 https://doi.org/10.3311/PPtr.38371

Periodica Polytechnica Transportation Engineering, 53(3), pp. 324–333, 2025

Revenue Alterations of Shared Automated Mobility Services Integrated into Mobility as a Service

Dahlen Silva[1*], Csaba Csiszár[1]

[1] Department of Transport Technology and Economics, Faculty of Transportation Engineering and Vehicle Engineering, Budapest University of Technology and Economics, H-1111 Budapest, Műegyetem rkp. 3., Hungary
[*] Corresponding author, e-mail: dahlen.silva@edu.bme.hu

Received: 21 September 2024, Accepted: 30 May 2025, Published online: 10 June 2025

Abstract

The concept of mobility as a service (MaaS) is integrating mobility services and offering them to users *via* a single means. The introduction of shared autonomous vehicles (SAVs) and adaptation of revenue models must be tackled in the MaaS concept. As the scientific basis for this is incomplete, we forecasted the alterations in the revenue of SAVs after the integration into MaaS. We analyzed the existing revenue models used by shared mobility services and MaaS, and used a revenue model framework (RMF) to explore the possible sources of revenue. Our methodology contains the before-and-after analysis and considers the MaaS integration levels. The main findings indicate that MaaS takes over revenue sources from mobility service providers as the integration levels increase. Also, the commission paid to MaaS is a new cost for mobility service providers. Then, integrating SAVs into MaaS is beneficial if the revenue increase caused by number of trips outweighs the loss generated by the responsibilities taken by MaaS. Finally, the door-to-door SAV services exist in all integration levels, but feeder is only present at level 3. MaaS operators and SAV mobility service providers can use our findings during negotiations of contracts, and the integration process can be accelerated.

Keywords

revenue model, shared autonomous vehicles, shared mobility, mobility as a service

1 Introduction

Shared mobility services offer flexibility, convenience, and accessibility to customers through a variety of service types and fees. The concept of mobility as a service (MaaS) offers multimodal transport services to users *via* a single means. MaaS is the bridge between mobility service providers and travelers, offering a digital interface to plan and pay the trip (Kamargianni and Matyas, 2017; Polydoropoulou et al., 2020).

With changes in the market and intense competition, business and revenue models should be reviewed continuously to make sure the business is still competitive, providing the value proposition that fulfils consumers' requirements (Simmert et al., 2019). The integration of autonomous vehicles (AVs) into MaaS will transform shared mobility businesses, their costs and revenue streams, but literature currently lacks exploitation of this topic. Some studies address the costs and revenue of AV-based mobility services and MaaS with AVs separately, however, revenue models applied to AV services are barely discussed.

Customized travel fee will monetize the spatial and temporal flexibility offered by AVs as well as additional services provided (e.g., child seat) (Silva et al., 2021). The advertisement revenue can be applied for autonomous taxi services (Kumar, 2014). Depending on cleaning costs, shared and pooled vehicles might not be the most efficient alternative to public transport and private cars (Bösch et al., 2018). Also, MaaS costs are subject to economies of scale, and lower marginal than average costs will allow a monopoly (Bahamonde-Birke et al., 2021).

We identified the following research gap: *revenues in context of shared autonomous vehicles (SAVs) have not been summarized in a system and operational oriented approach yet.* Therefore, we forecasted the changes in service and revenue models of mobility services based on SAVs when they are integrated into MaaS. The changes were determined as a result of before-and-after analysis. In our theoretical study, we considered literature sources and MaaS integration levels. The outcome of the research is the identified potential revenue sources in each MaaS

Cite this article as: Silva, D., Csiszár, C. (2025) "Revenue Alterations of Shared Automated Mobility Services Integrated into Mobility as a Service", Periodica Polytechnica Transportation Engineering, 53(3), pp. 324–333. https://doi.org/10.3311/PPtr.38371

integration level, which can convince SAV mobility service companies to join the MaaS concept.

Our research questions are the following: What are the alterations in the service and revenue models of SAV mobility services when integrated into MaaS? What are the implications of these alterations for potential revenue sources?

The limitations are:

1. Considered stakeholders: mobility service provider, vehicle operator and MaaS operator. Private AV owners and infrastructure operators are excluded as they apply only one revenue model and no alterations are observed;
2. Influence of service quality on the fee and revenue is out of scope;
3. Revenue sources are considered, but not the direct values or value ranges.

The paper is structured as follows. In Section 2, the methodology is presented. We analyze the revenue models of current shared mobility services and information platforms in Section 3. We explore the service and revenue models of SAV mobility services before integration into MaaS in Section 4. In Section 5, we investigate the integration levels and the revenue models of MaaS. In Section 6, we investigate the service and revenue alterations after SAV services are integrated into MaaS. Conclusions are drawn in Section 7.

2 Methodology

We used the revenue model framework (RMF) of Meyer (2019) in our study because it is an innovative approach; with it, we explore potential revenue sources rather than only selling a service/product. Thus, we focused on the revenue streams as well as on the multiple revenue models. It contributes deriving new scientific knowledge and forecasting the future as revenue models are explored from a unique perspective. The definition and way of usage of this framework is explained in Section 2.

