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The Degradation of Access-Based Business Models: Customer Misbehavior and Shared Mobility

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ABSTRACT

Access-based services are considered one of the strategies to embed sustainability in business models. Yet, because the evolution of these business models has been overlooked, we do not know whether their promise to create triple value is sustained. Against this backdrop, we studied how the business model of 10 shared mobility operators changed and its consequences on the formation of social, environmental, and economic value. Findings show that the evolution is the result of intertwined changes in consumer misbehavior and vandalism, industry lifecycle, shareholders' priorities, technological advancements, and regulatory shifts. We identify two overarching processes that explain why the operators ceased to maintain a balance in the creation of triple value: progressive focus on financial viability and a growing prioritization of a smaller and wealthier segment of customers. These processes degraded the original goal of providing green, affordable, and accessible mobility for all.

1 | Introduction

Access-based services or product-service systems (ABS hereafter) are one archetype of sustainable business models (Evans et al. 2017; Reuter 2022). ABS provide temporary access to products and deliver functionality rather than ownership (Peterson and Simkins 2019) to make services accessible to growing populations, use resources more efficiently, and reduce environmental impacts (França et al. 2017). ABS can optimize the use of underutilized assets, minimize overconsumption, and facilitate collaborative consumption, which can ultimately reduce the overall environmental footprint (Laukkanen and Tura 2020; Mignon and Bankel 2023).

Whereas many studies have proposed ABS as a strategy for innovating business models toward sustainability (Evans et al. 2017; Mignon and Bankel 2023), the transformations of these models remain largely overlooked (Cosenz et al. 2019; Moggi and Dameri 2021). Studying the "fine-tuning process" of business-model design (Demil and Lecocq 2010) is necessary to understand whether and how their promise to create triple value is sustained (Schneider and Clauß 2020). Indeed, the difficulties in balancing economic, social, and environmental benefits are one of the major challenges for embedding sustainability in business models (Crane et al. 2014; Evans et al. 2017; Reuter 2022). Evidence of the tensions in triple value creation challenges the underlying optimism in the literature on business model evolution and its implicit assumption that changes to the business model enable fit with the environment, so that the business-model architecture improves over time (Climent and Haftor 2021; König et al. 2022). This assumption has been problematized for the lack of evidence (Foss and Saebi 2018). Over time, ABS may strengthen the triple value creation of the business model or do the opposite: they may limit the creation, delivery, and capture of triple value (Snihur and Bocken 2022).

Short informative

This article examines how shared mobility business models evolve in response to customer misbehavior and reveals how this evolution can undermine the creation of economic, social, and environmental value.

Business models evolve due to changes in external factors, such as regulation, competitive environment, or technology (Foss and Saebi 2017). While these forces are likely to shape the evolution of ABS business models, firms are also affected by customer behavior. In particular, customer misbehavior poses a significant threat to the viability of ABS (Ma et al. 2020). Customer misbehavior increases operational costs, reduces service quality and availability, and damages trust and reputation (Schaefers et al. 2016). For these reasons, it can be one of the major drivers of ABS business model change. Past work has described the antecedents and consequences of customer misbehavior (e.g., Schaefers et al. 2016) or tested strategies to suppress it (e.g., Gong and Zhang 2023). Yet, the influence of misbehavior on organizational service providers (operators hereafter) has been limitedly studied, with extant work focusing on peer-to-peer providers (Rossmannek et al. 2024; Wen et al. 2025). The dearth of studies on how operators adapt their business model to address customer misbehavior is surprising, given that past work acknowledges that customer misbehavior will necessarily shape the design of business models (Ackermann and Tunn 2024).

We focus on shared mobility as a domain of ABS particularly affected by misbehavior (Jin et al. 2022). Shared mobility operators have experienced substantial losses due to vandalism and customer misbehavior. These incidents have resulted in service discontinuations (BBC 2023; YLE 2023; The Guardian 2018) or even the closure of operators in different countries (Business Insider 2018). For instance, the Paris-based carsharing service Autolib closed after persistent issues with customer misconduct (Carriat et al. 2018). In bikesharing, the Chinese company Wukong closed soon after launch, as 90% of its bicycles were either stolen or vandalized (BBC 2017). Yet, some companies remained in operation in the same locations, which suggests that they adapted their business model to tackle misbehavior. This study therefore asks which processes account for the divergent trajectories of shared mobility operators in the face of customer misbehavior and how the survival-oriented business model adaptations have influenced the creation of social and environmental value.

Using a multiple case-study of 10 operators that included the analysis of 450 news articles and 22 in-depth interviews and following a process theorizing (Langley 1999), we identify three stages in the evolution of the shared mobility business models. These are labeled according to the main goal of operators (*Market reach, Profitability*, and *Downsize-Diversification-Decline*); in each stage, companies deployed different strategies to curb customer misbehavior. Our study shows that the strategies employed led to evolve this business model from "a green shared mobility solution to all" to "a premium niche mobility solution" as operators increasingly focused on financial viability while limiting the accessibility, inclusivity, and affordability of the service. These changes degraded the original business model, as they limited the intended social and environmental value creation.

Our study contributes to research on business model evolution, access-based services, and customer misbehavior by advancing a configurational and critical understanding of business model change. We conceptualize customer misbehavior as a structural driver of evolution, showing how it triggers transformations that may degrade rather than enhance social value. We also highlight ownership structure as a neglected yet decisive factor shaping business model trajectories, constraining managerial autonomy and influencing inclusivity outcomes. By integrating internal and external drivers, we propose a configurational explanation of how business model evolution unfolds within ecosystems. Furthermore, we introduce the notion of *triple value degradation* to describe shifts that privilege financial over social and environmental value. Finally, we extend ABS research by conceptualizing misbehavior as a dynamic, stage-dependent phenomenon that co-evolves with firms' interventions and governance structures. The study also provides insights to mobility operators and policy makers to anticipate and manage customer misbehavior in ABS that can help mitigate its negative impacts.

2 | Conceptual Framework

2.1 | Evolution of Business Models

A business model outlines the logic or architecture of how a company creates, delivers, and captures value by meeting customer needs, generating revenue, and ensuring profitability (Snihur and Bocken 2022; Teece 2018). A business model is not just about how a firm makes money but how it creates value for customers and partners, linking the various activities of the firm into a coherent system (Zott and Amit 2010). Sustainable business models are a specific type of business models with three distinguishing features: (1) the integration of economic, environmental, and social dimensions in value proposition, delivery, or capture; (2) the involvement of multiple stakeholders; and (3) the adherence to a long-term perspective (Bocken et al. 2013; Mignon and Bankel 2023; Schaltegger et al. 2016).

Economic value consists of the generation of monetary profit (Gopalakrishnan et al. 2012). Social value may encompass community welfare, job creation, or other charitable activities (Gopalakrishnan et al. 2012). Environmental value is created when natural resources are used more efficiently, the environmental footprint is reduced, or the organization does not create harmful environmental impacts (Laukkanen and Tura 2020). Allegedly, sustainable business models strive to balance these three forms of value; however, in practice, companies make trade-offs between them (Stål et al. 2023).

Acknowledging that business models are dynamic, recent attention has been paid to the processes whereby business models change (Climent and Haftor 2021; Foss and Saebi 2017). Most research has focused on disruptive business model innovation or "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements" (Foss and Saebi 2017). Yet, the more mundane or incremental changes in the components of business models, usually known as business model adaptation or evolution, have been less studied (Saebi et al. 2017).

Business models are said to evolve to adapt to external discontinuities or changes in regulation, technology, the competitive environment, or consumer preferences (Climent and Haftor 2021;

Foss and Saebi 2017; Saebi et al. 2017). Not only do firms interpret these changes, but they respond with distinct strategies depending on their firm's strategic orientation, experimental orientation, dynamic capabilities, or the characteristics of the network of an organization (Filser et al. 2021; Teece 2018). Thus, there may not be univocal and monotone relationships between external threats and business model changes among firms in an industry, and conversely, the changes made to business model may have disparate influences across firms (Foss and Saebi 2017).

