025.²⁸ Together, these measures create a favorable policy environment for MetroBike's role as a first/last-mile connector in Austin's growing multimodal system.

MetroBike has also emphasized community engagement, launching ambassador programs with the Housing Authority of the City of Austin (HACA) to co-locate stations at affordable housing properties and provide discounted memberships. Recent strategic planning efforts included surveys, focus groups, and committee meetings to inform expansion priorities and ensure alignment with demographic needs and mobility best practices.²⁹

Ride On Flex, (Montgomery County, Maryland)

Ride On Flex is an on-demand service that was launched in 2019 by the Montgomery County Department of Transportation (MCDOT). This program provides flexible mobility options, especially for residents of low-density areas where fixed-route service does not reach. The program operates under a public-dominant governance model, with Montgomery County serving as the lead owner and policy authority while contracting out with private technology provider, Via, for software and operational support.³⁰ The partnership is through a service contract in which the county retains control over fares, the service area, and policy rules. Via is responsible for the demand-responsive technology and software operations component.

Uniquely, Ride On Flex is funded entirely through local public capital investment in the capital infrastructure or operations.³¹ The county covers most operating costs (approximately 85% of expenses) and retains all system revenue. Because the system has transitioned to a fare-free model (keeping the pay-per-ride structure only until June 2025), the farebox recovery rate is zero, and the program requires an estimated public subsidy of about \$23 per trip.³² This subsidy covers the high operating costs of on-demand service, and the program's focus on coverage in low-density areas is appropriate, as a large part of Montgomery County is suburban and car ownership is required (80% of the county's households have at least one car)⁴ for much of the day-to-day travel.

In terms of risk and revenue models, Ride On Flex functions as a traditionally publicly funded transit pilot rather than a public-private partnership with shared risk or revenue incentives. Montgomery County assumes full financial responsibility for operations and capital, while Via is accountable for meeting contractual service obligations, such as routing and scheduling. There is no revenue-sharing arrangement, and all revenue (that was collected from launch to mid-2025) was retained by the county. The main operational challenges are cost management in low-density service areas and ensuring accessibility in a rural environment.

San Francisco MTA Commuter Shuttle, (San Francisco, California)

The SFMTA Commuter Shuttle Program began as a pilot in 2014 and became a full, recurring program in 2017. It emerged in response to the proliferation of private shuttle services, often

²⁸ Hollingsworth et al., "MetroBike Strategic Expansion Plan."

²⁹ Hollingsworth et al., "MetroBike Strategic Expansion Plan."

³⁰ "Via Launches 'Ride On Flex' on-Demand Transit in Partnership with MCDOT."

³¹ Maryland Department of Transportation, "RFQ Microtransit Shared Ride Flex Software."

³² Foursquare, "Flex Expansion Study."

associated with the tech industry's ascendance in the South Bay during the mid-2010s.³³ The program is a city-administered permit system that allows private shuttles to use a designated network of shared Muni stops and shuttle-only “white zones.” Operators pay a per-stop fee of \$8.60,³⁴ which funds program staffing, enforcement, and administration—the program is intended to be cost-neutral. Fees and penalties are capped to cover the program's operating costs. Staff anticipate the number of expected stop-events and divide that by the total budget devoted to program administration. In FY2019, the program generated \$7.5 million in permit fees and \$1.07 million in penalties.³⁵

From an access lens, the program poses challenging questions: access to shuttles is limited to employees of companies that contract for the services, which naturally creates a two-tiered system. The program's impact on the broader transit network is, however, positive—SFTMA reports that many shuttle riders were former car commuters rather than people switching from conventional fixed-route transit.³⁶

Archetype 2 — Public Service Contract Operations

Public-SCO is the most common archetype in the dataset (n=9: Blue Bikes, Boise GreenBike, Capital Bikeshare, Divvy, Direct Connect, SF Ferry Program, River Rail Streetcar, SFRTA Rail, NICE Bus). Public-SCO achieves the best balance across all outcomes: operate = 0.889, dedicated funding = 0.778, access requirements = 0.667, Low-income Fare Allocation (LIFA) = 1.00 (highest), and alternative funding = 0.778.

Capital Bikeshare (Washington DC-Maryland-Virigina Region)

Capital Bikeshare, started in 2010, was one of the first large-scale bikeshare programs launched in the United States. The District Department of Transportation (DDOT), together with six partner jurisdictions – the City of Arlington, City of Alexandria, City of Falls Church, and the Counties of Montgomery, Fairfax, and Prince George's – contracted with a private operator, initially Motivate and since 2018 Lyft (which acquired Motivate), to manage day-to-day operations, maintenance, and system rebalancing. Capital Bikeshare operates in a distinctive metropolitan context. The Washington, D.C. region features high average incomes, lower-than-average car ownership in the core urban areas, and a dense network of existing metro-adjacent, transit-oriented development corridors. In a 2010 survey conducted right after the launch of the service, 57% of respondents owned a car, and 20% said they would consider getting rid of a car if the system were expanded.³⁷ While District has a car-ownership rate of around 68%, the surrounding metropolitan area, while still below the median for large metropolitan areas, has a car-ownership rate of 90%.³⁸

Unlike the private dominant models seen in systems like Citi Bike in NYC, Capital Bikeshare's public partners fully fund all capital costs, such as stations, docking infrastructure, and bicycles,

³³ San Francisco County Transportation Authority, *Emerging Mobility Evaluation Report: Evaluating Emerging Mobility Services and Technologies in San Francisco*.

³⁴ “Commuter Shuttle Program | SFMTA.”

³⁵ San Francisco Metropolitan Transportation Authority, “SFMTA Commuter Shuttle Program.”

³⁶ San Francisco Metropolitan Transportation Authority, *SFMTA Commuter Shuttle Program: 2017 Annual Status Report*.

³⁷ “Capital Bikeshare Development Plan Update.”

³⁸ “Car Access in US Major Metropolitan Areas | Newgeography.Com.”

while the private operator earns a performance-linked fee. The public sector retains ownership of all physical assets and exercises planning authority through inter-jurisdictional Memoranda of Understanding (MOUs) coordinated by the Metropolitan Washington Council of Governments (MWCOCG). The operating agreement includes five formal categories of key performance indicators: bike and dock availability, maintenance and repair turnaround, system rebalancing, customer service response time, satisfaction, and data reporting compliance. The multi-jurisdictional governance structure, while enabling regional network coverage, creates diffuse accountability: when service lapses occur, no single jurisdiction holds ultimate enforcement authority across the entire network. Expansion decisions similarly require negotiation across seven political bodies.