2.1 Definition

A revenue model (RM) is a framework (RMF) showing the way an organization acquires income; it is an integral part of an organization's business model (Fig. 1) and aims to capture value for the product or service (Meyer, 2019). A business model (BM) is a framework in which elements and resources for a new product or service are identified to enter the market successfully (Peric et al., 2017). The RMF outlines the five questions, helping to define a company's pricing in a market. Besides pricing, it focuses on other factors such as how payment is made or what is used as a currency. The five elements are presented in Table 1.

The MaaS integration levels are (Sochor et al., 2018):

- Level 1: integration of information, offering a multi. modal travel planner, price or reservation information.
- Level 2: integration of booking and payment, focusing on single trips.
- Level 3: integration of the service offer, focusing on customer's mobility needs and service attractiveness.
- Level 4: integration of societal goals, reducing car ownership, increasing service accessibility, creating a livable city.

2.2 Analysis steps

Fig. 2 presents our methodology, which contains the steps performed during before-and-after analysis. We indicated the steps in which the RMF is used in grey boxes:

1. Analysis of SAV and MaaS before integration:
   - Step 1: Analyzing current revenue models – we analyzed the RMs of shared mobility services and information platforms to explore potential

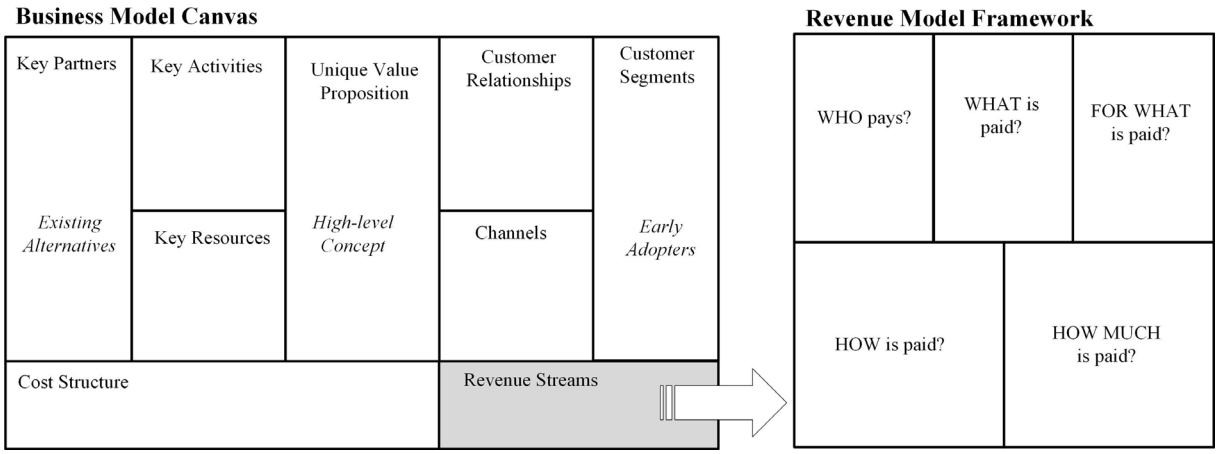

Fig. 1 Relationship between business model and revenue model

Table 1 RMF questions (Meyer, 2019)

Elements of the framework	Examples
Who pays?	Customer, partner, sponsor, advertiser
What is paid?	Money, data, referral
For what is paid?	Product, service, results
How is paid?	Lease, one-off, subscription, credit
How much is paid?	Price, discount, volume, or dynamic pricing

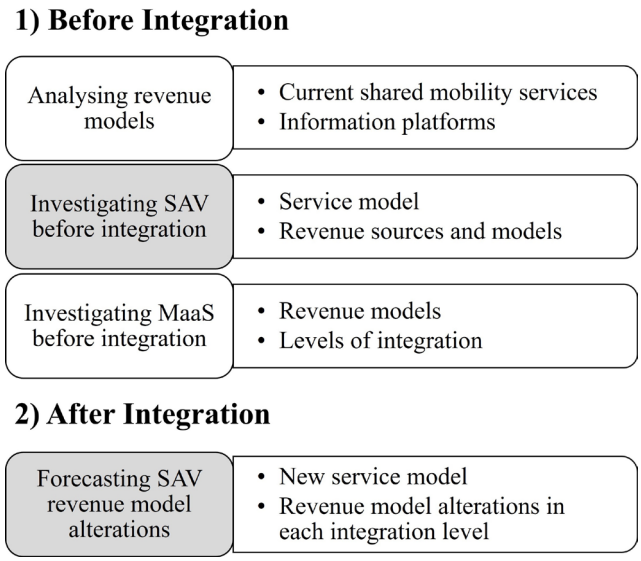

Fig. 2 Methodology

options to be used by SAV mobility services. We forecasted the RMs used by SAV services based on the findings.

- Step 2: Investigating SAV before integration – we investigated the service model of SAV before the integration into MaaS and the possible RMs for AV from the literature. We used the RMF to identify the sources of revenue, the payers and RMs for SAV services before the integration.
- Step 3: Investigating MaaS before integration – we investigated the RMs used by MaaS to select other potential RMs after the integration and foresee alterations.

