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REVIEW

Mobility as a Service: promises, pilot evidence and governance lessons

Movilidad como servicio: promesas, evidencia de pilotos y lecciones de gobernanza

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ABSTRACT

Mobility as a Service (MaaS) integrates fragmented transport modes into a single digital interface for planning, booking and payment, and is widely presented as a route toward less car-dependent cities. The concept rests on a ladder of integration that few operational schemes fully climb, and its sustainability claims remain partly speculative. Pilot evidence shows high satisfaction and modest reductions in private car use among self-selected early adopters, with substitution patterns that do not always favor public or active modes. Governance lessons point to a redefinition of the public role from operator to orchestrator, to contested control over trip data, and to equity outcomes that depend on deliberate inclusive design. MaaS is therefore best understood as a governance project rather than a purely technological fix.

Keywords: mobility as a service; integrated mobility; pilot studies; travel behavior; transport governance; public transport.

RESUMEN

La movilidad como servicio (MaaS) integra modos de transporte fragmentados en una única interfaz digital para planificar, reservar y pagar, y suele presentarse como una vía hacia ciudades menos dependientes del automóvil. El concepto se apoya en una escalera de integración que pocos esquemas operativos completan, y sus afirmaciones de sostenibilidad siguen siendo en parte especulativas. La evidencia de los pilotos muestra satisfacción alta y reducciones modestas del uso del automóvil privado entre adoptantes tempranos autoseleccionados, con patrones de sustitución que no siempre favorecen los modos públicos o activos. Las lecciones de gobernanza apuntan a una redefinición del papel público de operador a orquestador, al control disputado de los datos de viaje y a resultados de equidad que dependen de un diseño inclusivo deliberado. Por tanto, MaaS se entiende mejor como un proyecto de gobernanza que como una solución puramente tecnológica.

Palabras clave: movilidad como servicio; movilidad integrada; estudios piloto; comportamiento de viaje; gobernanza del transporte; transporte público.

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INTRODUCTION

Urban passenger transport is still organized as a set of separate modes, each with its own ticketing, payment and travel information channels. A traveler who combines bus, rail, bicycle and shared vehicles must assemble the journey from these fragments, while public authorities try to reduce private car use and the emissions it produces. Mobility as a Service (MaaS) responds to this fragmentation by proposing a single digital interface that plans, books and pays for a journey across modes, typically through a bundled subscription rather than separate transactions.(1,2)

The subscription analogy is explicit in the field: mobility packages are conceived along the lines of telecommunications contracts, in which users pay a monthly fee for access to a portfolio of services.(3)The proposition is therefore simultaneously a product, a business model and a policy instrument, and this triple nature explains much of the debate that surrounds it. For public authorities the appeal is direct: if a single platform can make the public and shared alternatives as easy to use as a private car, the platform becomes an instrument of transport policy rather than a convenience.(4)

The concept advanced faster than its evidence base. Definitions and integration taxonomies multiplied, while field trials remained short, small and concentrated in a few European cities and in Australia, and their behavioral results were dispersed across transport journals.(5,6) The first documented operational test, the UbiGo broker service in Gothenburg, ran for six months with 195 participants and was reported as a proof of concept rather than as a controlled evaluation.(7)

In parallel, a critical strand asked whether the promised integration would reduce car dependence at all, or whether it would transfer users, trip data and market power to private platforms at the expense of public transport.(3,8) A synthesis is therefore timely, because the promises, the pilot evidence and the governance questions have rarely been examined together within the transport literature published up to 2023, and because the gap between the promotional claims and the field results has widened as trials accumulate.

The objective of this narrative review is to synthesize the conceptual promises of Mobility as a Service, the evidence from pilots and early schemes, and the governance lessons for public authorities, drawing on the literature published up to 2023. Three questions guide the review. P1: which promises is MaaS expected to deliver, and on which assumptions do they rest? P2: what does the evidence from pilots and early implementations reveal about adoption and changes in travel behavior? P3: which governance lessons for public authorities emerge regarding market structure, equity and data? The review does not claim exhaustiveness; it organizes the documented evidence along three thematic axes that mirror these three questions.