These theoretical advances in business model evolution have yet to be applied to sustainable business models and ABS more specifically. Although ABS is one strategy to embed sustainability in business models (e.g., Evans et al. 2017; Mignon and Bankel 2023), its evolution has been underexamined, maybe due to an assumption that once established, the business model remains intact. In addition to the external factors that may influence business model adaptation, we focus on the specific role of customer misbehavior, as it is widely considered a major external threat to the viability of ABS (Bardhi and Eckhardt 2012; Schaefers et al. 2016). It is plausible that the business model components change to prevent or minimize misbehavior and that these changes may influence the long-term creation of economic, social, and environmental value. We provide next an overview of customer misbehavior and explain how it unfolds in ABS specifically.

2.2 | An Overview of Customer Misbehavior in ABS

Customer misbehavior is defined as "any act by a customer in an online or offline environment that deprives the firm, its employees, or other customers of resources, safety, image, or an otherwise successful experience" (Fombelle et al. 2020, 387). We adopt a broad view of misbehavior that also includes vandalism or "willful damage to or destruction of property owned by others" (van Vliet 1992: 32). Although customer misbehavior can target a firm's assets, its employees, or other customers (Fombelle et al. 2020), in the case of ABS, the former is the most relevant for its financial and operational costs (Schaefers et al. 2016). The specific forms of customer misbehavior are distinct across ABS spanning from illegal to uncivil actions (Golf-Papez and Culiberg 2023; Jia et al. 2018). In the case of shared mobility, illegal actions include thefts of vehicles or illegal parking or overspeeding, while uncivil actions may consist of littering the car or improper use of the vehicle.

Customer misbehavior can stem from factors associated with either the customer or the company (Fombelle et al. 2020), although they often interact (Fullerton and Punj 2004). Customer-driven motives commonly include financial gain (Daunt and Harris 2012; Fullerton and Punj 2004), thrill-seeking (Fullerton and Punj 2004), ego-related motives (Daunt and Harris 2012), and anger or revenge against an organization or employee (Grégoire et al. 2018). Company-driven factors, such as the nature of the product or service, the characteristics of the service exchange, and the physical environment, can either amplify or mitigate these individual triggers for misbehavior (Bitner 1992; Daunt and Harris 2012).

ABS have key characteristics that make them more prone to misbehavior, such as lack of ownership and minimal responsibility to care for the goods shared (Ackermann and Tunn 2024; Bardhi and Eckhardt 2012; Gong and Zhang 2023), absence of supervision and high anonymity (Ozuna and Steinhoff 2024; Pieper and Woisetschläger 2024; Srivastava et al. 2022), and weak enforcement and accountability mechanisms (Ma et al. 2020). Consumer-related characteristics compound the inclination to misbehave, such as the cost–benefit calculations for incurring in misbehavior (Huang et al. 2023; Jin et al. 2022), inclination to opportunistic behavior (Jin et al. 2022; Ma et al. 2020), or irritation toward the service provider (Lee and Kim 2022). Moreover, misbehavior is contagious (Danatzis et al. 2024; Jayasimha et al. 2024; Schaefers et al. 2016): Because the asset passes directly from one customer to the next without an interim inspection by the provider, it is not possible to eliminate signs of previous misbehavior. Customers infer from others' behavior the social norms governing the use of shared assets, and this leads to misbehavior contagion (Srivastava et al. 2022).

The consequences of customer misbehavior for companies are multifaceted, extending beyond economic losses to include adverse effects on service delivery, organizational performance, and employee well-being (Fisk et al. 2010; Grandey et al. 2004; Lages et al. 2023). Customer misbehavior can also damage a company's reputation and brand equity: Frequent service disruptions and negative customer interactions reflect poorly on the business, leading to negative word-of-mouth and social media complaints, which can harm the company's reputation and erode customer trust (Fullerton and Punj 2004; Schaefers et al. 2016). Persistent misbehavior issues may eventually lead to stigmatization, causing certain customer segments to avoid the service due to its association with antisocial behaviors limiting market growth and hindering scalability (Daunt and Harris 2012).

For the important repercussions of customer misbehavior, companies intentionally implement strategies to prevent, respond to, and minimize its impact (Fombelle et al. 2020). To curb misbehavior in ABS, Ackermann and Tunn (2024) identified 10 broad strategies that can enable care for shared goods. These strategies act upon the main ABS characteristics that enable misbehavior in the first place: They aim at reducing anonymity, increasing the costs of misbehavior or nurturing personal responsibilization. Only a few of these proposed strategies have been empirically validated as effective to curb misbehavior, namely, surveillance and monitoring (Jia et al. 2018; Pieper and Woisetschläger 2024; Srivastava et al. 2022); personal interactions with providers (Ozuna and Steinhoff 2024); reminders (Namazu et al. 2018) or the creation of a governance system with appropriate social norms, communal identification, and ethical climate (Culiberg et al. 2023; Jayasimha et al. 2024; Schaefers et al. 2016; Srivastava et al. 2022).

Yet, studies have also shown conflicting results: Rewards prove to be more effective than sanctions in the study by Huang et al. (2023) and the opposite in other studies (Danatzis et al. 2024; Yao et al. 2019). Also, some studies show that these strategies only work under certain conditions, that is, for some segments of consumers (Gong and Zhang 2023) or for certain degrees of severity (Danatzis et al. 2024; Jayasimha

et al. 2024) (see Table S1 for a summary of studies). Moreover, this work has also demonstrated that these strategies have negative repercussions. For instance, more than three social interactions with providers have been found to increase misbehavior concealment (Ozuna and Steinhoff 2024). Surveillance, sanctions, and monitoring increase negative word of mouth and demotivate customers from using the service (Pieper and Woisetschläger 2024).

Although prior studies shed light on the effectiveness of individual strategies to curb misbehavior, they do not explain how misbehavior shapes business model design over time. Moreover, past evidence indicates that firms face trade-offs when addressing misbehavior; since the strategies implemented to curb it, may unintentionally drive consumers away (Ozuna and Steinhoff 2024; Pieper and Woisetschläger 2024). In addition to the trade-off between customer base expansion and reduction of misbehavior, there could be other untheorized trade-offs among the economic, social, and environmental objectives of ABS. How they are managed, and how they influence the adaptation of business model components over time, remains underexplored. This is the gap that the present study addresses.

3 | Method

3.1 | Context

This study focuses on shared mobility, a subset of ABS. Shared mobility provides "shared use of a vehicle, bicycle, or other low-speed mode that enables users to have short-term access to transportation modes on an "as-needed basis" (Shaheen et al. 2015, 4). It includes many different services such as carsharing, personal vehicle sharing, scooter and moped scooter sharing, bikesharing, ridesharing, and on-demand ride services (Aguilera-García et al. 2020; Cohen and Kietzmann 2014; Castellanos et al. 2022). These ABS can advance social sustainability by improving accessibility and mobility for a wider range of people, including lower income groups unable to afford private vehicles (Shaheen et al. 2015), while fostering community and shared responsibility (Midgley 2009). They also contribute to environmental sustainability by optimizing road usage, lowering the total number of vehicles, and easing urban congestion (Martinez et al. 2024; Shaheen and Cohen 2013). Using electric vehicles further amplifies these benefits (Hu and Creutzig 2022). Economically, shared mobility offers cost-effective transport options, reducing the burden of ownership and creating new revenue and employment opportunities in the green economy (Cervero and Tsai 2004). Yet, the sustainability potential of this model depends on its design and implementation (Laukkanen and Tura 2020). For instance, while carsharing can reduce ownership, it may also displace more sustainable modes such as walking or cycling.