2. Analysis of SAV and MaaS after integration:
   - Step 4: Forecasting SAV RM alterations – we forecasted the alterations in the RM considering the three integration levels and the new service model. We used the RMF in the before-and-after analysis.

3 Step 1: analyzing current revenue models

We summarize the definition of the RM types identified in the literature. They are referred throughout the text and indicated in the RMF:

1. Subscription [S]: purchase of a service/product is paid in advance and refers to a period of time (e.g., monthly).
2. Pay-per-use [P]: users are charged for each use of the service.
3. Commission-based [C]: a service fee is applied; a percentage of the tariff is paid.
4. Advertisement [A]: third-party companies pay to advertise their products/services on other companies' products, services, or smartphone applications.
5. Data reseller [D]: user data is collected and sold to third-party companies to improve products and advertisements [Bechmann et al., 2016; Seiberth, 2018).
6. Freemium [F]: users get free features, but extended functionalities are purchased (Kumar, 2014).
7. Referral [R]: users refer the product/service to potential new users, generating more revenue.

All existing shared mobility services can be replaced by the SAV-based service (Silva et al., 2021). Therefore, we forecasted whether these RM types will be combined and used by SAV services. Besides that, we checked whether RM types applied to information platforms could be used by SAV services; as the sector is rapidly changing, innovative revenue options are found. The output of this step is the starting point for investigating the RMs of SAV before integration into MaaS.

Taxi companies apply pay-per-use RM; charges are based on the time and distance travelled, and period of the day. The commission-based RM is also applied in the case of user-driver matching platforms; a commission is charged from the operators using the platform (National Academies of Sciences, Engineering, and Medicine, 2016).

The *ride-sourcing* company Uber keeps 25% of commissions on trips, applies dynamic pricing and cancellation fee as well as premium services and leasing vehicles to drivers (Cuofano, 2024a; Rahul, 2020). Alternatively, *ride-sharing* services only apply commissions on trips. BlaBlaCar is a well-known example (Begum, 2016).

The RM for *car-sharing* is usually pay-per-use. Users are charged based on the usage time, the distance travelled or a combination of both. In *peer-to-peer* (P2P) car-sharing, the usage time and fee are determined by the vehicle owner who offers the vehicle *via* a sharing platform; the usage time in P2P car-sharing can be less than a daily fee. In *business-to-consumers* (B2C) car-sharing, the fee is per minute or kilometer and is defined by the company. *Car rental* companies charge consumers daily ("Avis Budget business

model canvas" (Vizologi, online); "Drivy business model canvas" (Vizologi, online); Cohen and Kietzmann, 2014).

Subscriptions can be applied to car-sharing, but it is not common. Moreover, a car subscription can be available; it is different from leasing as the user will not become an owner and costs with maintenance and insurance are included in the fee. For instance, Hertz and Swapp are companies offering car subscriptions (Atiyeh, 2021).

We summarize the RM types in Table 2.

Regarding the RM types of information platforms, companies offering free services such as Google and Facebook apply the data reseller RM; this can be part of the data-driven BMs (e.g., BMW) (Bechmann et al., 2016; Seiberth, 2018).

Most websites and smartphone apps are free to use because they are based on the advertisement RM. Display advertising occurs to reach large numbers of customers in a particular segment and performance-based advertising seeks specific user behavior collecting data about number of clicks, response to email campaign, online purchase, etc. (Block and Herrmann, 2019; Cuofano, 2024b). Freemium is a RM applied by LinkedIn and Dropbox (Kumar, 2014). Revolut, ShareNow and Mol Limo apply the referral RM.

The main findings of Section 3 are:

- Pay-per-use and commission are the most common RMs used for mobility services, but subscription is an additional option when pay-per-use is offered;
- Advertisement and data resell can be innovative options;
- Freemium is not used.

4 Step 2: investigating SAVs before integration

We characterized the *SAV mobility service* as follows:

- Vehicle capacity is 4–9 persons;
- Vehicles and rides are shared in the urban door-to-door service;
- B2C service is provided;
- Fleet is composed of public and private vehicles;
- Mobility service provider coordinates the service, bridging travelers and operators.

We identified the key stakeholders: travelers, mobility service providers, vehicle owners and operators, infrastructure operators, and in-vehicle service providers; they can be either public, private companies, or individuals. Partnerships allocate functions among stakeholders, with legal and economic conditions defined through contracts.

For AV services, in-vehicle advertisements generate around 2.5 times the revenue of out-vehicle ones. Although this difference indicates an opportunity for the revenue of AV services, it is not enough to guarantee free rides (Block and Herrmann, 2019). Subscription RM is a good fit for regular needs; it can work for temporal needs if additional services are provided, creating a holistic service concept (Kuusisto, 2018).

In urban areas where public transport can be offered at low prices, AV services may not be competitive. Sharing and pooling can increase fleet costs (e.g., cleaning), decreasing profitability. Automated cleaning and fines to avoid dirt can be a solution (Bösch et al., 2018). Small fleets of SAVs may expand profits, but have limitations on attending the demand (Fagnant and Kockelman, 2018).