DEVELOPMENT

An integration ladder that few operational schemes complete

The promise of MaaS is described in three parts: a single point of access for multimodal travel, a bundled offering that reduces the friction of planning and paying, and a shift toward public and shared modes that lowers car dependence (Table 1).(1,9)

These three promises rest on assumptions about traveler preferences and about the capacity of a broker to coordinate supply, and the literature asserts them far more than it tests them.(2)

The integration itself is treated as a ladder. Definitions in the field distinguish levels that move from information provision, through booking and payment in a single interface, up to the full bundling of services under one subscription.(1,6) Early definitional work framed the goal as a mobility operator that packages services on a subscription, and later syntheses formalized that goal into graded levels of integration.(6,10) Reviews of operational schemes agree that most deployments reach only the lower rungs, offering multimodal information or ticketing without a true subscription.(10)

The full ladder is therefore a target rather than a description of what exists. The state of definitional work is itself telling. A review of 57 MaaS documents indexed in Scopus up to January 2019 concluded that the field had not yet converged on a single definition and was still accumulating contributions on what MaaS is, who its actors are, how it can be implemented and why it should be.(11)A later categorization of 127 publications found the same distribution of effort, concentrated on the market, the users, the data and technology, and the effect on the transport system, with less attention to the institutional conditions under which a scheme operates.(5)Definitional multiplicity is therefore a structural feature of a concept that spans product design, regulation and behavior.(1)

Table 1. Conceptual promises of Mobility as a Service and the assumptions behind them.

Promise	Main assumption	Selected sources
Seamless multimodal travel from one interface	Travelers value a single point of planning, booking and payment	Jittrapirom et al., 2017; Kamargianni et al., 2016
Integration by levels up to a full bundle	A broker can coordinate operators without distorting competition	Jittrapirom et al., 2017; Utriainen and Pöllänen, 2018
Lower car dependence and emissions	Bundling public and shared modes substitutes private car trips	Smith et al., 2018; Strömberg et al., 2018
A viable commercial model	Users will pay for convenience and flexibility	Matyas and Kamargianni, 2019; Ho et al., 2020
Alignment with public goals	Authorities can steer private platforms toward policy objectives	Smith and Hensher, 2020; Hensher et al., 2023

The sustainability promise assumes that bundling public transport with car sharing, bike sharing and ride hailing will substitute private car trips, because the package makes the combined alternative visible and convenient.(12,13) Early scenario work treated this substitution as plausible and quantified its potential in terms of reduced car ownership and vehicle kilometers, but it did not demonstrate the effect with field data.(12)The assumption is contested by critics who note that convenience can also make car-based modes easier to consume, so the direction of the substitution is not guaranteed by the technology.(3)

The commercial promise assumes that users will pay for convenience and flexibility and that an intermediary can aggregate operators without distorting competition among them.(14,15) Stated-preference evidence supports the willingness of some segments to pay for a bundle, but the same evidence shows wide heterogeneity in what travelers value, which complicates a single subscription design.(4,15) The tension between the value of a unified offer and the cost of maintaining it is already visible at this conceptual stage, before any operational evidence is considered. Because the how and the why of MaaS are treated as separate questions, the literature also lists the preconditions that a city must satisfy before a scheme can work.(11)These preconditions include a critical mass of supply, interoperable ticketing and payment, and a willingness of operators to share data and revenue, all of which lie beyond the control of any single traveler or platform.(16)The promise is thus contingent on an alignment of commercial and public interests that the concept itself does not produce, a point that the governance axis develops further.(4)

The strongest formulation of the promise is the substitution of car ownership itself rather than of individual car trips. In this version the bundle is framed as an alternative to owning a private vehicle, and success is measured by households that forgo or delay a purchase.(17)The formulation is attractive to policy because ownership, not use, is the stable predictor of car dependence, but it also raises the evidential bar: no pilot has yet shown that a subscription replaces a car at the household level over the long run.(18,19)

