

Private-Sector-Led Orchestration of Urban Mobility: A Case Study of Strategic Alliance Among Competing Railway Operators for Social Implementation

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ABSTRACT

Despite significant advances in technical interoperability, the organizational barriers to unifying competing urban mobility providers remain largely unresolved. This study examines a private-sector-led orchestration model in which a neutral consulting entity coordinated three competing private railway operators and multiple micro-mobility providers in a high-density Japanese metropolitan district — without governmental initiation or public subsidy. The central challenge was overcoming institutional friction: the deep-seated reluctance of legacy infrastructure operators to share operational data and revenue streams with direct rivals. Through a three-phase governance process — strategic reframing, technical standardization, and lean social deployment — the orchestrator transformed zero-sum competition into a coopetition model (Bengtsson & Kock, 2000) anchored in shared regional asset value. Empirical validation came from a 559-pass social experiment: 38.4% of users utilized three or more transport modes per journey, average per-visit spending increased by 1,757 JPY, and 62.5% of participants visited commercial areas they had never previously accessed. The findings propose a scalable framework for Autonomous Urban Orchestration, demonstrating that private-sector agility — when guided by a neutral mediator — can drive social innovation more effectively than traditional public-private partnerships.

Keywords: MaaS, Private-sector leadership, Strategic alliance, Coopetition, Urban orchestration, Stakeholder management

INTRODUCTION

In the rapidly evolving landscape of Smart City development and urban digital transformation, the implementation of Mobility as a Service (MaaS) has emerged as a critical frontier for sustainable metropolitan growth. However, a significant paradox exists in contemporary urban planning: while technical interoperability — such as API integration and data standardization — has advanced considerably in recent years, the institutional and organizational interoperability required to unify disparate, often competing service providers remains a formidable and largely unsolved barrier. The technical layer of integration, however sophisticated, cannot by itself overcome the organizational inertia, competitive mistrust, and misaligned incentive structures that characterize relationships between incumbent infrastructure

operators. Most existing MaaS projects are characterized by a top-down, public-sector-led approach, which frequently encounters significant bureaucratic delays, rigid procurement processes, and a lack of market-driven agility. These administrative frameworks often prioritize regulatory compliance over user experience, leading to fragmented systems that fail to gain widespread adoption. Conversely, purely private-sector-led initiatives often struggle with fragmented interests, where intense competition for market share among infrastructure giants prevents the formation of a cohesive, user-centric mobility ecosystem.

This research examines a novel and disruptive model of “Autonomous Urban Orchestration,” facilitated by a neutral private strategic entity, STUDIO ZERO. This model succeeded in synchronizing the strategic goals of three major competing private railway operators and multiple micro-mobility startups in a high-density metropolitan residential district, notably without direct governmental initiation or public financial subsidies. The central problem addressed in this study is “Institutional Friction” — the inherent resistance and organizational inertia that arises when legacy infrastructure providers with historically overlapping territories are required to share sensitive operational data and potential revenue streams. Traditionally, these railway companies viewed one another as zero-sum rivals for passenger volume, where one operator’s gain was perceived as another’s loss — a competitive logic deeply embedded in decades of parallel infrastructure investment and territorial market segmentation. This paper analyzes how STUDIO ZERO utilized a shared vision of “regional area value” to transform this deep-seated rivalry into a “Coopetition” model (Bengtsson and Kock, 2000). In this framework, mutual cooperation leads to an expansion of the total economic “pie” of the transit corridor rather than a mere redistribution of existing passengers, fostering a more resilient and economically dynamic urban environment in which all participating operators benefit from network-level growth.

THEORETICAL FRAMEWORK: COOPETITION AND STRATEGIC ORCHESTRATION

The success of large-scale social implementation in a multi-stakeholder environment depends heavily on the presence of a Strategic Orchestrator. Orchestration is defined as the set of deliberate actions taken by a central hub entity to coordinate the resources and capabilities of diverse network members who lack a formal hierarchical relationship (Dhanaraj and Parkhe, 2006). Unlike conventional governance structures — which rely on authority, ownership, or contractual obligation to align behavior — orchestration operates through the alignment of interests, the reduction of perceived risk, and the creation of shared metrics that make cooperation individually rational for each participant. In the context of urban mobility, this orchestration must manage and mitigate what we define as the “Triad of Institutional Conflict”:

1. **Operational Conflict:** Reconciling disparate data standards, legacy ticketing protocols, and siloed operational workflows that have been optimized for individual corporate goals over decades. This friction increases Transaction Costs (Williamson, 1981) and often halts integration at the technical level, even when organizational will to cooperate exists.