Table 2 Revenue models

	Revenue model types						
Shared mobility service	Subscription	Pay-per-use	Commission	Advertisement	Data resell	Freemium	Referral
Taxi		S, O	S				
Ride-sourcing		O	S				
Ride-sharing		O	S				
P2P car-sharing		O	S				
B2C car-sharing	S	S	S				S
Car rental		S	S				
Information platform							
Facebook				Service provider	Service provider		
Google							
LinkedIn						Service provider	
Dropbox							

S: mobility service provider; O: vehicle operator

AVs will be expensive, but considered an investment if the owner uses them for chauffer services (Bösch et al., 2018); owners can earn 19% of the investment annually (Fagnant and Kockelman, 2018).

We applied the RMF (Table 3) to analyze the RMs for SAV mobility services. Third-party companies refer to advertisers, music and movie platforms offering on-board infotainment, and transport planning companies paying for trip and personal information.

Fig. 3 illustrates the service model of single SAV service, indicating the payers and paid activities from Table 3. The paid activity, payers and who applies the RM are indicated by the source of revenue arrows, the arrows' origin and end, respectively. The source of revenue arrows indicate the direction of revenue flow as well. Both service providers /A/ and vehicle operators /B/ have 5 paid activities; 1–5 for service providers, and 7–10 and 13 for vehicle operators. But vehicle operators have 4 payers (service providers, private AV owners, advertisers, 3rd-party companies) while service providers have 3 payers (travelers, advertisers and transport planning companies); therefore, more contracts must be handled as more payers are involved in the service model. We illustrate the RM types applied by each stakeholder and their respective payers in Fig. 4. The advertisement RM guarantees revenue for vehicle operators through in-vehicle advertisement; travelers must pay to not see or listen to advertisements, otherwise, advertisements are enabled and paid by advertisement companies.

Table 3 Investigation of SAV service and revenue models

Revenue model types	Who applies?	Who pays?	For what is paid?	What is paid?	How is paid?	How much is paid?
Subscription	S	Traveler	Mobility service package	Money, data	Subscription	Volume discount
Pay-per-use	S	Traveler	Per use of the service, app	Money, data	Debit, credit	Customized, dynamic pricing
	O	S	Per use of the vehicle	Money, data	Debit, credit	Customized, dynamic pricing
Commission	S	Traveler	Fines	Money	Debit	Service fee (%)
	O	AV owner	Operation of the vehicle	Money	Debit	Service fee (%)
	O	3rd-party company	On-board infotainment	Money	Debit	Service fee (%)
Advertisement	S	3rd-party company	Advertisement in the smartphone app	Money, shares	Credit	Volume discount
	O	3rd-party company	In- and out-vehicle advertisement	Money, shares	Credit	Volume discount
Data resell	S	3rd-party company	Trip and personal information	Money, shares	Credit	Auction
	O	S, 3rd-party company	AV owner information	Money, shares	Credit	Auction