Capital Bikeshare's revenue model combines annual and monthly memberships, pay-per-ride and per-minute fees, and advertising revenue from station displays and corporate sponsorships, supplemented by ongoing public contributions from jurisdictional growth. With a cost recovery ratio of 96%, the system covers most of its operating costs through advertising revenue, proffer, and user fees.³⁹ Operating shortfalls are covered by jurisdictional general fund revenue; for example, in FY24, DDOT proposed a one-time increase of \$5,780,000 to support Capital Bikeshare's operating costs.⁴⁰ The system has seen an increase in ridership, and additional revenue is needed to fund expansion, additional operations, and maintenance costs as ridership continues to grow. In response, membership rose to \$120 per person in FY206, but it maintains a \$5 access-based membership for low-income individuals.

Divvy Bikes (Chicago, Illinois)

The City of Chicago's public bikeshare program, Divvy, is a public-dominant public-private partnership in which the City is primarily responsible for the original capital expenditures and owns the system's core assets (bikes, stations, and related equipment), while operations are the responsibility of the private partner, Lyft Inc. (the third in a series of operators who have been sequentially acquired by larger entities).⁴¹ The current agreement spreads risk across the parties and provides mutual incentives for ridership and sponsorship growth through a revenue-sharing scheme, which provides a guaranteed annual payment from the operator to the City of \$6m, plus a substantial share of sponsorship revenue (\$1.5m or 40% of net revenue) and 5% of ridership revenues over \$20m per year. The City, in turn, pledges to use the annual payment exclusively for transportation purposes, including bike-lane construction and maintenance, and grants the operator an exclusive license for operating bikeshare on the City's right of way.⁴² Lyft also provides the bicycles and docking equipment that the City purchases with capital funds.

The original agreement, entered into in 2013 between the City and Alta Bicycle Share, Inc., has leveraged a variety of funding sources, including federal CMAQ and TIGER funds and local tax increment financing (TIF) funds, for the initial purchase of bikes and docks.⁴³ Identifying and pursuing capital funding, especially federal funding, remains the City's responsibility, while operating funding, from a combination of system revenues (memberships and daily rental fees) and sponsorship and advertising revenues, is the operator's responsibility.

³⁹ "Capital Bikeshare Development Plan Update."

⁴⁰ "Capital Bikeshare Partners & Sponsors | Capital Bikeshare."

⁴¹ Divvy 2019 Contract.

⁴² Divvy 2019 Contract.

⁴³ Sean Wiedel, Chicago Department of Transportation, "Growing Bikeshare (& Biking) in Chicago."

The system's operations follow a similar breakdown of responsibility, with the city in charge of siting and approving station locations and setting broad goals for distribution around the city, programmatic goals for reaching specific populations, etc., and the operator responsible for day-to-day operations, maintenance of bikes and stations, and marketing. The agreement also includes performance metrics, under which the operator retains greater amounts of profit the better the system performs in terms of ridership, utilization, maintenance, and customer satisfaction.⁴⁴

A 2019 amendment to the contract also included provisions for dockless bikesharing and e-bikes, extended the contract for another five years, and provided Lyft with a unique operating authorization for e-scooters. While other scooter operators go through a competitive licensing process operated by the City's Department of Business Affairs and Consumer Protection (BACP),⁴⁵ Lyft has the right under their bikeshare contract to skip the licensing process and deploy scooters that use the e-bike charging stations, can bear Divvy branding, and are rentable through the same app used for public bikeshare.⁴⁶

GreenBikes/Vall-eBike (Boise, Idaho)

The Vall-eBike pilot launched in July 2022 as a short-term P3 to test the feasibility of electric-assist bikeshare in Idaho's Treasure Valley. The service is managed by Valley Regional Transit (VRT) and was a relaunch of bikeshare following the suspension of Boise GreenBike in 2020. Vall-eBike operated for approximately 3.5 months and offered station-based e-bikes in Boise's downtown area, and Boise State University, and in adjacent neighborhoods. After returning to service, the Vall-eBike pilot was structured as a public-led initiative with private sector support. VRT retained ownership of the service and provided oversight, while Drop Mobility provided capital support. Unlike larger DBFOM concessions, Vall-eBike was designed as a temporary pilot rather than a long-term concession. Risk allocation reflected this scale: Drop Mobility assumed technological and maintenance responsibilities, while VRT managed revenue and administrative oversight.

Financial support came from a mix of local public and private sources, including a \$50,000 commitment from the Capital City Development Corporation (CCDC), and a \$25,000 sponsorship match.⁴⁷ To reduce capital expenses, stations from the Boise GreenBike system were reused and put back into service, ultimately increasing the geographic reach. The pricing model for this pilot was pay-per-ride and included an income-based membership option that offered reduced-cost access for low-income riders. Accessibility was limited to the shared e-bike model, with no additional adaptive vehicles provided.

By the end of the short 3.5-month pilot, Vall-eBike had recorded more than 3,000 trips by 2,400 unique riders,⁴⁸ demonstrating strong local demand despite its brief duration. Although this program was limited in scale and duration, it served as proof of concept for future bikeshare programs in the region.

⁴⁴ Divvy 2019 Contract.

⁴⁵ Chicago Scooter Business Rules.

⁴⁶ Divvy 2019 Contract.

⁴⁷ "Vall-eBike."

⁴⁸ "Vall-eBike."

NICE Bus P3, (Nassau County, New York)

The Nassau Inter-County Express bus, or NICE Bus, is the primary bus system serving Nassau County, New York. This bus system was formerly operated by the New York Metropolitan Transportation Authority (MTA) as MTA-Long Island Bus until 2012. Today, ownership and capital investment responsibilities remain within Nassau County, with operations, compliance, and customer-facing operations under the private operator, Transdev (one of the largest private transportation operators in North America). Transdev's role in operations encompasses managing a workforce of over 850 employees and overseeing larger operations, including scheduling, dispatch, ADA eligibility, customer service, finance, HR, procurement, and marketing. The system has grown to include fixed-route services, paratransit, and NICE MINI (microtransit pilot).

The contract between Nassau County and Transdev was recently renewed in 2024 and runs through 2030 and is structured around a fixed management fee plus an hourly service rate. Transdev's compensation is tied to actual service hours rather than ridership levels. Unlike some revenue-risk models, all farebox income and external revenues, such as advertising and special event shuttles, flow directly to the county. Transdev manages both fixed-route and paratransit services under these standards, making NICE Bus one of the more fully outsourced suburban bus systems in the United States.

Financially, NICE bus is sustained by a mix of federal, state, county, and farebox revenue, with the 2024 operations budget approved at \$128 million, or about \$3.07 per ride.⁴⁹ The agency maintains fare policy authority and has implemented reduced and fare-free options tied to statewide benefit programs, which also include seniors and people with disabilities. This unique P3 model relieves the county of operational and compliance burdens while guaranteeing predictable costs; however, it also means that Transdev bears no farebox ridership risk. In this way, NICE Bus provides a useful counterpoint to revenue-sharing or availability-payment P3s, showing how privately dominant operations can shift service delivery without tying private returns to ridership or fare revenue.