3.2 | Case Study

A multicase study design was used, suitable for theory building through cross-case comparison (Eisenhardt 2021). Adopting a process-oriented approach (Langley 1999), we traced the evolution of operators' responses to misbehavior using a temporal bracketing strategy (Langley et al. 2013). Each phase captured dominant forms of misbehavior, their impact, business model changes (value proposition, delivery, and capture), and relevant internal or external factors.

3.3 | Sampling Units

We employed purposive sampling to select 10 for-profit, B2C operators offering shared cars, motorcycles, scooters, and bicycles in Spain (Castellanos et al. 2022). The sample included at least two operators per transport mode, ensuring theoretical representation (Eisenhardt 2021). The firms varied in vehicle type, size, city coverage, and ownership (corporate, private equity-backed start-ups, and public operators) but shared comparable business model features (Calderón and Miller 2020): (1) short-term, pay-per-use rentals; (2) similar customer segments such as urban residents, tourists, and non-car owners seeking affordable, flexible mobility (Shaheen et al. 2015); and (3) parallel operational challenges including misbehavior, asset management, and sustainability trade-offs. Seven launched between 2018 and 2019, and the remaining three in late 2016 and early 2023, allowing for comparison under similar market conditions. Table 1 describes each operator in further detail.

3.4 | Data Collection

A combination of in-depth interviews and news articles was used. Following theoretical sampling principles (Strauss and Corbin 1998), CEOs, general managers, and area specialists (technology, customer experience, fleet management) were interviewed, later extending to experts in insurance, mobility, and business model innovation, as well as customers. The final sample included 22 informants (Table 2).

Interviews followed a semistructured guide (see interview protocol in Supplementary information), exploring professional experience, types, and impacts of customer misbehavior, management responses, and broader industry changes. Questions evolved iteratively (Charmaz 2015) as new themes emerged. While not all questions were asked to all participants, recurring issues such as service area adaptation and selective customer acquisition were probed repeatedly for saturation. The interviews, conducted by the first author between March and June 2024 (45–75 min), took place online or in person. Conducting them personally helped secure access to confidential data from competitors. All interviews were recorded, transcribed, anonymized (e.g., Carsharing_1.1), and translated into English. Ethical approval was obtained from the UNIVERSITY committee.

Complementing the interviews, we analyzed 450 news articles drawn from more than 8000 Factiva results covering the period from January 1, 2018 to March 31, 2025. Relevant items reported (1) specific misbehavior incidents like battery theft, illegal parking, speeding, accidents, and vandalism; (2) business-model changes such as new vehicle types or technological upgrades; or (3) contextual factors (e.g., regulation, technology, and competition). These materials enriched contextual understanding and enabled triangulation (Yin 2018). Cross-checking interviews and media evidence clarified the type, scale, and timing of misbehavior and business model

TABLE 1 | Description of operators.

Operator	Launch year	Brief description	Ownership	Geographical scope
CARSHARING_1	2018	Operator of an electric free-floating fleet of cars +1.000 vehicles. It can be used on a per minute basis or more recently as a monthly subscription. Only two car models	Multinational in the mobility sector	Madrid and Milan Previously present as well in France
CARSHARING_2	2018	Operator of a hybrid free-floating fleet of cars approximately 650 vehicles. It can be used on a per minute basis or by days. Only two car models	Multinational in the energy sector	Madrid only
CARSHARING_3	2023	Full electric, flee floating model with a fleet of approximately 650 vehicles of a single type. Tariffs per minute and up to one full day	National insurance company	Madrid only
MOTOSHARING_1	2018	More than 5.000 electric motorcycles for sharing. It can be used on a per minute basis with different tariffs depending on the driving mode (standard, sport, etc.)	Multinational in the energy sector	Several cities in Spain and Italy
MOTOSHARING_2	2016	Operator of electric motosharing and bikesharing with approximately 10.000 vehicles. It offers per-minute, daily and monthly rentals. It also offers fleet renting services to corporates	International financial sponsors	Several cities in Spain, Italy, and France
SCOOTER_1	2018	Large corporation that offers electric scooters and bikes, with a total fleet estimated at +35.000 vehicles	Listed company	More than 280 cities across more than 30 countries, including Spain, where it is present in several cities
SCOOTER_2	2018	Operator of electric scooters and electric and conventional bikes	European financial sponsors	Several Western European countries including Spain, with presence in +100 towns and cities
SCOOTER_3	2019	Operator of electric scooters, motorcycles and bicycles.	Spanish financial sponsors	Several cities in Spain and Italy
BIKESHARING_1	2018 (new consession)	Operator of electric and conventional bicycles under concessional agreements with cities. +10.000 vehicles	Spanish services company	Several cities in Spain
BIKESHARING_2	2016 (internalized by city)	Operator of electric and conventional bicycles under a direct mandate from the municipality after taking over the service from a private operator. +7.000 vehicles	Local authority-owned company	One city in Spain

adjustments. For instance, articles revealed that local authorities penalized illegal parking, a fact seldom mentioned by operators. Iterating between sources enhanced validity and completeness. A breakdown of search results by query is provided in Table S2, and a full description of the articles coded is found in Table S4.

3.5 | Data Analysis

Step 1. Coding and category integration. Guided by Gioia's methodology (Gioia et al. 2013), we progressed from the first-order informant codes to second-order themes and aggregate dimensions (see Table A1 in Appendix). Initial readings

TABLE 2 | Description of informants.

Operator	Title	Age	Gender	Description
Carsharing_1.1	CEO	45	Male	Responsible for launching the business and managing operations
Carsharing_1.2	Head of customer experience	44	Male	In charge of managing all interactions with customers, both inbound and outbound. In the role since the company was created in 2017
Carsharing_1.3	Fleet manager	30	Female	Managing the maintenance and repair of the fleet as well as the relationship with the insurance provider. In the role since 2020.
Carsharing_2	CEO	38	Male	Responsible for launching the business and managing operations
Carsharing_3	CEO mobility	55	Male	Responsible for all mobility businesses of the parent company. In charge of the specific task of launching a carsharing service.
Motosharing_1.1	CEO	46	Male	Responsible for launching the business, putting together a team from the scratch. He also designed and implemented the expansion strategy
Motosharing_1.2	COO	40	Male	Managing the day-to-day operations of the business, as well as the interactions with the supplier of motorcycles.
Motosharing_1.3	Head of technology	55	Male	Definition of the in-vehicle software and hardware required to operate a sharing business, and the evolution of the app
Motosharing_2	Head of product free floating	39	Male	Director of the free-floating business of the company, in charge of defining all the characteristics of the product (prices, service areas, vehicle, etc.)
Scooter_1	Country manager/ director of expansion	35	Male	Former director of expansion in Southern Europe. His last role in the company was country manager in Italy
Scooter_2	Senior public policy mnr. (Spain)	58	Male	Managing public tenders in Spain and the relationship with municipalities, including regulatory affairs
Scooter_3	Country manager	29	Female	Responsible for the implementation of the business in Italy and certain cities in Spain
Bikesharing_1	CEO	53	Male	Management of all the aspects of the service and the relationship with the client (municipality)
Bikesharing_2	CEO	41	Male	Take over of former private operator and creation of a new public. Responsible for the expansion of the service into the whole city.
Consultant_1	Partner mobility at big four	54	Male	Managing Director of the Transportation vertical, with experience supporting several shared operators in their strategy formulation and implementation worldwide
Journalist_2	Mobility expert digital media	46	Male	Industry expert with deep knowledge of the shared mobility sector in Spain
Insurance_1	Head of insurance Iberia	51	Male	Responsible for launching the business line of insurance brokerage for shared mobility operators in Iberia
Entrepreneur_1	CEO mobility advisory firm	49	Male	Past experience in a large automaker. Set up his own advisory firm to help clients launch their new ventures in shared mobility. He has advised operators in various topics
Customer_1	Lawyer	38	Male	Frequent user of carsharing and occasional user of bikes
Customer_2	Energy expert	35	Female	Frequent user of carsharing and occasional of scooters
Customer_3	Software developer	39	Male	Frequent user of motosharing and occasionally of carsharing
Customer_4	Student	23	Male	Frequent user of all modes of sharing

identified codes describing misbehavior types, impacts, and managerial responses. Deductive codes from prior research (Daunt and Harris 2012; Fullerton and Punj 2004) captured motives such as thrill-seeking, financial gain, and revenge, while inductive codes emerged from interviews (e.g., neighborhood resistance and illegal parking). Misbehavior was grouped into vandalism, misuse, and neglect. Impacts were labeled direct (e.g., vehicle damage) or indirect (e.g., insurance costs). Operator responses were classified under value proposition, delivery, and capture components, with archival data providing additional context. Some themes (e.g., penalties) appeared only in news sources.