2. **Economic Conflict:** Establishing equitable revenue-sharing models that compensate for the “marginal loss” of one operator (e.g., potential cannibalization of short-distance ticket sales) while maximizing the “network gain” and long-term asset value of the entire ecosystem. Without credible models of equitable distribution, economic conflict renders cooperation unstable.
3. **Strategic Conflict:** Balancing the protection of proprietary customer data and brand identity with the collective need for integrated user analytics and a unified digital interface. This dimension of conflict is particularly acute in data-rich digital mobility environments, where customer data constitutes a primary strategic asset.

From the perspective of the Resource-Based View (RBV), the competitive advantage of a MaaS ecosystem is derived from the integration of complementary resources that are “VRIN” (Valuable, Rare, Inimitable, and Non-substitutable). In this case study, the railway operators’ massive physical assets and long-standing brand trust were strategically combined with the micro-mobility startups’ agility and last-mile flexibility — two resource profiles that are independently insufficient to produce a seamless mobility ecosystem but highly complementary when integrated. However, these resources cannot be effectively integrated without a Neutral Orchestrator like STUDIO ZERO, who reduces Transaction Costs (Williamson, 1981) by serving as a trusted information mediator and risk-sharer. By adopting a “Studio-led approach” — which prioritizes rapid prototyping, iterative governance, and human-centered design (UX) — STUDIO ZERO was able to align conflicting Corporate Key Performance Indicators (KPIs) toward a singular, high-order goal: the revitalization of the urban district’s overall asset value and the fundamental enhancement of the user’s quality of life through seamless, friction-reduced movement across the full network.

CASE STUDY: THE MULTI-STAKEHOLDER ALLIANCE PROJECT

The empirical basis for this research is a strategic initiative designed to connect multiple major transit nodes in a high-density residential district of a Japanese metropolitan area. This district presented a unique challenge: it is a “border-zone” where the operational territories of three major private infrastructure providers converge. Historically, this led to a fragmented transit experience where inter-hub connectivity remained secondary to individual line efficiency, leaving “gaps” in the urban fabric that suppressed local economic activity.

The Role of STUDIO ZERO as a “Neutral Strategic Hub”

In this project, STUDIO ZERO assumed the role of the “hub,” a position that neither a government agency (due to administrative constraints and bureaucratic lag) nor a single transport operator (due to inherent competitive bias and the mistrust it generates among rivals) could effectively occupy. The neutrality of the orchestrator is not merely procedural — it is the structural

precondition for the trust that makes data-sharing and revenue-pooling possible. As a neutral orchestrator, STUDIO ZERO managed the complex and often misaligned interests of the three primary railway companies and several electric micro-mobility providers, translating competing institutional priorities into a shared operational framework. The primary objective was the development and deployment of a unified “Digital Mobility Pass” — a single digital credential frictionlessly accepted across all participating rail lines, municipal bus routes, and electric micro-mobility sharing platforms (e-scooters and e-bikes), thereby creating a unified “Activity Space” for the user that transcended the territorial logic of the underlying operator network.

Multi-Stage Governance and Consensus Building

To overcome institutional inertia and foster Coopetition (Bengtsson and Kock, 2000), the orchestration process was structured into three rigorous phases, each designed to build trust incrementally and reduce the perceived corporate risk of cooperation before committing to the next stage of integration:

1. **The Alignment Phase (Strategic Reframing):** STUDIO ZERO reframed the project not as a simple transportation experiment, but as a Regional Asset Management initiative. By identifying a common pain point — the measurable decline in commercial vitality of areas located between major station hubs — the orchestrator created a shared strategic imperative that positioned inter-operator cooperation as necessary for long-term regional competitiveness against other urban centers, rather than as a concession to rivals.
2. **The Standardization Phase (Technical and Legal Mediation):** The neutral entity facilitated the harmonization of disparate operational protocols across participating organizations. A critical breakthrough was the adoption of a unified, white-label digital interface that prevented the “branding conflicts” typical of such alliances, providing a neutral user experience that did not privilege any single participant’s legacy system over others. This design choice simultaneously resolved the strategic conflict dimension of the Triad and effectively reduced the Cognitive Load (Sweller, 1988) imposed on end-users navigating a multi-operator environment.
3. **The Implementation Phase (Social Validation through Lean Deployment):** To minimize financial and reputational risk for the large-scale legacy operators, STUDIO ZERO proposed a time-limited social experiment with a cap on the number of participants. This “lean” and agile approach allowed for rapid social implementation and real-world data collection, effectively bypassing the multi-year planning and approval cycles that routinely stifle innovation in public-sector-led urban projects. Crucially, this phase generated the empirical evidence base that served as proof-of-concept for the alliance, demonstrating the Dynamic Capabilities (Teece et al., 1997) of the partnership to respond to real-world user demand with measurable social and economic outcomes.