San Francisco Bay Ferry (San Francisco, California)

San Francisco Bay Ferries (WETA) currently operates regular routes via a public contract model with Blue and Gold Fleet. The program The REEF program (Rapid Electric Emission-Free Ferry) is San Francisco Bay Ferry's initiative to decarbonize its fleet. It involves procuring new battery-electric ferries, retrofitting existing diesel vessels, and building shoreside charging infrastructure across the Bay. REEF also covers electrification of terminals and an upgrade to the Alameda maintenance yard, positioning the Bay Area as one of the first U.S. regions with a fully electric high-speed ferry system.⁵⁰

Funding for REEF is substantial and layered, with the majority coming from federal dollars. The program has secured over \$200 million to date, with significant contributions from federal sources, including \$11.5 million from the Federal Transit Administration for new vessels and \$55.4 million from the EPA Clean Ports Program for charging infrastructure, a Mission Bay

⁴⁹ Murphy, "\$128 Million Budget Approved for Nassau Bus System."

⁵⁰ San Francisco Mayor's Office, "Mayor London Breed Announces \$55 Million Federal Grant to Advance the Country's First High Speed Zero-Emission Ferry Service in San Francisco."

terminal, and workforce training initiatives.⁵¹ State and regional dollars—such as California’s Transit and Intercity Rail Capital Program (TIRCP), State Transit Assistance, and toll revenues from Regional Measure 3 (RM3)—add to the mix, alongside City and County of San Francisco capital funds.⁵²

REEF is an addition to the existing P3 model but is not itself a new public-private partnership. Instead, it’s a system-wide upgrade to an existing P3. The Water Emergency Transportation Authority (WETA) owns the assets and manages funding, while Blue & Gold Fleet, a private company, operates the vessels under a long-term contract.⁵³ That arrangement—already a genuine P3—means that while REEF is publicly funded, its day-to-day service will be delivered by a private operator. In short, REEF is not itself a P3 project but an ambitious public investment that strengthens an ongoing public-private framework.

River Rail Streetcar (Little Rock, Arkansas)

The River Rail Streetcar (now branded Metro Streetcar) in Little Rock and North Little Rock, Arkansas, launched service in 2004 and operates as a public-led transit service. The system began with a 2.5-mile Phase 1 loop through both downtowns and expanded in 2007 with a half-mile Phase 2 extension to the Clinton Presidential Library. Service was designed as a heritage-style streetcar circulator, providing access to downtown for workers, residents, and visitors.⁵⁴ At its peak, the system carried more than half a million riders annually.

The streetcar was delivered through an interlocal public partnership among Central Arkansas Transit Authority (CATA, now Rock Region Metro), the City of Little Rock, the City of North Little Rock, and Pulaski County. Capital funding came primarily from the Federal Transit Administration (about 80% of the costs for Phase 1’s \$19.6 million and Phase 2’s \$7.6 million), with local governments providing the required 20% match. Unlike some U.S. streetcar projects, there is no evidence of private capital investment in construction. The private sector’s role has been limited to construction contractors and vendors supplying vehicles and infrastructure.

River Rail is notable for the clear federal-local split in cost responsibility and the absence of private financing despite frequent exploration of naming rights and sponsorships. All ongoing risks, both financial and operational, remain with the public sector.⁵⁵ Rock Region Metro operates and maintains the streetcar, while the cities and county provide the operating subsidy. In 2022, operating costs were approximately \$1.12 million annually, with no fare revenue because the service was fare-free. Historically, operating subsidies have been split between the two cities and the county.

In terms of risk and revenue models, this is a traditional publicly funded transit service rather than a P3. The federal government bore the capital risk, while the local jurisdictions assumed

⁵¹ San Francisco County Transportation Authority, “SF Bay Ferry Receives \$67 Million Federal Grants for Electric Ferries and Mission Bay Landing | SFCTA.”

⁵² Gajare, “San Francisco Bay Ferry Awarded \$12 Million State Grant for Electrification of Harbor Bay Ferry Route.”

⁵³ San Franc. Bay Ferry, “About Us.”

⁵⁴ Nelson\Nygaard Associates, *Missoula Urban Transportation District Urban Streetcar Study*.

⁵⁵ City of Little Rock, AR, “A Resolution Expressing the Willingness of the City of Little Rock, Arkansas, to Partner with the City of North Little Rock and the Arkansas Department of Transportation to Relocate Portions of the Rock Region Metro Streetcar Infrastructure.”

the obligation for ongoing subsidies. Contractors were responsible only for delivering vehicles and infrastructure, not for long-term operations. With fares eliminated, there is no revenue-sharing; instead, the program relies entirely on subsidies. The main challenges have been sustaining ridership and managing operating costs given the system's modest scale, particularly following the pandemic, which led to a decline in usage.

SRFTA Rail (Miami, Florida)

The South Florida Regional Transportation Authority (SFRTA) entered into a memorandum of understanding in 2019 to expand commuter rail service between downtown Miami and Aventura, with operations scheduled to begin in 2024, post-pandemic. The project originated from years of negotiations among stakeholders, including SRFTA, Florida DOT, Miami-Dade County, Amtrak, and Virgin Trains USA (operating as Brightline). Unlike traditional commuter rail projects, this service relies heavily on shared infrastructure and complex agreements to balance public investment and private risk.

Funding for this service comes from a strong federal commitment, which covers half of the capital costs through formula and discretionary grants. The State of Florida has contributed 20% of costs, while Miami-Dade County and other local partners pay a combined 30% (including operational expenses). While fare revenue covered nearly 10% of operating costs in 2023, the majority of financial support remains public.⁵⁶ Brightline assumed the capital risk for operations and maintenance, agreeing to reimburse Miami-Dade County if performance falls below the thresholds defined in the MOU. Operational risk is also shared – Brightline manages day-to-day service and on-the-ground delivery, while the county retains responsibility for long-term capital costs. The contractual framework includes performance metrics, ensuring accountability for reliability and service quality.

This project builds on Tri-Rail's existing fare policies, which offer half-priced discounts to Medicaid recipients, seniors, students, people with disabilities, and households receiving state assistance. These provisions extend affordability across a diverse ridership base. With a regional population density of over 1,400 residents per square mile and a median household income of around \$66,700, the line targets both choice riders seeking alternatives to congestion and transit-dependent populations who rely on affordable, reliable mobility. While the service is still in its early stages, its financing and operating model could help to inform future rail expansions in regions where public ownership of rail infrastructure is limited.