Step 2. Temporal bracketing. We reconstructed event sequences for each operator by triangulating interview and media accounts to identify key phases, their causes, and consequences (Langley et al. 2013). When informants stated, "we did this before launching" or "the first thing was to exclude certain areas," we verified timing through contemporaneous articles. Since most firms launched in 2018, comparison across cases was feasible. Findings were consolidated into three periods: 2018–2020; 2021–2023; and 2023–Q1 2025 to clarify links among misbehavior, managerial responses, and contextual factors.

Step 3. Cross-case pattern matching. Finally, we identified common patterns across cases (Langley 1999), revealing three evolutionary stages: market reach, profitability, and downsize–diversification–decline. Two overarching processes emerged: a growing focus on financial viability and narrowing toward wealthier customers. Among potential contingencies, ownership structure (public vs. private) best explained variations in strategic responses. Other attributes, international scope or number of operators, had minimal influence.

4 | Findings

We first explain how the business model of shared mobility evolved throughout the stages identified. For each stage, we describe the prevalent forms of misbehavior, the impacts of misbehavior on the operator, and the changes implemented in the business model to address them. Finally, we theorize the processes explaining the evolution of this business model. To enhance readability, we have used the operator's name (e.g., SCOOTER_3) and the informant's name (Scooter_3) interchangeably, unless otherwise specified.

4.1 | First Phase: A Focus on Market Reach

Types of misbehavior. Three forms of misbehavior were relevant in this phase: vandalism, misuse and neglect. The three intertwined: Unintentional neglects like leaving the windows open facilitated vandalism, as noted by Carsharing_1.3. Each form is described in turn. Vandalism was dominant, driven by motives ranging from destruction for its own sake to economic gain or revenge. It spiked when shared mobility was new to a city (Scooter_1, Scooter_3, Bikesharing_1; Entrepreneur_1). Vehicle damage—burns, dents, graffiti—was common (Scooter_1; Carsharing_1, 3; Motosharing_1.1, 2; Bikesharing_1, 2; El Confidencial 17th/12/2019; Metropoli Abierta 30th/01/2022).

Vandalism often reflected revenge from dissatisfied users reacting to overcharges or system errors, and from citizens angered by the occupation of public space (ABC 18th/07/2019). Operators admitted that vehicles displaced private parking or obstructed pedestrians (Las Provincias 21st/10/2021; El Confidencial 11th/12/2021). Competitors, notably taxi drivers, also vandalized fleets, viewing them as unfairly unregulated rivals. Insurance_1 observed: "Carsharing was a target of taxi drivers because they were seen as a threat to their business." Carsharing_2 added: "In the early days the cars, ours and our competitors', were vandalized by taxi drivers who were against the service." Some vandalism had economic motives: helmet, battery, and even full-vehicle thefts were frequent (Scooter_1–3; Bikesharing_2; ABC 10th/12/2022). Motosharing_1.2 explained: "The battery crisis was huge ... We have seen our batteries in flea markets of [city]."

Misuse was also common. At launch, users "played around with the vehicles to see how they work" (Scooter_1). Many exploited promotional codes for free rides, often being careless (Carsharing_1.1) or using cars illegally; one operator reported illegal racing (ABC 1st/07/2020). Tampering to ride for free also occurred (Motosharing_2; Scooter_1; Bikesharing_2). Neglect, particularly illegal parking, was widespread: to avoid per-minute charges, users parked irresponsibly (Scooter_3), often on sidewalks (Las Provincias 6th/09/2019; El Español 28th/07/2021), which further provoked revenge vandalism. Some neglect was unintentional—users drained batteries completely (Carsharing_2, 3) or failed to lock bikes properly (El País 3rd/10/2022).

Impact of misbehavior. Shared mobility operators faced substantial economic consequences from misbehavior. Direct costs for repairing or replacing damaged or stolen vehicles rose sharply. Motosharing_1.2 reported spending nearly €1 million in one month to replace stolen batteries, while Scooter_2 noted that each battery cost up to €400 and total vehicle repair could reach €700. These repairs also increased operators' environmental footprint. Additional operational costs followed: Bikesharing_2 described hundreds of daily vandalism incidents, requiring a larger repair and recovery team. Insurance premiums, often "around a third of total costs, excluding repairs" (Insurance_1), also escalated, reflecting the severity of misbehavior and threatening business viability (Motosharing_1). Insurance itself became critical; as Carsharing_1.1 stated, companies could be "forced to cease operations if coverage cannot be secured." Some insurers avoided offering policies due to high risk and lack of historical data, limiting coverage to annual terms. The issue was particularly severe for motosharing and scooters, which are more exposed to vandalism than heavier vehicles (El Confidencial 15th/11/2021). As Motosharing_1.2 observed: "Some insurance companies didn't even bother to bid for our motorcycles, it was too risky."

Operational disruptions compounded the financial strain. Carsharing_2 towed over 500 cars monthly due to battery depletion, while managers devoted most of their time to crisis management rather than service improvement. As Motosharing_1.2 explained: "We spent 80% of our time solving motorbike issues and only 20% on client needs," underscoring

how misbehavior reduced fleet availability. Indirect costs further eroded profitability. Acts such as painting over QR codes rendered vehicles unusable (Scooter_1), and removing bikes from docking stations led to free, unauthorized use and infrastructure damage (Bikesharing_2). Damaged fleets also frustrated customers and citizens, harming operators' reputations.

Changes in business model components. To counter misbehavior, firms modified value proposition and value delivery while still pursuing market reach. Initially expanding citywide, they soon restricted service areas, especially in scooter and motosharing. Operators withdrew from lower income neighborhoods, focusing on wealthier or tourist zones (El Diario.es 12th/10/2020; Mercad2 5th/10/2021); only public bikesharing systems continued expanding. Carsharing operators raised the minimum age after early incidents:

> Our first lesson was just 9 days after launching the service. In Christmas eve a car was crashed and posted in social media, in a video with over 2 million views (...) In that moment we decide to increase the minimum age to 25

These changes reconfigured their value proposition. Formerly, it was based on the availability of vehicles and the possibility of being used citywide by all citizens. It was also promoted as a climate-friendly mobility solution for all. Yet, the changes applied reduced the customer base that could access this solution and the use cases, by making impossible to use the vehicles in certain areas.

Second, they adjusted the value delivery by making simple vehicle modifications. For instance, Carsharing_1 and Carsharing_2 reduced vehicle torque, forcing customers to use the Eco-mode to mitigate misuse from excessive acceleration, while motosharing and scooter operators addressed battery theft by securing batteries to vehicles.

Factors explaining the business model evolution. Two internal factors guided adaptation: growth objectives and limited capabilities. Firms prioritized rapid expansion with little industry experience, underestimating misbehavior. Consultant_1 noted: "We included in our clients' models a certain amount of loss ... However, reality was much worse." Thus, responses were tactical and short-term.