S: mobility service provider; O: vehicle operator

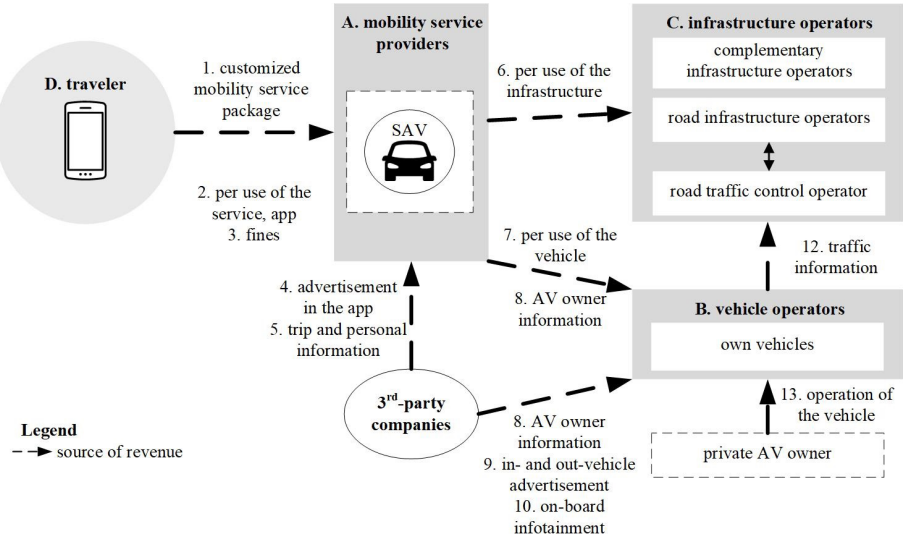

Fig. 3 SAV mobility service model

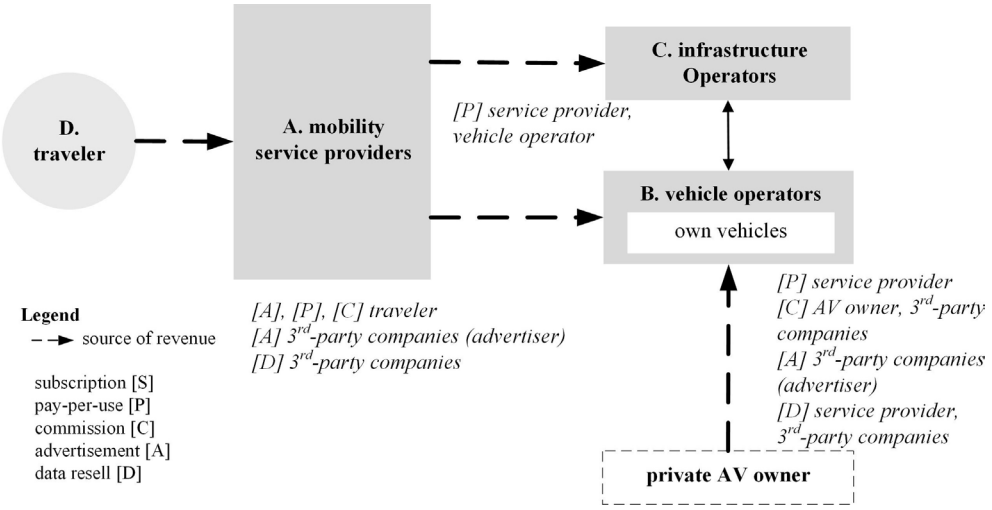

Fig. 4 Revenue models and payers

Vehicle operators can resell data about private AVs and metrics. For instance, data about car usage can be sold to car insurance companies. Additionally, metrics such as fleet per capita and empty-run distance can be negotiated with transport planning sectors and service providers; both data are useful for demand-supply analysis. Auctions can be used to obtain higher incomes. Depending on the agreements among key participants, payments can be done after a period (e.g., credit after one month).

The main findings of Section 4 are:

- Subscription RM may only be applied by service providers;
- A mix of RM types (e.g., pay-per-use, commission, etc.) is applied by mobility service providers and vehicle operators due to various sources of revenue;
- Higher incomes arise from advertisement and data resell RM types due to auctions; yet, the value is credited, not allowing rotation of income every day.

5 Step 3: investigating MaaS before integration

MaaS can be classified according to the different integration levels. The RMs used in each level (Sochor et al., 2018) are shown in Table 4. Levels 1–3 are considered in our analysis as they indicate variations in RMs used as well as a mix of RMs.

In Level 1, sites or apps are financed by ads or taxpayers' money. If they are used only as trip planners, there is no revenue; we call this stage as Level 1A. But a small commission is applied when forwarding the user to the service provider (Level 1B).

In Level 2, the revenue sources are commissions, fixed mobility service provider memberships as well as data on users' behavior sold to cities for mobility management. In Level 3, the service is bundled. There is a two-way responsibility from end user to supplier and vice versa; the service is financed by the difference between the repackaged services and the volume agreements with the transport service providers.

Table 4 MaaS integration levels

Level	Integration	Revenue model
0	No integration	–
1	Information	No revenue to small commission
2	Booking and payment of single trips	Commission, subscription, data resell
3	Service offer, contracts, and responsibilities	Subscriptions, pay-per-use, data resell
4	Societal goals	Same as level 3

In Level 2, besides commissions for individual trips, MaaS companies expand their revenue streams offering trips with partial or full subscriptions (ERTICO – ITS Europe, 2019). Some advantages and disadvantages of subscription RM for operators and travelers are (Hörcher and Graham, 2020; Kuusisto, 2018):

- Operator: financial stability of MaaS operators, but tariff is done under uncertainty as demand is difficult to predict.
- Traveler: freedom and effort savings when planning trips, but represents a burden on monthly expenses.

Combining ticket types can result in higher revenue. Therefore, price sensitivity of frequent and infrequent travelers can be exploited to boost revenue. For infrequent travelers, single tickets with high prices are offered as they

are less price sensitive. On the other hand, subscription packages are offered with the lowest tariff to frequent travelers (Hörcher and Graham, 2020).

A customized service package to attend individual needs is urged as preferences are tied to people's needs (Kuusisto, 2018). MaaS may enhance the end-to-end customer experience due to data analysis and a customized service (Nagy and Csiszár, 2022); thus, it represents less effort and enhanced quality for the user when planning trips.

The main findings of Section 5 are:

- Lower levels of MaaS integration have commission-based RMs;
- As the MaaS integration level increases, a mix of RMs arise based on subscriptions, pay-per-use and data;
- Pay-per-use and subscription RMs expand MaaS revenue tackling infrequent and frequent travelers.

6 Step 4: forecasting SAV revenue model alterations

We considered the changes in the service characteristics of SAV mobility services due to the integration to MaaS as follows:

- Feeder and door-to-door service are offered.
- Instead of mobility service providers, MaaS coordinates the service according to the integration levels.

MaaS platform operator acts as a bridge between SAV mobility service providers and travelers; we illustrate the service model after integration into MaaS in Fig. 5.

Every stakeholder with its own expertise is in the service model. Thus, efforts to acquire knowledge of other stakeholders to perform tasks are not necessary. Alternatively, having more stakeholders implies more contracts to handle and decisions makers which may make the decision process longer.