Blue Bikes (New Orleans, Louisiana)

After a one-year hiatus, New Orleans relaunched its bikeshare system in 2021 under a new model that placed community leadership at its core. The program, rebranded as Blue Bikes, is operated by the nonprofit Blue Krewe in partnership with the City of New Orleans, with major sponsorship from Blue Cross Blue Shield of Louisiana. Unlike many other bikeshare systems in the US that rely heavily on municipal funding, Blue Bikes operates with minimal city financial support, relying instead on sponsorships, grants, and user revenue to sustain its operations.

The current operating agreement, initially set from 2021 to 2026, was extended in 2025 through a new five-year contract, ensuring system continuity through 2030. Blue Krewe serves as the operator and assumes operational responsibility, while corporate sponsors cover most of the

⁵⁶ South Florida Regional Transportation Authority, *SFRTA FY 2026-FY 2035 Transit Development Plan Major Update*,.

capital costs. Financial records suggest that revenue margins remain slim; nonetheless, the non-profit model enables the program to be more community-oriented and equitable. Per the City's requirements, Blue Krewe offers a low-income membership program, provides free rides for riders enrolled in the state benefits program, and offers discounted monthly passes priced at just \$4, compared to the standard \$60.⁵⁷ Coverage extends into historically underserved neighborhoods identified by the City's Bicycle Equity Index, including the 7th Ward, Tremé, Central City, and parts of Mid-City and the Lower Garden District. Community engagement has been robust, with ambassadors, liaisons, and workshops designed to bring residents into decision-making and increase ridership in priority zones.

Operationally, Blue Bikes integrates closely with New Orleans' transit network, placing docking stations near bus and streetcar stops to enhance first- and last-mile connections. The program has also received external funding for expansion, most notably a \$1.7 million EPA grant to expand service coverage and advance sustainable transportation goals.⁵⁸ While fare revenues and advertising help offset operating costs, corporate sponsorship remains crucial for the program's financial viability.

Direct Connect (Pinellas County, Florida)

Direct Connect was the first effort by a US transit agency to directly provide transportation services to the general public through a contract with a ridehailing company. Serving the area around St. Petersburg and Clearwater in the Tampa Bay region of FL, a car-dominated suburban context, the Pinellas Suncoast Transit Authority (PSTA) initially conceived the Direct Connect program in 2015 as a replacement for two low-ridership, infrequent feeder bus routes.⁵⁹ The pilot was expanded to a more extensive zone-based approach and later made permanent, alongside several other PSTA initiatives that used ridehail companies as well as local taxi and wheelchair-accessible vehicle (WAV) providers to serve different populations in areas where transit service is difficult to deliver effectively.⁶⁰

The Direct Connect program is a public-dominated partnership with multiple transportation providers. Under the contracts, the agency reimburses transportation providers for the first \$5 of each ride with riders covering the rest; trips are of limited distance and must start or end at a designated bus stop, costing riders \$1.25-\$3 out of pocket for most rides. WAV rides under the program cost riders \$25, and were a little-used option.⁶¹ Since most rides are provided by the ridehail company Uber and are a straight reimbursement with no larger contractual obligation or risk sharing, capital expenses and much of the operating expenses are mostly on the shoulders of the provider under the prevailing structure of ridehail.⁶²

The incentives in the system are fairly indirect and are not tied to performance: ridehail and taxi providers can encourage participation in the program as a way of increasing their overall usage, while for the transit agency the program keeps riders connected to the transit system for parts of their trips that they might otherwise take entirely by ridehail. However, because the agency pays a per-ride fee that scales directly with ridership, it has little incentive to increase the

⁵⁷ "Blue Bikes For All."

⁵⁸ "New Orleans Receives \$1.7 Million to Expand Blue Bikes - Verite News New Orleans."

⁵⁹ Murphy et al., *When Uber Replaces the Bus*.

⁶⁰ Murphy et al., *When Uber Replaces the Bus*; Bonnie Epstein, PSTA, "PSTA Mobility on Demand Programs."

⁶¹ Murphy et al., *When Uber Replaces the Bus*.

⁶² Zinkula, "How Much Do Uber and Lyft Drivers Really Make?"

program's usage much. But on some discontinued bus routes that Direct Connect helped replace, the subsidy per ride could be as high as \$40/trip, making the \$5/trip cost to the agency a significant savings for some rides. Thus, the program represents a compromise that the agency must continue to weigh the value of.⁶³ Since the program has been renewed several times and continues to operate under largely the same parameters as in its early years (with the addition of Lyft as a provider), PSTA has apparently decided that the trade-off is still valuable to them and their customers.⁶⁴

Archetype 3 — Consortium/Nonprofit Hybrid

Consortium programs (n=8: Campus Shuttle PV TX, FLM Shuttle, HOURCAR, KC Streetcar, King County Bus, MovePGH, Q-Line Trolley, START Bus) are governed by multi-stakeholder coalitions combining public agencies, nonprofits, foundations, employers, and occasionally private operators. The archetype shows strong service continuity (0.875), but its central vulnerability is funding stability: without a single anchor funder, programs depend on sustained coalition alignment. MovePGH illustrates this risk; HOURCAR illustrates the archetype's potential.

Atlanta BeltLine Autonomous Transit Pilot (Atlanta, Georgia)

The Atlanta BeltLine Autonomous Transit Pilot is a 12-month demonstration of driverless shuttles slated to launch in 2026 and operates as a community-led public-private partnership. The project will run a roughly 2-mile fixed route linking the MARTA West End station with the Atlanta University Center, Lee + White, and the BeltLine's southwest trail. The service will use Beep-operated autonomous vehicles with onboard attendants.⁶⁵

This initiative is structured as a public-private service contract rather than a full concession. On the public side, Atlanta BeltLine, Inc., a non-profit Business Improvement District (BID) is the sponsor and contracting entity, while the Atlanta-Region Transit Link Authority (ATL) approved a \$1.75 million grant from the Georgia Transit Trust Fund to cover roughly 58% of the total pilot cost (~\$3 million).⁶⁶ The BeltLine will contribute the remaining balance. The private partner, autonomous vehicle company Beep, will supply and operate the autonomous shuttles, manage safety attendants and remote monitoring, and provide data and technology support.

The project is notable because it blends state trust-fund dollars with a tightly defined pilot contract, making it an instructive case for evaluating how AV pilots are financed when private operators are not assuming revenue risk. The pilot includes community engagement and workforce development components, but existing agreements have not outlined specific goals for ridership, equity zones, or similar metrics.

Under the operating agreement, funding risk sits with the non-profit and public agency, while operational and technology risk—vehicle performance, uptime, and safety procedures—rests with Beep. Reports suggest the service will be fare-free during the pilot, meaning there is no revenue-sharing or profit model;⁶⁷ Instead, performance will be measured by ridership, reliability, and event integration. Challenges include ensuring reliability in mixed-traffic conditions, meeting

⁶³ Murphy et al., *When Uber Replaces the Bus*.