Among the external factors, the competitive landscape, characterized by the near-simultaneous entry of new operators and the presence of an untapped customer base, pushed operators to emphasize customer acquisition over profitability, avoiding fines and issuing only mild warnings (Carsharing_1). The absence of regulation allowed fast growth (El Mundo 19th/12/2019) but also spurred revenge-motivated vandalism. Finally, limited technological solutions forced reliance on generic vehicles and software. As Carsharing_1.3 recalled: "When we launched the cars, they only had the open-and-close remote technology." Consequently, adaptations were reactive and minimal, primarily aimed at reducing economically motivated vandalism.

4.2 | Second Phase: Increased Profitability

Types of misbehavior. While vandalism gradually declined, misuse and intentional neglect persisted or even increased (El Periódico 4th/05/2024). Typical neglect included illegal parking (El Mundo 28th/03/2023), smoking, littering, careless driving, and failure to fill accident reports, which hindered insurance claims (Motosharing_1.2; 2). As the customer base grew, payment fraud also rose, while misuse such as speeding and illegal racing became common (Journalist_1; Scooter_1). These behaviors were publicized on social media, as noted by Customer_4: "We have all seen videos of illegal racing on social media."

Impact of misbehavior. Costs escalated sharply. Operators, particularly scooter and motorbike services, faced fines for illegal parking: in Madrid alone, police imposed 124,000 fines in a single year, with 63% to scooters, 20% to motorcycles, and 17% to bicycles (El Periódico de España 6th/04/2022). Fines ranged from €30 to €200 (20 Minutos 10th/09/2020). In addition to repair and insurance expenses, indirect costs rose as firms invested in surveillance technology, more robust vehicles, and in-house recovery teams. Bikesharing_2 spent €50 million upgrading its fleet and docking systems to curb theft and vandalism (El Periódico de España 23rd/01/2024). Payment defaults were another burden: Carsharing_1 estimated up to 20% nonpayment, while Scooter_1 noted that low ticket values made debt recovery uneconomical.

Changes in business model components. During this phase, operators further modified business model components. First, regarding the value proposition, in addition to the service area restrictions introduced in the previous phase, operators suspended services on specific dates such as New Year's Eve and the start of school holidays to prevent vehicle misuse. This measure was applied across private transport modes (Carsharing_1; Carsharing_2; Motosharing_1) as well as public bikesharing schemes. As Bikesharing_2 explained: "We now close certain stations during school holidays to minimize the impact of vandalism from young customers."

In value delivery, operators invested in purpose-built vehicles (Carsharing_1; Motosharing_1; 2; Scooter_1–3) and upgraded infrastructure (Bikesharing_2). Scooter_1 described: "The company moved away from off-the-shelf light vehicles ... to heavier ones that are more difficult to vandalize." They also installed on-board monitoring, alarms, and geofencing to track use and prevent fines (Motosharing_1; Scooter_1; 2). Carsharing_1 reported a 36% drop in accidents after installing new sensors. Customer processes became stricter to screen users and encourage compliance. Firms introduced credit-card pre-authorizations (Carsharing_1; 3; Scooter_2) and improved registration and fraud-detection systems (Motosharing_1; Scooter_1; Bikesharing_1). Trip-ending procedures required users to upload photos verifying proper parking, noncompliance triggered penalties. Scooter operators imposed a €10 fine for illegal parking, reducing incidents from 80% to 3.2% (Cinco Días 21st/07/2022). Many internalized fleet operations, replacing subcontractors with larger in-house teams to manage parking (Scooter_2; Motosharing_1) and theft (Bikesharing_2).

In value capture, operators adopted dynamic pricing, adjusting rates by time or area to shape behavior. Carsharing_2 increased prices on weekends to deter risky driving; Motosharing_1 used discounts to redistribute vehicles: "Some areas experienced high vandalism ... We reduced pricing there to encourage users to move vehicles." Overall tariffs increased, often with optional insurance surcharges. Historical price data show steady growth. Carsharing_1 rose from €0.26 to €0.41 per minute (2020–2024), Motosharing_1 +26% in 2024, and Scooter_3 +40% in 2021. Bikesharing prices remained stable due to municipal subsidies.

Factors explaining the business model evolution. Internally, the focus shifted from growth to profitability. Insurance_1 noted: "Operators focused first on attracting clients. They are now cleaning their customer base, trying to retain only the good ones." This strategic re-orientation justified penalties and surveillance, aiming to protect margins and loyal users. Operators also gained experience and technological capability, enabling longer-term solutions.

Externally, new supplier partnerships and technological advances facilitated innovation. Examples include new monitoring systems, geolocation, and analytics improving fleet control and behavioral insight. Carsharing_1.3 highlighted: "With the new technology on-board ... we can detect pretty much all the accidents. Before, it was impossible." Collaborations with manufacturers produced sturdier vehicles with embedded sensors and reinforced parts. Meanwhile, public backlash against scooters occupying sidewalks prompted tighter regulation and designated-parking mandates with fines for non-compliance (El Periódico 24th/02/2023; El Economista 10th/05/2023). To offset these costs, firms implemented trip-verification procedures and passed fines to customers, improving compliance but reducing usability.

4.3 | Third Phase: Downsize, Diversification, or Decline

Despite prior adjustments, several forms of misbehavior persisted, increasing costs and operational strain. Many operators further altered their business models, while one (Scooter_3) ultimately declared bankruptcy. Some firms downsized their service areas, focusing on safer and more profitable zones. Carsharing_1 withdrew from two cities, with one shareholder exiting completely. Carsharing_2 and 3 maintained smaller fleets within their original cities, and Motosharing_1 reduced both geographical scope and fleet size, serving only specific neighborhoods. Regulatory issues also played a role: Scooter_1 was banned from a major city due to repeated illegal parking and unsafe riding. Scooter_2, which once operated nationwide, consolidated to two highly touristic city centers.

Other firms diversified to sustain revenue. Motosharing_2 expanded into the B2B segment, added petrol-powered vehicles, and introduced long-term rental options, moving beyond the short-term pay-per-minute model. Carsharing_1 followed a similar path, blending consumer and business services. In contrast, public bikesharing schemes evolved differently. Benefiting from municipal subsidies, Bikesharing_1 and 2 expanded fleets, dockstations, and ridership. Public financial support proved vital for preserving accessibility and affordability as private operators retrenched.

4.4 | Degradation of Business Models and Processes Involved

The findings show that the shared mobility business model evolved from "shared mobility for all" to a "premium niche mobility solution." This evolution represents a degradation of the original model, driven by two interlinked processes: a growing focus on financial viability and an increasing prioritization of wealthier customer segments. Consequently, the earlier balance among economic, environmental, and social value eroded, making the model less sustainable.

Although the precise economic impact of misbehavior could not be quantified, informants consistently described it as substantial. As profitability targets came under pressure, operators, especially start-ups backed by investors, shifted their priorities. Capital-backed firms, seeking to demonstrate growth and financial solidity, altered their models accordingly (El Periódico de Aragón 5th/06/2024). Carsharing_1.1 confirmed: "Our shareholders required either profitability or exit." Scooter_3, similarly, sought new investment to expand into more cities and improve financial indicators. In contrast, public bikesharing operators, sustained by municipal funding, retained broader accessibility and did not face comparable profitability constraints. This shift produced clear trade-offs between economic and social goals. As Motosharing_2 acknowledged: "The trade-off between economic and social objectives is real." The measures introduced to mitigate misbehavior (restricted service areas, user screening, and higher prices) undermined accessibility for those who most benefited from affordable mobility. Operators reduced coverage in low-income or peripheral areas (El Diario.es 13th/10/2020), further deepening inequalities in urban mobility. Progressive selection of "reliable" users narrowed the customer base, while price increases made services unaffordable for many.