A further promise, stated less prominently but central to the policy case for MaaS, is accessibility. The argument is that a single platform can make multimodal options legible to travelers who would otherwise not consider them, and can extend the reach of public transport to first and last mile connections.(4,20) This promise rests on the assumption that the platform will present public and shared modes on equal terms with private ones, an assumption whose fulfillment depends on design choices examined under P3.(21)

A critical reading treats part of the promise as speculative. The concept has been described as an ideal or utopian framework whose operational form remains underspecified, and the reviews that map the field note that conceptual contributions outnumber empirical ones.(5,11,22)The checklist literature reinforces this view by reducing the concept to a set of conditions, technical, institutional and commercial, that a city must satisfy before MaaS can function, which is another way of saying that the promise is conditional rather than automatic.(16)This does not negate the promise; it locates it as a governance and design ambition whose delivery depends on conditions that the pilots examined next test only partially.

Fourteen documents inform this axis, and the balance between conceptual frameworks and field evidence explains why the promise remains better documented than its realization.

Pilots that recruit early adopters and move car use only modestly

The earliest evidence comes from a small set of field operational tests, most notably UbiGo in Gothenburg, the Munich mobility station and the Sydney MaaS trial.(7,18,23)These trials recruited self-selected participants, ran for months rather than years, and measured outcomes through travel

diaries, app records and questionnaires rather than through controlled comparisons.(13,24) The UbiGo test is the reference point: 195 participants used a broker service for everyday urban travel for six months, and the evaluation combined questionnaires, interviews and travel diaries (Table 2).(7)

Table 2. Main Mobility as a Service pilots and early schemes with their reported behavioral findings.

Scheme (location)	Design	Reported behavioral finding	Source
UbiGo, Gothenburg	Six-month field operational test	High satisfaction; reduced private car use and more public and active travel	Sochor et al., 2016; Strömberg et al., 2018
Mobility Station, Munich	Ex post survey of service users	Positive changes in travel behavior among users	Miramontes et al., 2017
Sydney MaaS trial	Field trial with monthly bundles	Lower private car use among frequent car users; substitution partly away from active and public modes	Hensher et al., 2021; Ho et al., 2021
Rural public-private pilots	Public-private pilot deployments	Limited uptake without sustained public support	Eckhardt et al., 2020; Hult et al., 2021
National demonstrations, Taiwan, Japan, Budapest	Pilot demonstrations	Implementation lessons on integration and ticketing	Chang et al., 2019; Tran and Hashimoto, 2022; Esztergar-Kiss et al., 2021

The consistent finding across these trials is high user satisfaction and a reported reduction in private car use during the trial period. UbiGo participants described the package as simplifying their travel and reported using public transport and active modes more than before; the attributes that enabled the change were the breadth of the offer, its simplicity, the improved access and flexibility, and the economy of a single payment.(7,13) In Sydney, the trial was associated with lower private car use, concentrated among participants who had been frequent car users before joining.(18,25)

The Sydney trial allows the promise to be read against actual uptake rather than stated intentions. It began in April 2019 and presented participants with a choice between pay-as-you-go and four subscription bundles that combined public transport, ride sharing, car sharing and car rental with varying discounts and monthly fees, introduced incrementally over five months.(25)The choice models fitted to this uptake are the first to model real subscription decisions, where earlier studies relied on stated preferences.(25,26) The substitution findings qualify the sustainability promise: substitution did not always run from car to public or active modes, and part of the change replaced walking, cycling or public transport with shared or on-demand options.(26,27) Bundle composition and pricing shaped which modes participants used, so mode-shift evidence should be read at the level of the specific bundle rather than of MaaS in general.(26,28) A second Swedish service extends the picture beyond the earliest trials. The EC2B scheme launched in Gothenburg in the spring of 2019, and its adopters resembled the profile found elsewhere: they were motivated by simplification and by the chance to test a combined offer, and their reported use pointed to changes concentrated in a limited set of trip types.(29)The persistence of this profile across schemes and countries strengthens the conclusion that MaaS first attracts travelers who are already prepared to use several modes.(29,30)