⁶⁴ Pinellas Suncoast Transit Authority, *Direct Connect | First & Last Mile Transit in Pinellas County*.

⁶⁵ Gregory, "Atlanta Beltline Driverless Vehicle Pilot Gets Green Light."

⁶⁶ Gregory, "Atlanta Beltline's Driverless Vehicle Pilot Program a Go."

⁶⁷ Wheatley, "Shuttling FIFA Fans, No Driver Needed."

insurance and indemnification requirements, and preparing infrastructure and vehicles in time for the 2026 launch.⁶⁸

START Bus (Jackson, Wyoming)

The START Bus (Southern Teton Area Rapid Transit) in Jackson, Wyoming, was launched in 1987 as a joint service between the Town of Jackson and Teton County. It has grown into a regional system that provides local circulators and commuter routes from Star Valley and Teton Valley⁶⁹, and intensive seasonal service to Teton Village and Jackson Hole Mountain Resort (JHMR).⁷⁰

The Town of Jackson and Teton County fund the local share; the Federal Transit Administration (FTA) provides operating support through Section 5311 rural grants; and the State of Wyoming (WYDOT) administers pass-through funds. On the private side, Jackson Hole Mountain Resort (JHMR) has a formal Transit Funding Agreement committing roughly \$300,000 annually. This contribution makes START a notable case of public transit with recurring private-sector operating support.⁷¹

The funding and operating agreements reveal a layered model of risk sharing. JHMR's agreement pegs its payments to a formula tied to service hours and ski-pass usage, while lodging-tax allocations fluctuate with tourism demand. This distributes financial risk among multiple stakeholders, ensuring that no single entity bears the full burden. Operational and performance risk, however, remains fully public: START owns the fleet, employs drivers, and manages delivery service.

In terms of revenue models, START is heavily subsidized, with farebox recovery historically low relative to costs.⁷² The system's reliance on lodging taxes and resort payments is unusual compared with most U.S. rural transit systems, creating a quasi-P3 dynamic in which tourism and resort industries directly finance a share of operations. Challenges include balancing commuter needs with seasonal tourism demand, sustaining funding agreements, and adapting to growth pressures in the Jackson Hole region. These dynamics make START an instructive example of a hybrid public-private funding model in a rural resort setting.

King County Electrification P3 (Washington)

The King County Metro Bus Electrification project was first initiated in 2015, with implementation beginning in 2017. King County and King County Metro remain the lead public entities but work with a wide range of private partners (Proterra, Gillig, and New Flyer) and contractors (Vanir, Umstot, Exceltech, Wise Charging, and others). The electrification plan calls for King County Metro to fully transition its fleet of over 1,400 buses⁷³ to zero-emission technology by 2040, supported by a \$115 million program budget.⁷⁴ Federal and state grants

⁶⁸ Green, "Atlanta Beltline Inc. Aims to Launch Driverless Vehicle Route next Year | Urbanize Atlanta."

⁶⁹ "Maps & Schedules | Jackson, WY."

⁷⁰ Town of Jackson, WY, "FY24 Operations Plan Update (July 1, 2023 – June 30, 2024)."

⁷¹ Teton County, WY, "JIM-TVA-JHMR Funding Agreement."

⁷² City of Jackson, WY, "START Ridership Data 2021-23."

⁷³ King County Metro, "Moving to a Zero-Emission Bus Fleet: Transition Plan."

⁷⁴ Pauley, "King County Starts Construction on \$115M Electric Bus Charging Station."

cover a significant portion of the total cost (\$101.2 million from multiple grants⁷⁵ and \$6 million,⁷⁶ respectively), with only a small share of funding coming from local revenue.

The operating and financial model is structured as a leasing and supply agreement rather than a revenue-sharing concession, where Metro retains the full farebox revenue. At the same time, private partners provide vehicles, charging infrastructure, and technology. The project is not expected to generate new operating revenue streams, but to integrate electrification costs into Metro's existing budget framework. Ancillary revenue may come from advertising, energy grants, or utility partnerships, but fare revenue remains with King County Metro.

Responsibilities are divided by project phase - design and engineering are shared, construction is primarily contracted out, and operations remain public. Although this contract isn't publicly available, King County has incorporated access and workforce development commitments into the program, including apprenticeship requirements and an "Equity and Social Justice Innovation Plan."⁷⁷ Private partners play a significant role in addressing the challenges of electrification, including vehicle reliability, charging infrastructure performance, and long-term maintenance. Meanwhile, King County Metro is responsible for permitting, environmental review, and service reliability.

Kansas City Streetcar (Kansas City, Missouri)

The Kansas City Streetcar is a downtown circulator/light rail line that opened in May 2016. Due to a unique operating model that blends Business Improvement District funding with federal support for capital expenditures, the project has stayed fare-free from its inception. There are expansions planned, including south to the University of Missouri-Kansas City (UMKC) and north to the Berkley Riverfront.⁷⁸

The KC Streetcar is unique in its operating model: rather than relying on traditional sources like transit funds or state revenue, it funds most of its operations through revenue from the Downtown Transportation Development District (DTDD). Day-to-day service of the KC Streetcar is managed by a non-profit (the Kansas City Streetcar Authority), which works closely with the City of Kansas City, making it a publicly owned, privately operated service contract. KCSA contracts with Herzog Transit Services for the operations, maintenance, and supervision of the system. Land use and project management are under the discretion of the City of Kansas City.

The DTDD levies a 1% sales tax, along with parking lot fees and special property assessments, to cover the service's entire operating costs. Capital contributions come in equal measures from the federal government, through an original TIGER grant,⁷⁹ and through contributions from the City of Kansas City. Ridership is among the highest of any streetcar system in the country—roughly 1.86 million trips in 2024.⁸⁰

⁷⁵ "FY23 FTA Bus and Low- and No-Emission Grant Awards"; King County Metro, "King County Metro Green Lights Contract for 89 New Battery-Electric Buses, Growing Its Zero-Emission Fleet"; "FY24 FTA Bus and Low- and No-Emission Grant Awards."

⁷⁶ King County, WA, "King County Expands EV Fleet, Receives \$6 Million Charging Grant."

⁷⁷ King County, *Equity and Social Justice Strategic Plan - 2016-2022*.

⁷⁸ *Kansas City Streetcar Authority | Streetcar Management - Operations*, n.d., accessed September 30, 2025, <https://kcstreetcar.org/about-streetcar/kcsa/>.

⁷⁹ Kansas City Streetcar Authority, *KC Streetcar | How Is the KC Streetcar Funded?*

⁸⁰ Kansas City Streetcar Authority, *KC Streetcar | Ridership*.