Considering the service model configuration and integration levels from the literature review, we summarized the revenue alterations in Table 5. In this step, we also used the RMF. Level 1A is not represented in Table 5 as there is no revenue for MaaS and revenue for the other stakeholders is the same presented for 1B. We have summarized the RM alterations according to each integration level in Fig. 6. We indicated the source of revenue, the payers and the RM types.

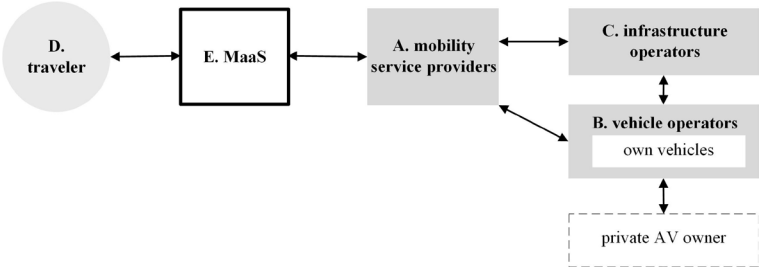

Fig. 5 Service model

Table 5 Revenue alterations according to the integration level

			Who gets the revenue?		
Integration level			1B	2	3
For what is paid?	Who pays?	Revenue model type			
Mobility service package	Traveler	Subscription, Pay-per-use	S	S	S
Per use of the service, app	Traveler	Advertisement	S	M	M
Per use of the vehicle	S	Pay-per-use	O	O	O
Fines	Traveler	Commission	S	S	M
Operation of the vehicle	AV owner	Commission	O	O	O
On-board infotainment	3rd-party company	Commission	O	O	O
Advertisement in the smartphone app	3rd-party company	Advertisement	S	M	M
Advertisement in- and out-vehicle	3rd-party company	Advertisement	O	O	O
Trip and personal information	3rd-party company	Data resell	S	M	M
AV owner information	S, 3rd-party company	Data resell	O	O	O
Forwarding the user to mobility service	S	Commission	M	–	–
Booking, ticketing	S	Commission	–	M	M