Beyond the trials, survey and stated-preference studies identify who is willing to adopt MaaS. Adoption intention is highest among multimodal, urban, younger and higher-educated travelers who already combine public transport with shared modes, and lowest among car-dependent, older and rural populations.(19,30,31)Early adopters in the Netherlands were profiled through five indicators, innovativeness, technical aptitude, need for travel information, a multimodal mindset and a desire for freedom of choice, and the resulting index shows that the likely first users are already the least car-dependent segment of the population.(30)Australian consumer work points in the same direction.(32)The limits of this evidence base are as important as its content. Because comprehensive pilots remain scarce, researchers have had to rely on stated-adaptation experiments that present hypothetical bundles and ask travelers how they would respond, which measures propensity rather than behavior.(33)The distinction matters: the surveys that find strong willingness to adopt describe intentions, while the field trials that observe actual uptake describe behavior, and the two do not always move together.(15,29) Reviews of the field make the same caution explicit when they note that adoption studies outnumber studies of sustained use.(34)

The barriers mirror this segmentation. Cost, the complexity of choosing among bundles, distrust of platform operators, privacy concerns and the fragmentation of institutional arrangements all depress uptake.(17,34,35)Modeling work on mode choice reaches the same conclusion: MaaS shifts mode shares only when the bundle is cheaper and simpler than the status quo, and the

effect is otherwise small.(29,33) A pilot survey of user preferences for a prospective MaaS found that behavioral variables had to be elicited before the scheme could even be designed, which indicates how far the evidence is from a mature adoption model.(36)Bundle design is where the behavioral and commercial questions meet. Reviews of MaaS modeling show that the factors entering bundle and mode choices, user profiles, business models and service attributes, are numerous and interact, which is why simple statements about MaaS changing behavior fail to hold across settings.(10)The modeling studies consistently find that the effect of a bundle depends on its discount structure, its modal composition and the alternatives it replaces, rather than on the presence of an app.(10,33) Design therefore carries the causal weight that the technology alone cannot.(26)

Smaller and rural pilots add a cautionary note. Public-private pilots in rural areas achieved limited uptake without sustained public support, and the shared-mobility pilots examined in Sweden depended on local organizational arrangements that do not transfer easily.(37,38) National demonstrations in Taiwan, Japan and Budapest delivered implementation lessons on ticketing and governance rather than behavioral change, which is consistent with the view that deployment is itself the hard part.(39-41)These schemes show that a MaaS can be built and operated; they do not by themselves show that travelers will abandon the car once the pilot subsidy disappears.

Nineteen studies inform this axis, and the overall picture is one of satisfied early adopters, modest and bundle-dependent shifts in car use, and adoption concentrated where car dependence is already low.

A public role that shifts from operator to orchestrator

Governance studies approach MaaS as a challenge to the incumbent public transport regime. Public authorities face a strategic choice between leading a scheme, partnering with a private platform, or resisting platform-based mobility, and the choice shapes what a scheme becomes.(12,42) Comparative work on Amsterdam, Birmingham and Helsinki shows that cities differ in this choice and that the difference explains much of the variation in how MaaS develops locally.(42,43) The Helsinki case shows that the same city can move across these positions as political and commercial conditions change, which indicates that the public stance is not fixed once and for all.(43,44) The institutional content of this choice is documented in detail for a Swedish regional MaaS ecosystem, where 24 interviews with 18 representatives of authorities, providers and other stakeholders identified three logics, state, market and sustainability, that coexist and compete within the same scheme.(45)The coexistence means that no single actor can impose a design, because the scheme is continuously renegotiated among actors who do not share the same measure of success.(45)This finding generalizes the Helsinki and Stockholm observations and explains why the public stance in those cases appears unstable across time (Table 3).(43,46)

Table 3. Governance lessons from Mobility as a Service by domain.