The revenue model has been primarily resilient to transit funding shocks that have affected other systems. This is in part due to the scale of development along the line: within the first six years of the streetcar service, the area experienced a 40% increase in residential density within three blocks of the route and a 56% increase in sales tax receipts. Funding for the university extension would be provided 100% by the federal government.⁸¹

Q-Line Trolley (Wichita, Kansas)

The Q-Line Trolley was a 12-month pilot service, now permanent, launched in 2017 to improve travel for short distances in downtown Wichita.⁸² The service followed a fixed loop that connected key destinations (office districts, restaurants, and entertainment venues) in the city's business district. The route primarily runs along Douglas Avenue and adjacent streets, linking downtown entertainment districts, commercial areas, and cultural destinations. Vehicles are equipped with accessibility features such as wheelchair lifts, ramps, and bicycle racks, ensuring compliance with ADA accessibility standards. This service primarily operates in the evenings and on weekends to move people around the downtown area.

The Q-Line operates as a fare-free trolley-style system, with operating costs largely covered by public funding streams and local contributions, rather than relying on farebox recovery. Because the service is free to ride, the farebox recovery ratio is zero, and the system relies on subsidies estimated at approximately \$10.61 per passenger trip.⁸³ The service operates under a public-dominant consortium-based governance model, with the City of Wichita serving as the lead owner and program administrator, in partnership with Wichita Transit and the Wichita Downtown Development Corporation. In addition, the project works with the Federal Transit Administration (FTA) as a funding partner. Private sector involvement includes vehicle manufacturing and service contracting, as well as participation from North American Bus Industries. Private and nonprofit partners support about 20% of total costs, while the FTA provides most funding.⁸⁴ The public agency retains revenue generated by the system (from advertisements).

The program originated as a pilot project, funded entirely through operating budgets rather than capital-intensive infrastructure investments. Unlike rail-based streetcar projects, the Q-Line uses trolley-style buses that operate in mixed traffic, allowing the city to implement the service quickly without the extensive environmental review processes typically required for fixed-rail systems. This regulatory flexibility reduced implementation barriers and made the project easier to test as a short-term mobility and placemaking intervention. Performance oversight is relatively limited. The service contract includes basic performance monitoring through ridership reporting by route and day, but the agreement includes no extensive incentive or penalty mechanisms tied to service outcomes.

⁸¹ Mandelbaum, *KC Streetcar | FTA Recommends \$174M for KC Streetcar Extension*; Gerend, "KC Streetcar Update."

⁸² "Wichita's FREE Q-Line Trolley | Free Bus for Downtown Wichita."

⁸³ KFDI, "KS."

⁸⁴ "Fiscal Year 2017 Bus and Bus Facilities Projects | FTA."

Hourcar (Twin Cities, Minneapolis)

Hourcar, launched in 2005 and reconfigured as an independent nonprofit organization in 2017, is a U.S. carshare provider that offers both hub-based and free-floating services.⁸⁵

The project is a mission-driven public-private-nonprofit partnership. Hourcar operates the service and manages the fleet, while public sector partners (the Cities of Minneapolis and Saint Paul) provide infrastructure support and community engagement.⁸⁶ Xcel Energy contributes EV charging infrastructure, and the American Lung Association of Minnesota serves as a grant administrator, facilitating federal and philanthropic funding—including a \$6.7m grant from the U.S. Department of Energy. Other partners, such as Metro Transit, Metro CERT, and local foundations, support planning, outreach, and matching funds.⁸⁷

Hourcar retains fare revenue and assumes operational risk, while public and philanthropic contributions share capital risk. Farebox revenue helps sustain operations, though challenges persist, including vehicle supply constraints and the need to balance community-focused service with financial viability. Outreach programs like Access PLUS offer reduced fares for low-income users.⁸⁸ And Hourcar's governance includes multilingual community feedback mechanisms, but no specific spatial guidelines exist about equitable vehicle deployment or uptake.

Move PGH (Pittsburgh, Pennsylvania)

Move PGH was a two-year shared mobility pilot that, operating under a private-dominant public/private/philanthropic model, provided a coordinated set of new transportation offerings (e-scooters and on-street mobility hubs) alongside existing bikeshare, carshare, and transit services, with a single app to plan trips, locate and check out shared vehicles, and purchase transit fares. Beyond demonstrating services and technologies, the pilot was notable for its partnership structure, known as the Pittsburgh Mobility Collective, which helped coordinate planning and deployment across multiple providers and, through a nonprofit partner, provided a conduit for philanthropic revenues that partially supported the pilot.⁸⁹

The Move PGH pilot operated from July 2021 through July 2023.⁹⁰ During its tenure, it operated under a temporary authorization for e-scooters, which were otherwise illegal in the state for personal or fleet use, making it the first deployment of this mode in Pennsylvania.⁹¹ The formal pilot ended when the temporary statutory authority for scooters sunsetted after two years and was not subsequently renewed.

The pilot's primary partners were Spin (scooters), Healthy Ride/POGOH (bikeshare and mobility hubs), Zipcar (carshare), Swiftmile (mobility hubs and kiosks), Transit app (trip planning/ticketing) and PRT (the region's public transit agency). The City's Department of

⁸⁵ Schroeder, "HOURCAR Is Serving More People, in More Places (and Yes, It's Challenging)."

⁸⁶ Hourcar, "Impact Report: 2023 HOURCAR & Evie Community Carshare Services."

⁸⁷ Hazzard, "Electric Vehicles Have a Reputation for Appealing to 'Fancy,' 'Privileged' Drivers. A New Program Seeks to Boost Access in Diverse Neighborhoods."

⁸⁸ Eldred, "Car-Share Programs Try to Reach Low-Income Drivers in Twin Cities Neighborhoods Most Harmed by Pollution."

⁸⁹ Shared-Use Mobility Center, *Move PGH Final Evaluation*; City of Pittsburgh, *Move PGH Mid-Pilot Report*.

⁹⁰ Shared-Use Mobility Center, *Move PGH Final Evaluation*.

⁹¹ Pittsburgh Department of Mobility & Infrastructure, *Pittsburgh Shared E-Scooter Pilot Report*.

Mobility and Infrastructure (DOMI) provided policy and regulatory oversight, while the local nonprofit Innovate PGH helped with overall service integration and pilot facilitation.⁹²

Campus Shuttle, Prairie View A&M University, (Prairie View, Texas)

Prairie View A&M University introduced its campus shuttle to provide students in a rural setting with a more reliable, no-cost transportation option. The shuttle was first launched in 2019 in partnership with Prairie View A&M University and RideCo as a microtransit service to connect students to groceries, shopping, off-campus employment, and intercity travel (Greyhound and Flixbus). This service is largely publicly dominated, as the university owns the vehicles, funds operations, and retains authority over fares and policies, while RideCo is limited to providing scheduling and routing technology under a service contract. There is no capital investment, no shared fare revenue, and no exposure to ridership fluctuations, except during summer and holiday breaks when students are not present. The system is free to students and fully subsidized by the university.⁹³ This demand-responsive microtransit service helps connect a rural campus environment to surrounding destinations, with university support.