RESULTS AND CRITICAL SUCCESS FACTORS

Quantitative Performance and Market Reception

The success of the “Private-Sector-Led Alliance Model” was empirically validated through the deployment of the digital mobility pass in a high-density urban corridor. During the defined experimental window, the consortium achieved a total sale of 559 digital passes — a result that is particularly significant from a strategic perspective because it required a direct monetary commitment (2,000 JPY) from users. This design choice deliberately moved beyond the limitations of “free-of-charge” social trials, which routinely fail to reflect actual market willingness-to-pay or genuine behavioral intent, and instead demonstrated that the integrated service proposition had sufficient perceived value to generate real commercial demand. To capture the qualitative and quantitative impact of the intervention, a post-experiment survey was conducted, achieving a robust 58.7% response rate (n = 328). This participation level provides a high degree of statistical confidence in the findings and supports meaningful disaggregation of results by user segment and behavioral pattern, enabling the kind of nuanced strategic analysis that aggregate adoption metrics alone cannot produce.

Intermodal Synergy and “Coopetition” in Action

One of the primary strategic objectives was to determine empirically whether competing railway operators could foster genuine synergy rather than mutual cannibalization through shared digital infrastructure. The data revealed that 38.4% of users utilized three or more distinct modes of transport — integrating the rail networks of multiple operators with municipal buses and micro-mobility platforms — within a single journey. This figure substantially exceeds typical multimodal usage rates in comparable urban settings, where fragmented payment systems and the cognitive friction of platform-switching ordinarily suppress cross-modal behavior. The finding empirically supports the coopetition framework (Bengtsson and Kock, 2000), demonstrating that:

- **Synergy over Competition:** Rather than users switching from one rail line to another in a zero-sum fashion, the digital integration encouraged users to “loop” through the district, utilizing different lines as a unified backbone for urban exploration. The structure of the pass transformed competitive corridors into complementary segments of a single seamless network, producing mobility patterns that no individual operator’s service could have generated in isolation.
- **Micro-mobility as a Strategic Extension:** The recorded average of 2.6 micro-mobility trips per user indicates that these services functioned not as competitors to the heavy rail infrastructure, but as “last-mile extensors” that increased the overall utility and geographic reach of the railway networks. This relationship — complementary rather than substitutive — expanded the effective service territory of each operator without direct operational investment, producing a net increase in the total value of the network for all participating parties.

Area-wide Economic Stimulation and Asset Value

The orchestration model shifted the strategic focus from individual ticket revenue to collective area asset value — a reframing that proved essential not only for aligning operator interests during the governance phases, but for producing the downstream economic outcomes that justified the alliance *ex post*.

- **Economic Boost:** Pass holders spent an average of 1,757 JPY more per person during their visits to the area than their routine behavior suggested. The neutralization of transportation cost effectively converted what would have been saved travel expenditure into local commercial activity, producing a direct transfer of value from mobility friction into neighborhood economic vitality. The pass thus functioned simultaneously as a mobility product and a local economic stimulus instrument.
- **Discovery of Marginal Commercial Spots:** Crucially, 62.5% of users visited new commercial establishments located between major transit hubs for the first time during the experiment period. This “discovery effect” directly contributes to the long-term asset value of the transit corridor by transforming “passive commuters” into “active regional consumers.” The fact that this effect was concentrated in previously under-visited inter-hub areas — precisely the commercial zones whose stagnation had motivated the alliance — served as the ultimate empirical justification for the co-competition strategy.

DISCUSSION: THE DYNAMICS OF AUTONOMOUS GOVERNANCE

Orchestration as a Trust-Building Mechanism

The findings suggest that in a multi-stakeholder metropolitan environment, the presence of a neutral orchestrator is the most critical success factor for overcoming institutional inertia — more important, in practice, than technical interoperability standards or regulatory frameworks. As suggested by Gulati et al. (2012), successful collaboration in strategic alliances requires both cooperation (alignment of interests) and coordination (synchronization of actions). Large-scale legacy organizations routinely suffer from a structural reluctance to share proprietary data with direct competitors, a resistance rooted not in irrationality but in legitimate concerns about competitive exposure and revenue cannibalization under conditions of information asymmetry.

In this case, STUDIO ZERO functioned as a Trusted Third Party (TTP), managing a white-label digital interface that allowed each operator to participate without compromising their individual brand equity or core customer databases. This “Data Neutrality” was essential for reducing the Transaction Costs (Williamson, 1981) of the alliance and building the foundational trust necessary for social implementation. The architecture of the digital pass — white-label, operator-agnostic, and jointly governed — served as the institutional expression of that neutrality, making cooperation structurally safe for organizations that would otherwise have viewed data-sharing as a strategic liability. The practical implication for future MaaS implementations is that governance architecture is at least as important as

technical architecture: the rules governing who controls what data, under what conditions, and with what safeguards are the preconditions for organizational participation, not secondary considerations.