Domain	Lesson	Selected sources
Market structure	An unregulated platform can capture customers, data and pricing power and weaken public transport	Pangbourne et al., 2020; Wilson and Mason, 2020
Data governance	Trip data are contested between operators and planners, and app-based access excludes some groups	Sourbati and Behrendt, 2021; Tsvetkova et al., 2022
Equity and inclusion	Inclusive outcomes require deliberate design, targeting and subsidy rather than the technology alone	Dadashzadeh et al., 2022; Brown et al., 2021; Hasselwander et al., 2023
Institutional role	Authorities move from operator to orchestrator through procurement and open-data mandates	Fenton et al., 2020; Hirschhorn et al., 2019
Global South context	Barriers are institutional, and informal paratransit requires different integration strategies	Hasselwander and Bigotte, 2022; Hasselwander and Bigotte, 2023

The principal risk identified is that an unregulated platform captures the customer relationship, the trip data and the pricing power, and weakens the public transport operator it was meant to complement.(3,47) This concern is not hypothetical: the governance of smart mobility more broadly shows how quickly private intermediaries can sit between travelers and the public network.(8)The counterargument is that MaaS can also enlarge the public transport market if the authority keeps control of integration and uses the platform as a distribution channel for the public network.(12,20)

Control over data is the most contested resource. Platform operators hold trip records that public authorities need for planning and concession management, and the terms on which those records are shared are not settled in advance.(48,49) Data-driven mobility also raises exclusio-

nary effects, because app-based access and algorithmic intermediation assume digital skills and smartphone ownership that are unevenly distributed, with age a documented axis of exclusion.(50)The Merwede neighborhood case in Utrecht illustrates the practical form of these tensions, in which organizational structures, decision procedures and instruments all have to be invented for a mobility platform embedded in urban development.(51)

Equity outcomes depend on deliberate design. Frameworks such as the MaaS inclusion index make the point that inclusivity must be specified and measured, because the default configuration of a subscription platform does not by itself serve low-income, disabled, rural or older travelers.(21,52) Gender reviews reach the same conclusion from the other direction, showing that safety and care-related travel are not represented in standard bundle designs.(53)

Where inclusion was tested, as in the Los Angeles first-and-last-mile program, the analysis of just over a year of trip data showed that the equity effects depend on targeting and subsidy rather than on the technology alone.(54)The scale of the equity evidence remains thin relative to the conceptual claims. A systematic review of real-world MaaS applications screened 2009 papers and identified 20 that considered equity impacts, concentrated in Europe and Asia, and it found that the studies did not quantify the societal advantage they attributed to the schemes.(52)

A parallel review of 420 peer-reviewed articles on gender and MaaS reached a similar conclusion: gender is treated unevenly across the literature, and the data on how perceptions and intended use differ between men and women are not yet sufficient to support design decisions.(53)Both reviews locate the gap in measurement rather than in the absence of concern.(52,53)

The pandemic added a stress test to these arrangements. Governance analyses based on workshops with public and private actors argue that mobility innovations require collaborative, adaptive and outcome-based models, and that the pandemic made this need more pressing by showing how quickly travel demand can change.(49)

The lesson for MaaS is that a scheme negotiated for a stable demand profile must be renegotiated when the profile shifts, which places a premium on the adaptive capacity that the institutional-logic studies describe.(45,48)

The accessibility potential is real but conditional. Simulation and case work on MaaS for transit accessibility and on spatial justice indicates that bundled schemes can improve access to opportunities if they are designed around the public network and its underserved areas, and can worsen it if they are designed around the profitable core.(55,56) A rural Japanese assessment found equity gains in non-work accessibility only under specific policy settings, which reinforces the conditionality.(57)These results give the equity question a precise form: the design variable, not the platform, carries the burden of inclusion.