The changing balance was openly recognized by operators. Originally conceived as complementary to public transport, shared mobility gradually reframed itself as a private service. Entrepreneur_1 stated: "The only objective for shared mobility operators should be to become profitable. Cities cannot expect private operators to act like public services." Carsharing_1.1 similarly argued that, without subsidies to offset misbehavior costs, democratizing access was unfeasible because "the numbers just don't add up." Hence, although still marketed as sustainable mobility, shared mobility's limited scope and higher prices curtailed its social value creation.

Misbehavior also increased the environmental footprint through damaged and discarded components. Some operators tried to mitigate this: Motosharing_2 opted to repair rather than replace parts, while Scooter_2 sold waste materials (e.g., metal and batteries) to firms for reuse. Initially, all operators used electric vehicles, but at least two introduced petrol-powered vehicles, compromising environmental objectives.

In sum, shared mobility business models lost much of their initial sustainability promise. By prioritizing financial value creation, operators disrupted the earlier equilibrium among economic, social, and environmental aims. The original mission of providing affordable, equitable mobility gave way to selective user retention, price hikes, and withdrawal from high-risk,

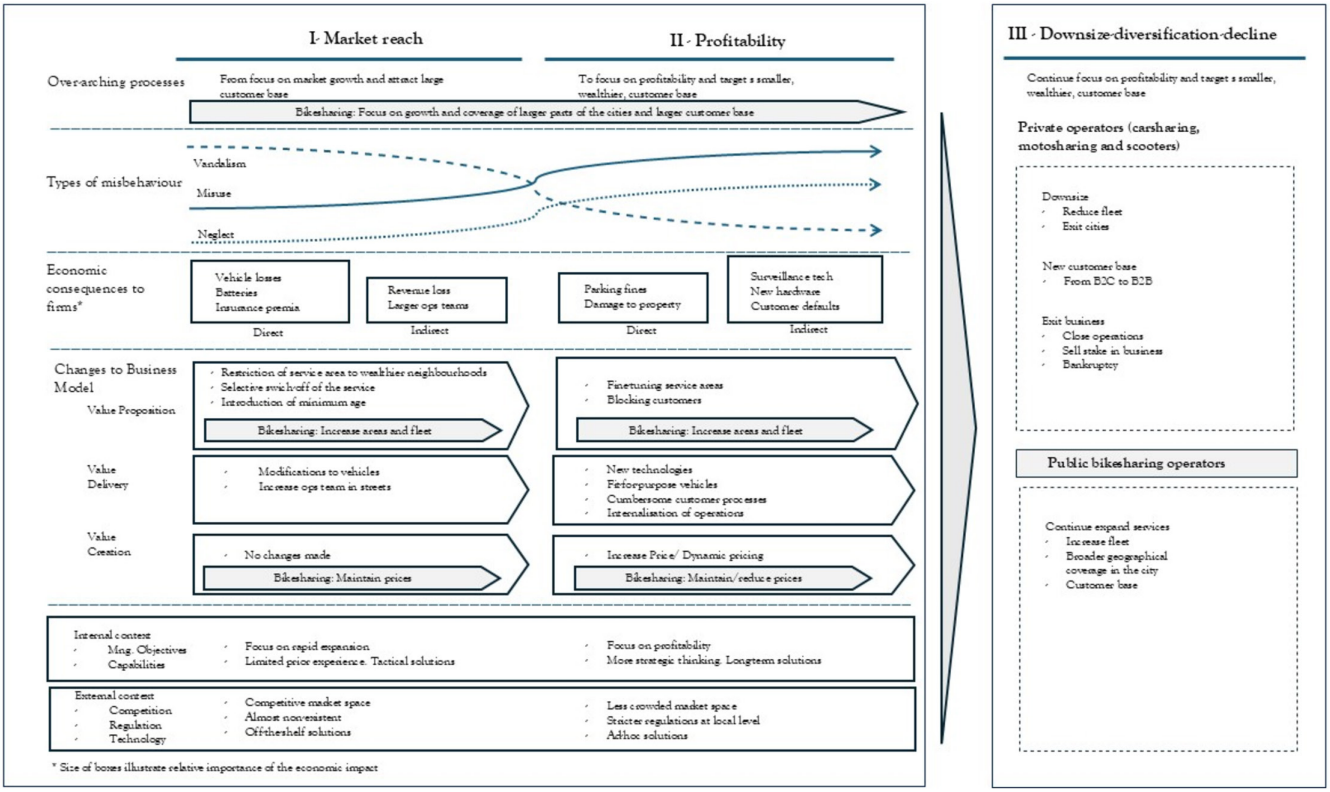

FIGURE 1 | The evolution of shared mobility business models.

low-income areas. This process of degradation, illustrated in Figure 1, captures how business-model evolution can reduce, rather than enhance, triple-value creation.

5 | Discussion

5.1 | Theoretical Contributions

Our study contributes to the literatures on business model evolution, ABS business models and customer misbehavior in ABS, as explained next. We contribute to the literature on business model evolution by extending the antecedents or drivers of change, providing a configurational explanation for their influence and proposing new typologies of business model change beyond the degree of novelty. First, responding to the call for more research into the antecedents of business model evolution (Foss and Saebi 2017), we reconceptualize customer misbehavior as a structural driver of business-model evolution. Past work has represented evolution as "fine-tuning" or the attempts to progressively gain "quality" and better adapt to customer requirements (Climent and Haftor 2021; König et al. 2022). Similarly, scholarship on diffusion of social innovations represents customers as drivers or brakes in their role of accepters/rejecters of value propositions (Clausen and Fichter 2019; Priem et al. 2018). Our study also shows the centrality of customers to explain business model evolution but portrays customers in a different role: as potential damagers of corporate assets, consumers also limit the diffusion of social innovations such as shared mobility. Extant work on customer misbehavior in ABS provides further evidence of the threat that this role poses to these business models: because misbehavior is contagious (Schaefers et al. 2016), it tends to grow over time; the interventions implemented not only limitedly curb it (Danatzis et al. 2024; Ozuna and Steinhoff 2024) but also reduce the intention to use the service (Pieper and Woisetschläger 2024).

Portraying consumers in this new role provides a different, less optimistic explanation for business model evolution. Our work begs the question of what constitutes "quality" and for whom. The changes described in onboarding, pricing, and parking monitoring rendered customer experience more burdensome. Although allegedly the "quality" of vehicles may have improved—as vehicles are less damaged, littered, and properly parked—it is unclear that all customers benefit from these changes; rather, the findings suggest that quality improved for a segment of wealthier users and that the business model evolution increased social inequalities in access to affordable mobility solutions.

In addition to misbehavior, our research highlights that shareholder priorities and goals are a fundamental driver of the evolution of the business model. Ownership structure has neither been examined as a factor explaining business model evolution (Foss and Saebi 2017) nor sufficiently emphasized in the literature on strategies to embed sustainability in business models (e.g., Evans et al. 2017; Mignon and Bankel 2023). Yet, our case study shows that investors significantly influenced the direction of the changes on business model components. Private mobility operators in our study were often pressured by shareholders to first grow and then to deliver quick results, which forced them to make decisions that ultimately altered their original social mission. This pressure frequently led to a shift from a shared mobility model focused on inclusivity to a niche-focused approach catering to less price-sensitive customers in specific geographic

areas. In contrast, publicly funded bikesharing services, supported by local governments and subsidies, were able to implement strategies aligned with their long-term vision of mobility for all, without compromising inclusivity. Thus, ownership models emerge as a fundamental factor driving the evolution of business models and the accompanying tensions to maintain financial viability and socio-environmental value (Crane et al. 2014; Klein et al. 2021). Financial owners curtail the autonomy of managers to design the components of the business model. This bounded autonomy is best reflected in the decision to limit service areas; whereas privately owned operators often relied on this measure to curb vandalism and misbehavior, publicly owned operators did not adopt it.