This P3 leans heavily on the public side. RideCo assumes little risk beyond meeting software performance standards, while the university covers staffing and fleet management. No fares are collected, and no revenue is shared. Instead, student tuition and statewide funding sustain the system.⁹⁴ Unlike availability payment or revenue-sharing P3s, this model is closer to a turnkey service contract, where accountability is measured less by profit margins and more by performance metrics such as on-time service delivery, accessibility, and reliability. The buses are ADA-compliant, ensuring that students with disabilities can access service.

From an access standpoint, the shuttle's biggest impact comes from affordability. This service primarily provides students who live off campus with access to university education. While this model offers limited innovation in risk transfer and revenue sharing, it shows how a public-dominant microtransit partnership can prioritize accessibility over cost recovery.

Archetype 4 — Traditional P3 Concession

Traditional P3 programs (n=5: Eagle P3, Portland Airport MAX, Purple Line MD, SkyConnect APM, Stockton GO!) follow the DBFOM/DBOM concession model for fixed-asset infrastructure, with long-term contracts (34–85 years) and availability payments or development rights as the primary revenue sources. This archetype achieves near-perfect service continuity (.80) but the lowest access outcomes in the dataset: access requirements = 0.000, community engagement = 0.00. Access provisions not included in the initial contract terms are effectively unenforceable once the concession is operational.

Maryland Purple Line Extension (Montgomery County, Maryland)

The Purple Line is a 16.2-mile light rail line under construction in Maryland, connecting New Carrollton in Prince George's County to Bethesda in Montgomery County, with 21 stations. Revenue service is scheduled for late 2027. The project operates under a Design-Build-Finance-Operate-Maintain (DBFOM) P3 concession, the most fully privatized delivery model applied to U.S. urban light rail to date. Under the 2016 concession agreement,

⁹² Shared-Use Mobility Center, *Move PGH Final Evaluation*.

⁹³ cdmoore, "Transportation Services."

⁹⁴ "Texas A&M Board Approved Operating Budgets."

MDOT Maryland Transit Administration (MDOT MTA) contracts with Purple Line Transit Partners (PLTP), the private concessionaire, to design, build, finance, operate, and maintain the line for 30 years, after which ownership reverts to the state. The state repays private investment through availability payments, conditional on meeting operational performance targets, while retaining ownership of the assets throughout.

The project has gone through considerable financial uncertainty. In 2016, the total concession cost was estimated at \$5.6 billion, but by 2022, a renegotiated contract raised the agreement to \$9.23 billion to account for inflation driven by post-pandemic supply chain disruptions, material costs, and labor shortages.⁹⁵ The availability payment structure normally transfers construction, operations, and performance risk to the private partner. In practice, this risk transfer is often proven to be incomplete. When the original contractor withdrew from the agreement, the state became the project manager, and the scale of cost escalations required renegotiating PLTP's rate of return down by 20% to preserve the concession.⁹⁶ The Purple Line thus illustrates a recurring constraint of DBFOM P3 models: contractual risk transfer is bounded by the state's ultimate political and financial stake in project completion, which limits its willingness to allow a distressed concessionaire to fail.

The corridor spans a socioeconomic divide, originating at New Carrollton (median household income: \$73,629) and terminating in Bethesda (median household income: \$178,370).⁹⁷ Communities along the central corridor, including Langley Park, Riverdale Park, and Long Branch, are home to large concentrations of low-income residents, immigrants, and communities of color with histories of disinvestment and limited transit access. The Purple Line Corridor Coalition (PLCC), formed in 2013 in direct response to community concerns,⁹⁸ has worked to embed anti-displacement, affordable housing, and TOD strategies into corridor planning. However, the concession agreement itself contains no direct access mandates; displacement risk is addressed through external coalition advocacy and public planning, not through the P3 contract.

As of early 2026, construction is more than 75% complete, all 21 stations are under active construction, and dynamic testing of light rail vehicles has begun.⁹⁹ Despite its turbulent delivery history, the Purple Line demonstrates that the DBFOM P3 model can enable states to leverage private financing for large-scale transit infrastructure without upfront public capital outlay, but also that availability payment obligations constitute a long-term fiscal commitment that grows, not disappears, when construction goes wrong.

Eagle P3 (Denver, Colorado)

The Eagle P3 project in Denver, Colorado, was launched in 2010 under a 34-year Design-Build-Finance-Operate-Maintain (DBFOM) concession, with service commencing in 2016. The Eagle P3 is one of the largest transit Public-Private Partnerships (P3s) in the US, in terms of both cost (\$2.1 billion) and size. The Regional Transportation District (RTD) is developing it as

⁹⁵ Maryland Transit Administration, "Purple Line Construction Status Report"; "BOARD OF PUBLIC WORKS APPROVES PURPLE LINE P3 AGREEMENT MODIFICATION WITH NEW DESIGN-BUILD TEAM | Maryland Transit Administration."

⁹⁶ "Cost of Purple Line Increases yet Again, Completion Pushed Back - Maryland Matters."

⁹⁷ PLCC – Purple Line Corridor Coalition.

⁹⁸ PLCC – Purple Line Corridor Coalition.

⁹⁹ Maryland Transit Administration, "2026FY - Operating Budget Analysis - J00H01 - MDOT Maryland Transit Administration."

part of its FasTracks expansion, which aims to bring heavy commuter rail service to the Denver-Aurora-Lakewood metro area.¹⁰⁰ The Eagle P3 partnership uses public ownership with private-sector delivery: RTD retains ownership of the infrastructure, while the private consortium designs, builds, finances, and now operates the system. Notably, the Eagle P3 integrates three new commuter rail lines with Denver Union Station alongside the RTD network to provide high-capacity transit connections to Denver International Airport.

This project's structure is a classic DBFOM model, with RTD and Denver Transit Partners sharing responsibilities. The private partner (Denver Transit Partners Consortium) assumed design, construction, financing, and operation risks, while the public partner (Denver RTD) retained revenue and farebox risk. Availability payments are made annually by RTD to Denver Transit partners, regardless of ridership levels. Capital funding for this project came from a diverse mix of sources, including a \$1.03 billion¹⁰¹ FTA New Starts grant, TIFIA loans, private equity bonds, and \$54 million in private equity.¹⁰² RTD is obligated to pay nearly \$7.1 billion in availability payments over the life of the contract.