Across these studies the public role is being redefined from operator to orchestrator. Local governments increasingly act through procurement conditions, open-data mandates and public ownership of the integrator rather than by running services directly.(20,46,58)

A stakeholder survey in Stockholm found that the city administration is assigned an important but delicate role, expected to enable the ecosystem without crowding out the private operators whose participation the model requires.(46)Institutional analysis of MaaS ecosystems describes this as the coexistence of public, market and platform logics that must be negotiated rather than resolved by contract alone.(45)In the Global South, where paratransit dominates, authorities face the added task of integrating informal operators, and the barriers are institutional rather than technical.(59,60)

The policy-oriented literature converges with these case studies. Reviews of the European regulatory framework and stakeholder interviews in three metropolitan areas identify technical, regulatory, financial and social obstacles, and translate them into recommendations addressed jointly to public authorities and prospective operators.(61)Twenty-one studies inform this axis, and their shared lesson is that the governance of MaaS, not the technology, decides who benefits from it.

DISCUSSION

The question that opened this review was whether MaaS delivers what its name promises. The synthesis answers it in three parts, and each answer is more cautious than the promotional framing that surrounds the concept.

The first answer concerns the promise itself, which is real in design terms but thin in delivery. The integration ladder is now a stable reference in the field, and its upper rungs, full bundling and a working broker, are exactly what most operational schemes have not reached.(1,10) This finding aligns with earlier reviews that described MaaS as a young concept whose definitions exceeded its

deployments.(6,11) It diverges from the optimistic early literature, which treated the shift from fragmentation to integration as an engineering problem with an imminent solution;(2)the discrepancy is explained by the later arrival of field evidence that revealed the institutional and commercial obstacles.(5)

The second answer concerns behavior, and the pilot evidence supports only a narrow version of the behavioral promise. Participants are satisfied and car use falls during trials, but the reduction is modest, bundle-dependent and observed among self-selected adopters who were already multimodal.(13,18,30)This is consistent with reviews that rank MaaS among the weaker levers for mode shift when compared with pricing and infrastructure measures.(62)The substitution findings from Sydney complicate the sustainability claim, because replacing active or public trips with shared vehicles yields no environmental gain, and this mechanism is absent from the conceptual literature that motivated the pilots.(26,27) The gap between stated intention and observed behavior is the most likely explanation for the divergence between the optimism of preference surveys and the smaller measured effects.(15,33)

The third answer concerns governance, where the literature converges on the need for public design of the market. This review corroborates the critical analyses that warned against leaving integration to private platforms,(3,8) and it extends them with case evidence that proactive cities can steer schemes toward public transport when they control procurement and data.(46,58) The equity findings add a condition that the early governance debate treated only in passing: inclusion is an outcome of design choices, not a property of the technology.(21,52) Where this review differs from the more optimistic policy frameworks is in emphasis, because those frameworks assume an authority with the capacity to orchestrate, which the Global South evidence does not take for granted.(59,60)

Read together, the three axes point to the same conclusion from different directions. The concept promises integration, the pilots deliver integration only where a public actor holds the scheme together, and the governance literature identifies that public actor as the missing variable. This is why the utopian framing of MaaS is best treated as a benchmark rather than a forecast.(22) The conceptual and empirical literatures are therefore not in disagreement; they describe different objects, the platform as designed and the platform as operated, and the gap between them is the central finding of the review.

Previous reviews have covered each axis separately. Definitions and levels of integration have their own syntheses,(1,6) adoption and its barriers have been reviewed systematically,(17,34) and governance has been treated in policy and scenario work.(12,20)

The present review adds the joint reading of the three axes, which makes visible a mismatch that single-axis reviews cannot show: the promises are stated at the level of the full ladder, the pilots are evaluated at the level of individual bundles, and the governance conditions are analyzed at the level of city institutions. Comparing across these levels, rather than within one, is what exposes the gap between what MaaS claims and what its evidence supports. The review also has strengths that follow from its design.