S: mobility service provider; O: vehicle operator; M: MaaS

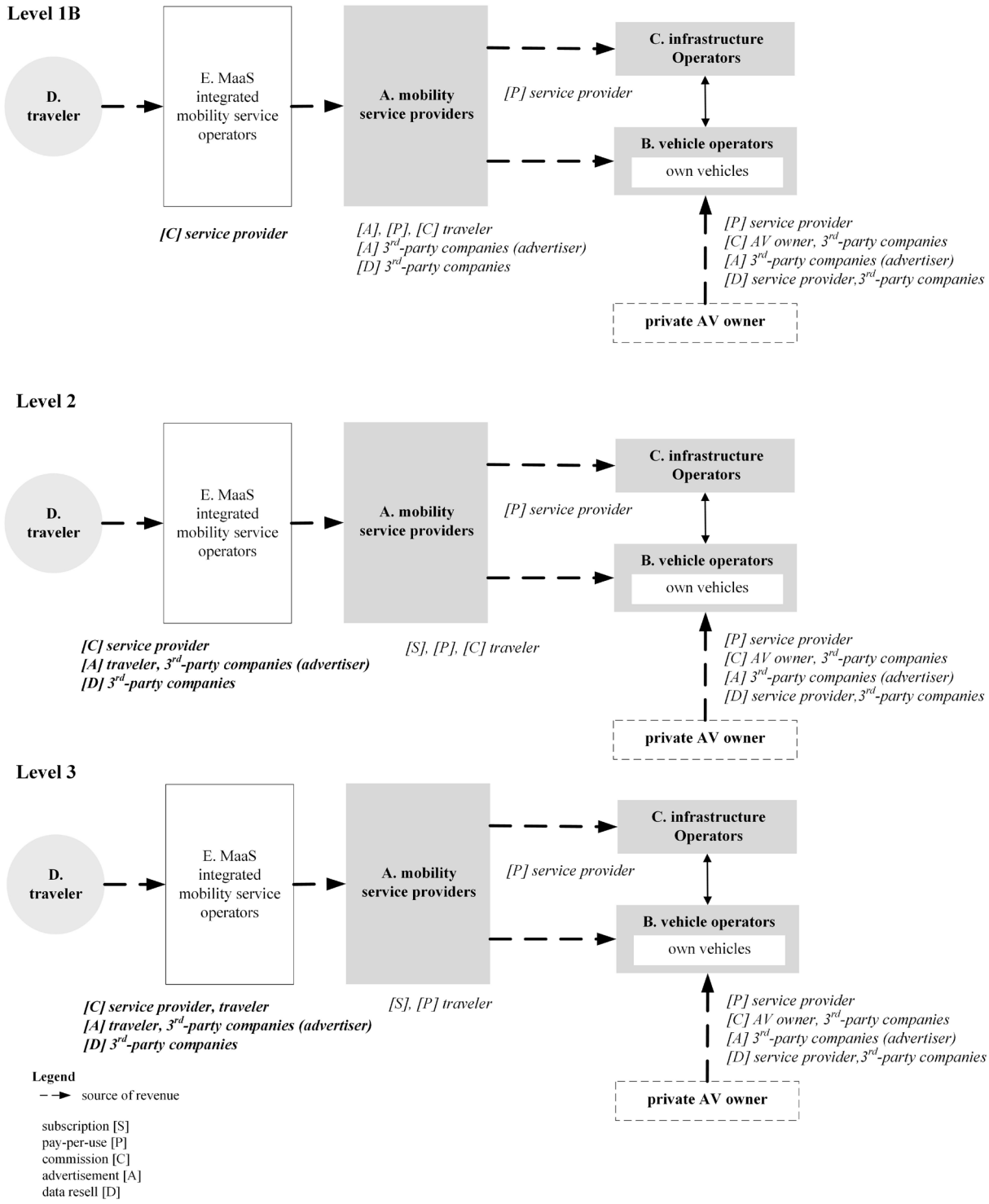

Fig. 6 Revenue model alterations

We identified that MaaS takes over revenue sources from mobility service providers as the integration levels increase; we indicated these alterations in bold.

The main findings from Table 5 are:

- Mobility service providers pay commission to MaaS for forwarding the users in level 1B;
- Mobility service providers pay commission to MaaS for booking and ticketing (levels 2 and 3), and processing the fines (level 3);
- Commissions for forwarding the user and booking and ticketing are new costs in the BM of mobility service providers;
- Sdvertisement and data resell RMs are transferred from mobility service providers to MaaS from

level 2 of integration because the app is offered by the MaaS, as well as trip and traveler information are collected by MaaS.
- Mobility service providers pay commission to MaaS processing the fines in level 3.

Other main findings of Section 6 are:
- Service model configuration fits all studied integration levels, representing gradual evolution of MaaS implementation.
- Door-to-door services exist in all integration levels, but feeder is only present at level 3.
- The integration of SAV mobility services to MaaS is beneficial for the mobility service provider if the revenue generated by the increase in the number of trips outweigh the loss of revenue (Eq. (1)). The revenue comes from subscriptions R_s and pay-per-use R_p mobility service packages, the losses in revenue are from advertisement R_a, data resell R_d and commission R_c, and the new cost with the commission paid to the MaaS provider C.

$$R_s + R_p > R_a + R_d + R_c + C \tag{1}$$

7 Conclusion

Current shared mobility services based on cars are expectedly substituted by SAV mobility services in the future. The SAV is increasingly integrated into the MaaS concept, allowing planning and payment of multimodal trips *via* a single platform. The main contribution of our study is an analysis about the changes in service and revenue models due to SAV integration to MaaS and identifying the key findings. The RMF of Meyer (2019) is used and levels of MaaS integration are considered.

The key findings are:
- MaaS takes over revenue sources from mobility service providers as the integration levels increase, and new costs in the BM of mobility service providers arise;
- Integrating SAV into MaaS is beneficial for SAV revenue if the revenue generated by the increase in the number of trips outweighs the loss of revenue generated by the responsibilities taken by MaaS.

A fundamental research niche has been filled with forecasting alterations in the revenue SAV services when integrated into MaaS, even though the technology is not yet fully developed. Our results support negotiations of contracts between SAV mobility service providers and MaaS operators, and the integration process can be accelerated.

For future research we will explore:
- The elements from the customized travel fee to create a tariff plan;
- The AV acceptability of public transport users when considering the bundled journeys;
- MaaS taking over responsibilities from vehicle operators and negotiating directly to AV owners.

References

Atiyeh, C. (2021) "Car Subscription Services: The Complete Guide To Getting The Car You Want", Forbes, Oct. 04. [online] Available at: https://www.forbes.com/wheels/advice/car-subscription-services/ [Accessed: 21 March 2022]

Bahamonde-Birke, F. J., Goletz, M., Ettema, D. (2021) "The provision of mobility as a service with autonomous vehicles. The necessity of regulatory schemes for a natural monopoly", Research in Transportation Economics, 90, 100993. https://doi.org/10.1016/j.retrec.2020.100993

Bechmann, A., Bilgrav-Nielsen, K., Korsgaard Jensen, A.-L., Jensen, A.-L. (2016) "Data as a revenue model: Sharewall as a payment method and editorial algorithm in the news industry", Nordicom Information, 38(1), pp. 76–82. [online] Available at: https://pure.au.dk/portal/en/publications/data-as-a-revenue-model-sharewall-as-a-payment-method-and-editori [Accessed: 21 September 2024]

Begum, H. (2016) "Bla Bla Car", Business Model Zoo, Sept. [online] Available at: https://www.businessmodelzoo.com/exemplars/bla-bla-car/ [Accessed: 30 August 2021]

Block, L., Herrmann, F. (2019) "Estimating Advertisement Revenue for Robocabs", Transportation Research Procedia, 41, pp. 511–524. https://doi.org/10.1016/j.trpro.2019.09.084

Bösch, P. M., Becker, F., Becker, H., Axhausen, K. W. (2018) "Cost-based analysis of autonomous mobility services", Transport Policy, 64, pp. 76–91. https://doi.org/10.1016/j.tranpol.2017.09.005