We also advance a configurational understanding of how external and internal factors combine to explain business model evolution (Furnari et al. 2021). Existing literature portrays the drivers of business model evolution as having a separate and independent influence (see for instance Foss and Saebi 2018). In contrast, we show that it results from a complex intertwining of several external and internal factors, such as customer behavior, technological advancements, regulatory shifts, industry competition, internal capabilities, and ownership structure. This calls for applying configurational causality to explain business model evolution (Furnari et al. 2021) as opposed to the dominant application of variance-based causality where these factors are examined separately.

Finally, our work invites the proposal of new typologies of business model evolution that go beyond the degree of novelty. Business model evolution has been usually categorized along a continuum of novelty, from radical to incremental (e.g., Foss and Saebi 2018). We propose adopting a more critical perspective and outline typologies that articulate the consequences of business evolution on different stakeholders. Other work has shown that business model evolution may result in greater social and environmental value formation (Mignon and Bankel 2023). Our findings illustrate the other end of this continuum that we labeled triple value degradation: The social intended value was downplayed at the expense of the financial targets.

This study also extends the nascent research on the evolution of sustainable business models and ABS in particular. Whereas much work has examined how traditional business models evolve to become sustainable (Mignon and Bankel 2023), we demonstrate the reverse process: how changes in the ABS value proposition, delivery, and capture deteriorate the social value formation. First, value propositions were reconfigured as service areas were restricted to wealthier, high-traffic zones; services were suspended during high-risk periods; reliable customers were primarily targeted while unreliable customers were banned. Second, value creation and delivery strategies underwent substantial modifications, as operators adapted their fleets with more robust, vandal-resistant vehicles and embedded real-time monitoring technologies. Operational processes, such as onboarding, became more stringent and cumbersome for users, involving customer blocking and secure end-of-trip procedures requiring photo verification. Finally, changes in value capture were introduced to reach the profitability targets, such as dynamic pricing to manage demand, as well as penalties for non-compliance with company norms.

Although these changes proved effective to curb misbehavior, they also compromised the previously sought balance between economic and social value formation, so that their model became less sustainable or degraded. Aiming to achieve financial targets, shared mobility operators progressively focused on the wealthiest and less risky consumer segments, usually concentrated in certain areas of the cities, and ceased to provide an affordable and accessible mobility solution for all citizens. Only publicly owned bikesharing operators were able to retain the original social mission, while the others limited the creation of social value formation. While environmental objectives remain a stated priority, their alignment with economic interests such as recycling practices that reduce costs may explain their persistence. However, these benefits are likely to be offset by the additional waste generated from replacing vandalized or stolen assets.

A similar evolution has been noted in other ABS business models, such as fashion rentals (Barletta et al. 2024), and other sustainable business models more broadly. Indeed, to ensure viability, these business models have progressively focused on a segment of wealthier consumers (Rana and Paul 2017). This prioritization jeopardizes the social value formation insofar as it limits the possibility that consumers from low socioeconomic status adopt a sustainable lifestyle and deters from scaling up sustainable lifestyles (Al Mamun et al. 2018; Hurth 2010).

Finally, our findings extend research on customer misbehavior in ABS, currently centered on explaining why consumers misbehave, how misbehavior spreads, and which interventions may curb it. We inductively created a typology of the actions damaging corporate assets, differentiating between vandalism, misuse, and neglect, and further categorizing misuse and neglect into intentional and unintentional. This complements other typologies created in the context of home sharing (Golf-Papez and Culiberg 2023). More importantly, we show that misbehavior is a dynamic or time-dependent construct that unfolds differently as ABS evolve, by identifying stage-specific misbehavior types. Foregrounding misbehavior as a time-dependent construct implies that interventions must be strategically timed and adaptive to the type of misbehavior considered and the operators' objectives. Whereas nudges may be effective in reducing unintentional neglect (Namazu et al. 2018), they are not likely to decrease other forms of misbehavior and thus should not be introduced in earlier stages. In contrast, camera surveillance is more effective at reducing intentional neglect and misuse, but since it also demotivates potential consumers (Pieper and Woisetschläger 2024), it could be adequate when operators have nurtured a more loyal consumer base. These distinctions help nuance the effectiveness of interventions to curb misbehavior and may explain the mixed findings noted in past work. Some interventions, such as campaigns to increase psychological ownership or company-consumer identification (e.g., Schaefers et al. 2016), which have been tested in labs, were ineffective in curbing financial fraud and car misuse according to operators.

This insight calls for more specific testing of which interventions are effective to reduce which type of misbehavior and when. It also calls for studying the long-term consequences that these interventions may have. Experimental studies on misbehavior have modeled the one-directional, short-term implications of

interventions. Our work problematizes this view by showing that intervention strategies implemented at a point in time not only affect misbehavior at this point, but they create fertile conditions for other subsequent forms of misbehavior. Studying the future outcomes and the recursive relationships between misbehavior, interventions and outcomes would provide a better explanation for misbehavior in ABS.

Finally, we also extend this literature by unveiling the internal and external context guiding the choice of interventions. Ackermann and Tunn (2024) proposed a long list of strategies that can be implemented to motivate users to care for shared goods. Our work shows that internal capabilities, regulation, technological advancements, and financial goals constrain the choice of one or other strategy. To illustrate the influence of internal factors, our findings provide additional evidence that sanctions are an effective measure to reduce misbehavior (Jin et al. 2022). Yet, this measure must be aligned with business goals: Given its negative effect on market penetration, it can only be implemented when reach targets were met. Regarding external factors, Pieper and Woisetschläger (2024) defended the use of real-time monitoring systems of drivers, yet, the use of this technology is limited by privacy regulations in Europe and for this reason, it could not be implemented.

5.2 | Practical Implications

The study offers practical insights for mobility operators and policymakers on anticipating and managing customer misbehavior to minimize its negative effects. First, this research highlights the importance of considering customer misbehavior when ABS are designed so that they include measures to prevent and minimize its impact since their inception. This may facilitate maintaining a balance between the three forms of value. Shared mobility operators can also apply the strategies unveiled to design services that proactively reduce misbehavior. For instance, integrating features like geofencing to ensure proper parking or telematics to encourage safer driving can significantly improve user behavior and reduce operational disruptions. Also, proactive incident management systems that empower users to report issues can enhance trust and enable companies to respond more effectively.

For policymakers, this research underscores the potential of subsidized models in shared mobility, similar to the approach taken with public bikesharing systems. Subsidies can expand the reach of shared mobility services to underserved populations, ensuring affordability and inclusivity while supporting sustainability goals. By offsetting costs associated with implementing safety features or expanding service areas, subsidies can help operators maintain their commitment to equitable access without compromising financial viability. Infrastructure development is another key area where policymakers can make a difference. Creating well-lit, secure parking zones or expanding dedicated bike lanes can enhance user safety and reduce incidents of vandalism. Governments can also encourage industry-wide standards for safety and misbehavior management, ensuring consistency and transparency across providers. Educational campaigns targeting users can raise awareness about the proper use of shared mobility services, emphasizing the shared benefits of these systems and the importance of responsible behavior.

Collaboration between managers and policymakers is critical. By fostering innovation ecosystems where companies, governments, and communities work together, stakeholders can codevelop solutions for shared mobility's most pressing challenges. For example, shared data platforms could be used to analyze patterns of misbehavior and inform joint safety campaigns. Policymakers and companies can also establish sustainability metrics that measure the impact of misbehavior and its mitigation on the triple bottom line, ensuring that shared mobility solutions remain aligned with societal objectives.