From “Share-Taking” to “Value-Creation”

This project represents a fundamental shift in the strategic mindset of urban infrastructure providers — moving from a “share-taking” mentality to a “value-creation” strategy. Historically, the success of a transit operator was measured by its “Passenger Share”: the proportion of total journeys captured relative to competitors operating in the same corridor. This zero-sum framing made cooperation structurally irrational at the level of the individual firm, as any gain for one operator was perceived as a direct loss for another. The result was a competitive equilibrium that was stable at the operator level but systematically suboptimal at the network level, leaving significant mobility value unrealized and significant economic activity in inter-hub areas undeveloped.

The “Private-Sector-Led Alliance Model” demonstrates that in a saturated urban market, sustainable growth is better achieved through Regional Value Creation — the collective effort to expand total demand within a geographic corridor rather than redistributing existing demand across operators. By collaborating to make the entire district more accessible and “discoverable,” the operators collectively increased the attractiveness of the region, generating net new mobility demand rather than merely shifting existing passengers between competing services. This strategic pivot aligns with the concept of Dynamic Capabilities (Tece et al., 1997), where firms must integrate and reconfigure internal and external competences to address rapidly changing urban environments and evolving user needs. The shift from competitive to collaborative value logic, in this context, constitutes precisely the kind of organizational reconfiguration that Tece et al. describe — a fundamental reorientation of strategic purpose rather than a marginal adjustment to existing practice.

Agility and the “Studio Approach” to Social Innovation

A significant and transferable takeaway for Smart City governance is the demonstrably superior agility of the private-sector-led model compared to traditional Public-Private Partnerships (PPP). Administrative initiatives in urban mobility typically struggle with “Bureaucratic Lag” — the structural time gap between technological readiness and regulatory approval that compresses the window of market opportunity and systematically erodes the responsiveness of public interventions to actual user needs. In fast-moving urban environments, where mobility behaviors and digital platform ecosystems evolve rapidly, this lag can render public-sector-led initiatives obsolescent before they reach deployment, producing infrastructure solutions calibrated to yesterday’s problems.

The “Studio Approach” facilitated by STUDIO ZERO bypassed this lag by focusing on Lean Social Implementation — framing the project as a time-limited experiment with clear private-sector KPIs rather than as a permanent infrastructure commitment requiring multi-agency sign-off. This

framing allowed the orchestrator to move from strategic conception to real-world deployment in a matter of months, compressing timelines that would conventionally span years. This agility is not merely a procedural advantage; it is epistemically significant. Real-world deployment generates behavioral data — on adoption patterns, usage combinations, economic spillovers — that no planning process can simulate with equivalent fidelity. The ability to design, deploy, and learn from a live social experiment at speed is the defining capability of the “Studio Approach” as a model for social innovation in the digital era, and its replication potential extends well beyond the urban mobility domain to any context in which complex institutional actors must be aligned around shared social objectives.

CONCLUSION

This research has demonstrated that the traditional boundaries of corporate competition can be transcended through strategic orchestration and a shared commitment to regional revitalization. The “Private-Sector-Led Alliance Model” provides a robust and scalable framework for “Autonomous Urban Orchestration,” proving that competing infrastructure providers can effectively co-exist and thrive within a unified, user-centric digital ecosystem when a neutral mediator successfully aligns their strategic interests around a shared metric — in this case, the collective asset value of the transit corridor rather than the individual passenger share of each operator. The cooperation dynamic, far from being a theoretical abstraction, proved empirically generative: it produced intermodal usage patterns, economic spillovers, and user experience outcomes that no single operator could have achieved through unilateral action.

By reducing institutional friction and aligning conflicting corporate goals, this project successfully transformed a fragmented urban transit landscape into a seamless, high-value activity space. The measurable increases in intermodal connectivity — 38.4% of journeys utilizing three or more distinct modes — and local economic spending — 1,757 JPY per person above baseline — serve as a replicable blueprint for future MaaS implementations globally. As metropolitan areas face increasing pressure to become more resilient, sustainable, and economically inclusive, the shift toward private-sector-led, collaborative governance will be essential for delivering the pace, user-centricity, and adaptive capacity that citizens and local economies increasingly demand.

Future research should explore the further institutionalization of this model — particularly how digital governance frameworks, revenue-sharing protocols, and data-sharing architectures can be standardized across different urban contexts without sacrificing the agility that makes the approach effective. The generalizability of the cooperation dynamic to transit environments with different competitive structures (e.g., monopolistic public operators, highly fragmented micromobility markets, or mixed ownership regimes) also warrants systematic investigation. Additionally, the long-term stability of cooperation arrangements — and the conditions under which they

dissolve or deepen over time — represents an important frontier for both organizational theory and urban policy. Ultimately, this study offers both a practical framework and a theoretical contribution: evidence that institutional friction is not an immutable feature of competitive urban infrastructure, but a design problem amenable to orchestration-based solutions with measurable social and economic outcomes.

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