Eagle P3's revenue model is straightforward: all fare revenue, along with ancillary income from advertising, naming rights, and park-and-ride fees, flows directly to RTD. The agreement includes no profit-sharing with the private partner, and it provides no dedicated reduced-fare policy beyond RTD's standard regional fare zones (though service does reach low-income neighborhoods in Aurora). While this arrangement prevents the operator from profiting directly from fare increases, it also leaves RTD exposed if ridership underperforms. Most notably, this occurred during the COVID-19 pandemic. From a policy perspective, the project is a notable case of how major transportation expansions can be delivered through a P3 without giving up control over fare revenue or policy.

Portland Airport MAX Red Line (Portland, Oregon)

The Portland Airport MAX Red Line, opened in 2001, is a public-private partnership involved in light rail development. The 2.9-mile extension connected Portland International Airport (PDX) to the existing MAX light rail system and was delivered through an unsolicited proposal by Bechtel Enterprises. The initial partners, Bechtel, TriMet, and the City of Portland, entered an 85-year, rent-free lease under which Bechtel agreed to finance and construct the \$125 million project in exchange for the development rights to 120 acres of land near the airport, specifically at Cascade Station.¹⁰³

The project's financing combined public and private contributions. Public funding included \$23.8 million in City of Portland Bonds backed by tax increment financing (TIF), \$45.5 million from TriMet's general fund (from payroll and self-employment taxes), and \$28.5 million from Port of Portland Passenger Facility Charges (PFCs).¹⁰⁴ Bechtel contributed \$28.3 million by assuming responsibility for the bonds TriMet issued, with compensation tied to both its design-build contract and potential profits from the Cascade development project.

¹⁰⁰ Reg. Transp. Dist., "Eagle P3 Project."

¹⁰¹ Reg. Transp. Dist., "Eagle P3 Project."

¹⁰² John Laing LLC, "John Laing Increases Equity Stake in Denver Commuter Rail Project."

¹⁰³ "FHWA - CIFS - Project Profiles: Airport MAX Red Line."

¹⁰⁴ "FHWA - CIFS - Project Profiles: Airport MAX Red Line."

The Airport MAX line opened on September 10, 2001, one day before the September 11 terrorist attacks, which, along with the ensuing recession, stalled planned commercial development at Cascade Station. Bechtel ultimately sold its development rights to Trammell Crow in 2006. After several years of delay, development finally accelerated, and by 2011, nearly all space in the retail center had been leased. Today, Cascade Station hosts more than 40 stores and restaurants, along with three hotels, generating steady activity and tax revenues.

Operationally, TriMet and the City of Portland retained responsibility for planning and service delivery, while Bechtel's role focused primarily on upfront financing and construction risk. TriMet assumed ongoing responsibility for system operations and farebox revenue collection, with no additional state or federal funds required beyond the local contributions and PFCs.

Stockton Go! Microtransit (Stockton, California)

The Van Go! microtransit served San Joaquin County, California. San Joaquin's population density is 554 people per square mile, with more than 84% of households owning at least one vehicle. San Joaquin Regional Transit District (RTD) launched as a pilot initiative in 2018 to expand mobility options beyond fixed-route transportation. This program was designed to provide flexible, on-demand service to both urban and unincorporated rural areas of San Joaquin County, connecting to the Stockton metro area. The service in the City of Stockton ended on September 1, 2024, following a comprehensive assessment of performance, financial impact, and public outreach.¹⁰⁵ Under the six-year DBOM, which ran from 2018 to 2024, RTD handled capital expenses, while Transdev handled operations under contract. According to the San Joaquin RTD webpage, as of September 30, 2025, residents could still use the program for travel between Stockton and rural areas within San Joaquin Valley.¹⁰⁶

Structurally, Van Go! was a public agency-led P3 pilot, with RTD retaining ownership of the program while outsourcing operations and technology to Transdev. This arrangement placed most of the policy risk on RTD rather than a risk-sharing concession. Although relatively low, RTD retained all fare revenue from the service. To supplement the low farebox recovery, RTD relied heavily on subsidies from federal, state, and local sources. Funding for Van Go! was drawn from a mix of sources, including FTA, the state of California's Transportation Development Act,¹⁰⁷ and local sources, such as Measure K Sales Tax revenue.¹⁰⁸

The pricing model for this service was pay-per-ride, offering discounts to seniors, people with disabilities, and students. Vans were ADA-compliant. To ensure that the community's needs were met, RTD administered surveys, conducted a Comprehensive Operations Analysis to refine the service, and worked closely with its Access Advisory Committee to inform accessibility standards. Although the program was relatively small compared to RTD's fixed-route network, it filled a vital service gap by connecting low-density areas within the county. Overall

¹⁰⁵ "Press-Release RTD Announces Discontinuation of Van Go Service Within City of Stockton."

¹⁰⁶ Cao, "Van Go!"

¹⁰⁷ State of California, "Transportation Development Act | Caltrans."

¹⁰⁸ "Measure K | San Joaquin Council of Governments, CA."

SkyConnect APM System (Tampa, Florida)

Tampa International Airport's SkyConnect system, which opened in 2018, is an automated people mover that links the airport's main terminal to the car rental center and parking garage.¹⁰⁹ This P3 was developed under a DBOM contract with Mitsubishi Heavy Industries America and Sumitomo Corporation of Americas, with Hillsborough County Aviation Authority (HCAA) as the public lead to own, oversee, and finance the system.¹¹⁰ Unlike many transit systems that depend on fares to sustain operations, SkyConnect is entirely funded by the airport itself through bonds, federal FAA grants, and passenger facility charges. Riders do not pay a fare; the cost is absorbed into the broader airport revenue ecosystem.

The contract carefully balances risk, with private partners handling design and construction and providing strict reliability and availability guarantees once the system is operational. At the same time, HCAA retains ownership and control over alternative revenue streams.¹¹¹ Every train station is accessible, equipped with elevators, tactile surfaces, and audio/visual announcements to help passengers with mobility barriers easily access the service. Public hearings during the airport's master planning process provided a venue for input, and the project was framed as a public investment in efficiency and accessibility, rather than a revenue-generating initiative.

SkyConnect transports millions of passengers annually between core facilities. In addition to linking to the parking garage and car rental center, it also connects to the Hillsborough Area Regional Transit bus service. This link bridges regional travel and the local transportation system. SkyConnect demonstrates how an airport authority can use public financing and private expertise to deliver world-class mobility, not by chasing profits, but by embedding reliability, accessibility, and efficiency directly into the fabric of airport operations.

¹⁰⁹ "Tampa International Airport (TPA) – SkyConnect Automated People Mover & Rental Car Center."

¹¹⁰ Mitsubishi Heavy Industries Engineering Ltd., "Commencement of Automated People Mover System SkyConnect at Tampa International Airport in U.S.,"

¹¹¹ "D-B Tampa International Airport SkyConnect Automated People Mover."

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