Cohen, B., Kietzmann, J. (2014) "Ride On! Mobility Business Models for the Sharing Economy", Organization & Environment, 27(3), pp. 279–296. https://doi.org/10.1177/1086026614546199

Cuofano, G. (2024a) "How Does Uber Make Money? Uber Business Model Analysis", FourWeekMBA, Jun. 09. [online] Available at: https://fourweekmba.com/uber-business-model/ [Accessed: 21 June 2024]

Cuofano, G. (2024b) "The Advertising Economy: Inside Facebook Money-Making Machine", FourWeekMBA, Febr. 06. [online] Available at: http://fourweekmba.com/facebook-advertising-business/ [Accessed: 21 March 2024]

ERTICO – ITS Europe (2019) "Mobility as a Service (MaaS) and Sustainable Urban Mobility Planning", [pdf] ERTICO – ITS Europe, Brussels, Belgium. Available at: https://urban-mobility-observatory.transport.ec.europa.eu/system/files/2023-11/maas_and_sustainable_urban_mobility_planning.pdf [Accessed: 21 September 2024]

Fagnant, D. J., Kockelman, K. M. (2018) "Dynamic ride-sharing and fleet sizing for a system of shared autonomous vehicles in Austin, Texas", Transportation, 45(1), pp. 143–158. https://doi.org/10.1007/s11116-016-9729-z

Hörcher, D., Graham, D. (2020) "Pricing and Efficient Public Transport Supply in a Mobility as a Service Context", International Transport Forum Discussion Papers, OECD Publishing, Paris, France, No. 2020/15. https://doi.org/10.1787/79126b85-en

Kamargianni, M., Matyas, M. (2017) "The Business Ecosystem of Mobility-as-a-Service", presented at 96th Transportation Research Board (TRB) Annual Meeting, Washington, DC, USA, Jan. 8–12.

Kumar, V. (2014) "Making "Freemium" Work", Harvard Business Review, May. [online] Available at: https://hbr.org/2014/05/making-freemium-work [Accessed: 21 September 2024]

Kuusisto, M. (2018) "Consumer preferences in adopting product-service systems with a subscription revenue model", Master's thesis, Aalto University.

Meyer, R. (2019) "Model 4: Revenue Model Framework", [pdf] Center for Strategy & Leadership, Barendrecht, The Netherlands. Available at: https://www.c4sl.eu/portfolio/revenue-model-framework/ [Accessed: 21 March 2022]

Nagy, S., Csiszár, C. (2022) "Assessment Methods for Comparing Shared Mobility and Conventional Transportation Modes in Urban Areas", Periodica Polytechnica Social and Management Sciences, 30(2), pp. 158–166. https://doi.org/10.3311/PPso.16605

National Academies of Sciences, Engineering, and Medicine (2016) "Taxis, Regulation, and the Rise of Transportation Network Companies", In: Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services, The National Academy Press, Washington, DC, USA, Rep. 319, Appendix B, pp. 1–31. https://doi.org/10.17226/21875

Peric, M., Durkin, J., Vitezic, V. (2017) "The Constructs of a Business Model Redefined: A Half-Century Journey", SAGE Open, 7(3), 2158244017733516. https://doi.org/10.1177/2158244017733516

Polydoropoulou, A., Pagoni, I., Tsirimpa, A., Roumboutsos, A., Kamargianni, M., Tsouros, I. (2020) "Prototype business models for Mobility-as-a-Service", Transportation Research Part A: Policy and Practice, 131, pp. 149–162. https://doi.org/10.1016/j.tra.2019.09.035

Rahul, S. (2020) "How Uber works and makes Money: Business and revenue model of Uber", AppsRhino, May 05. [online] Available at: https://www.appsrhino.com/how-uber-works-and-makes-money-business-and-revenue-model-of-uber/ [Accessed: 21 March 2022]

Seiberth, G. (2018) "Data-driven Business Models in Connected Cars, Mobility Services & Beyond", BVDW Research, Berlin, Germany, No. 01/18.

Silva, D., Földes, D., Csiszár, C. (2021) "Business Model for Mobility Services Based on Shared Autonomous Vehicles", In: 19th European Transport Congress - European Green Deal Challenges and Solutions for Mobility and Logistics in Cities, Maribor, Slovenia, pp. 159–172. ISBN 978-961-95633-0-4

Simmert, B., Ebel, P. A., Peters, C., Bittner, E. A. C., Leimeister, J. M. (2019) "Conquering the Challenge of Continuous Business Model Improvement", Business & Information Systems Engineering, 61(4), pp. 451–468. https://doi.org/10.1007/s12599-018-0556-y

Sochor, J., Arby, H., Karlsson, I. C. M., Sarasini, S. (2018) "A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals", Research in Transportation Business & Management, 27, pp. 3–14. https://doi.org/10.1016/j.rtbm.2018.12.003

Vizologi "Avis Budget business model canvas", [online] Available at: http://vizologi.com/business-strategy-canvas/avis-budget-business-model-canvas/ [Accessed: 13 August 2021]

Vizologi "Drivy business model canvas", [online] Available at: http://vizologi.com/business-strategy-canvas/drivy-business-model-canvas/ [Accessed: 02 September 2021]