Anchoring the synthesis to three explicit questions forced each claim to be attributed to a specific study and each axis to be reported with its own count, which keeps the argument traceable to the underlying matrix. The use of four bibliographic sources, with Scopus queried first, reduced the dependence on a single index and brought together the transport, planning and information-systems literatures that cite one another only partially.(5)Because the window was fixed at 2013 to 2023, the review reflects the field as it stood at the end of the period rather than as it has since evolved.

The mechanisms that connect the three axes are commercial and institutional rather than behavioral. A platform that must recover its costs will price bundles to attract users who already pay for mobility, which selects for the car-dependent segments that the sustainability promise needs to convert, while the segments that would benefit most from integration, low-income and peripheral travelers, are the least profitable to serve.(21,55) This commercial logic explains why the pilot results are so sensitive to bundle design and why equity requires explicit public subsidy rather than emerging from the market.(54)

The practical implications follow directly. Authorities that consider a MaaS scheme should specify which rung of the integration ladder they intend to reach, should commission pilots that measure substitution against a baseline rather than satisfaction alone, and should settle data-sharing terms before the platform becomes indispensable.(48,49)

Operators and authorities alike would benefit from bundle designs that price public and active modes attractively, given the Sydney evidence that bundle composition drives substitution.(26)For cities in the Global South, the priority is different: the integration of informal paratransit

and the strengthening of institutional capacity come before the platform, because the technology cannot substitute for the missing governance.(59,60)

The transfer of these lessons across contexts is the weakest link in the current evidence. The best-documented schemes sit in northern European and Australian cities with strong public transport networks, capable authorities and high smartphone penetration, and the Global South evidence cautions against importing that template wholesale.(59,60) What transfers is not the bundle but the governance question behind it: which public actor controls the integrator, the data and the terms of inclusion.(21,60)

The measurement agenda follows from the same analysis. The pilot literature would advance faster if evaluations reported baseline mode shares, bundle composition and substitution by trip purpose as a matter of routine, because those three quantities are what separate a sustainability gain from a rebranding of existing travel.(26,28) The equity literature points to a second requirement: reporting outcomes for underserved groups separately, since aggregate uptake can mask widening gaps for the travelers who would benefit most.(21,52) These are modest additions to existing trial protocols, but they are what would convert the accumulated demonstrations into cumulative evidence.(29)

This review has limitations. Selection was guided by the three questions and was not exhaustive, so studies outside the chosen terms may have been missed, and the synthesis reflects the English-language and European weight of the field. Where full text was not openly available, claims rest on titles and abstracts rather than on complete methods, a weakness shared by many narrative reviews.

The pilot effects are further limited by self-selection, short durations and novelty, and the review cannot separate those effects from durable behavior change. Each of these limits could be reduced by a registered systematic review with full-text appraisal and by longitudinal pilots with control groups, neither of which was feasible within the present scope.

What remains open is the long-run question. The field has not yet produced evidence that a MaaS scheme, once public support and pilot enthusiasm are withdrawn, continues to shift travel behavior and to serve users whom the market alone would not reach. Studies that follow schemes beyond their pilot phase, that measure equity and car use together under realistic institutional constraints, and that test the inclusion designs proposed in the equity literature are the clearest next step.(28,52,60)The same applies on the governance side, where the durability of the orchestrator role has yet to be tested against changes of administration and of commercial partners.

CONCLUSIONS

The conceptual promise of MaaS rests on an integration ladder that few schemes have climbed, and its sustainability claims remain only partly supported. Pilot evidence indicates that MaaS satisfies early adopters and reduces private car use modestly, with substitution patterns that depend on bundle design and do not always favor sustainable modes. The governance literature shows that public authorities, by acting as orchestrators of data, procurement and inclusive design, determine whether MaaS delivers public value or concentrates it in private platforms.

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