5.3 | Limitations and Further Research Lines

Generalizability is the main limitation of this study. The methodology used is adequate for theory-building but limits generalization to other ABS business models or shared mobility models in other countries. Stage-dynamics and business model changes may vary across contexts, given that regulatory and infrastructural contexts shaped business model evolution. Although the types of misbehavior are likely the same, their prevalence and the responses from policymakers may differ across countries and cities. Another limitation stems from data collection. We were only able to interview one manager per operator (except in the case of one carsharing and one motosharing company). Although we redressed this limitation with the use of news articles and interviews with experts, the single interviews may raise concerns about the reliability of findings. Finally, we could not obtain evidence of the actual economic costs and the evolution of the environmental footprint of operators, limiting a more nuanced and precise analysis of how these forms of value evolved. Taken together, the findings should be interpreted as a process model that may explain other conceptually similar ABS settings, while claims about magnitude or incidence require larger-scale, cross-context tests.

This study also opens fruitful lines of inquiry. First, future work could examine the decision-making processes of managers in shared mobility companies, especially regarding strategies for addressing customer misbehavior. By uncovering the internal processes that inform companies' strategic responses, such studies could reveal important factors that shape how organizations respond to operational challenges arising from misbehavior. Second, a deeper investigation into the financial and environmental implications of customer misbehavior and the influence of investor expectations on company responses would provide further insights into the sustainability of shared mobility business models under different financial constraints.

Third, cultural and socioeconomic contexts also play a role in shaping the prevalence and nature of customer misbehavior in shared mobility. Comparative studies across different regions and countries could extend the generalizability, while identifying region-specific challenges and effective solutions. Such research could enhance our understanding of how cultural norms and socioeconomic factors influence customer behavior and how companies might tailor their strategies to different cultural settings.

Fourth, studying the social trade-offs within shared mobility services is another promising research avenue. This line of

inquiry could investigate how different measures to curb misbehavior affect various customer demographics, potentially revealing unintended consequences that exacerbate social inequalities. Finally, future research could broaden the scope of study to include other ABS such as fashion rental, tool-sharing platforms, or peer-to-peer lending. With this, we could identify both common patterns and unique challenges, enabling a more comprehensive understanding of misbehavior across diverse contexts and asset types.

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Conflicts of Interest

The authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Table S1:** Summary of studies on customer misbehavior in access-based services. **Table S2:** Queries employed and results. **Table S3:** Timelines of each operator based on interviews and archival data. **Table S4:** List of articles reviewed by Factiva query and related coding.

Appendix A

Coding Methodology

TABLE A1 | Gioia coding.

Sampled quotes	First-order concepts	Second-order categories	Aggregated dimensions
"It was not uncommon to see our motorbikes on the floor. Clearly someone had pushed them for no reason" (Motosharing_1.1.)	Thrown vehicles		
The new fashion of uncivil behavior in Barcelona: bikes in trees (Metrópoli Abierta 30th/01/2022)			
"People try to tear off the bikes from the stations. When they see they cannot do it they just leave the bikes alone" (Bikesharing_1.)	Damaged vehicles/ infra		
Three individuals caught stealing batteries valued at €1700 each (Europa Press 9th/12/2022)	Theft	Vandalism (deliberate damage)	
Three years later, nobody fixes the chaos of shared scooters, and this photo proves it (El Confidencial.com 11th/12/2021)	Neighborhood resistance		
"Sometimes, if the user had a bad experience with the service, they would kick the car, jump on top of them, or even break a window" (Carsharing_3.1.)	Revenge		
Crackdown on the «ghost drivers» who raced in rental cars (ABC 1st/07/2020)	Thrill seeking		
"Drivers hit the wheels against curbs or potholes. They do not really care" (Motosharing_1.2.)	Careless driving	Misuse (active but improper use)	Categories of misbehavior in shared mobility
Driving drunk on an electric scooter also has a fine and it is not cheap (ABC.es 12th/09/2019)			
"Teenagers always try to figure out how to keep riding for free or start a free rental" (Scooter_1.)	Obtaining financial gain		
Almeida will withdraw licenses to all electric scooters parked on the sidewalk (El Independiente 23rd/10/2019)	Illegal parking		
"There are customers that do not bother to fill the accident report, which compromises the position of the company in a potential claim" (Motosharing_2)	Failure to follow instructions	Neglect (failure to use/care properly when required)	
"There are some customers that used up all the battery on purpose, even if they have been advised not to do so. That generates additional operational costs" (Carsharing_1.3.)			
Since the start of operations Carsharing_2 has had to replace 60 cars which were totally destroyed (El Confidencial 4th/03/2024)	Replace vehicles		
We lost 30 to 40 batteries in a single day (Motosharing_1.2)	Replacement of components	Direct Impact	
Bikesharing_2 reported hundreds of vehicles being vandalized every day, forcing the company to increase the team responsible for repairing and recovering bikes from the streets (ABC 29th/12/2021).	Increased operating costs		Assessment of the impact of misbehavior in operators
Delete identification code of scooters and manipulate start-stop system to use for free (Europa Press 2nd/03/2020)	Loss of revenue	Indirect Impact	
Scooters with safety control now ready (Coche Global 7th/01/2022)	New onboard capabilities		
Motosharing_2 enters B2B in the [country] (Expansion 8th/10/2024)	New customer segment		
"In [city], we reduced very aggressively our area coverage in which we were suffering a lot of problems" (Carsharing_1.2.)	Redefinition of service area		

(Continues)

TABLE A1 | (Continued)

Sampled quotes	First-order concepts	Second-order categories	Aggregated dimensions
"We spent a lot of time redefining the area coverage to maximize the potential value of the use of our motorbikes which included among others, the cost of misuse and vandalism" (Motosharing_1.2.)		Value Proposition	
"We set a minimum of 21 years old or 2 years of driving experience to access the service" (Carsharing_2.)	Limit access		
"Scooters are now very repairable and easy to change parts like the fork, or the wheel. Eventually, we moved to swappable batteries" (Scooter_1.)	Vehicle design		
"Several companies have added alarms if the vehicle is moved illegally. I am not sure it is that effective." (Scooter_1.)	Monitoring		
The technology that will prevent scooters from circulating on sidewalks (El Comercio Online 8th/12/2021)		Value Delivery	Changes made to business models in response to misbehavior
"We introduced the need to send a picture after parking the vehicle to avoid illegal parking" (Motosharing_1.1.)	Customer process		
Acciona is making its shared motorcycle service more expensive with increases of up to 26% (El Confidencial 25th/05/2024)	Pricing (inc/dec)		
"We increase prices to reduce the usage in certain timeframes in which accidentability is very high. This also partially covers extra costs" (Carsharing_1.1.)	Dynamic pricing	Value Capture	
The fine for leaving a shared electric scooter badly parked can reach up to 200 euro (20 Minutos 10th/09/2020)	Penalties (companies and clients)		
"Even if the outlook was bleak, the company would go ahead and launch no matter what." (Scooter_1.)	Growth	Corporate goals	
"Operators focused first on attracting clients. They are now cleaning their customer base, trying to retain only the good ones". (Insurance_1)	Profitability		Internal Context
"We included in our clients' models a certain amount of loss for vandalism, based on historical data and the type of city and Neighborhoods in which our client operated. However, reality was much worse." (Consultant_1)	Lack of experience	Management capabilities	
"Companies now use machine learning tools to map the city." (Scooter_1)	Tools for decision making		
No motorbikes and few scooters: the shared mobility bubble 'bursts' in Zaragoza (El Periódico de Aragón 5/06/2023)	Competition	Competition landscape	
"The decision to close [city] was due to important, repeated damages to the fleet due to vandalism and poor driving" (Carsharing_1.1.)	Market exits		
The 'scrap corpse' that reminds us why shared bikes do not work in Spain (El Confidencial 15th/11/2021)			External context
The lack of regulation at the time allowed companies to expand rapidly without significant legal constraints (El Mundo 19th/12/2019)	Lack of regulation	Regulation	
Local authorities to introduce stricter regulations, such as designated parking zones (El Periodico 24th/02/2023; El Economista 10th/05/2023).	New regulation		
"When we launched the cars the only available technology was the remote open and close. Now there are more options available." (Carsharing_1.3)	New solutions	Technology	