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ABSTRACT

The sharing economy is promoting sustainable usage of materials, equipment, and tools. Moreover, ride-sharing is a recognized means of sustainable mobility. Besides, in the wake of COVID-19 prevention measures, bicycles and e-scooters became encouraged transportation means to allow individual and non-crowded outdoor transit compared to other public transportation means. In this study, the authors aim to identify the core differentiating aspects of business models of European micro-mobility sharing online services (platforms). The Business Model Canvas framework proposed by Osterwalder and Pigneur (2010) was used as a basis to carry out the comparative analysis. The most popular European micro-mobility services were identified using the Crunchbase database, and the data on their business models was collected from secondary sources. The paper presents an analysis of four cases: Bolt (an international ride-hailing service), Nextbike (international bike-sharing service), CityBee (regional free-floating car-sharing service), and TIER Mobility (regional scooter sharing service). Future research will include a broader range of cases, interviews of the micro-mobility platform's representatives, surveys of their users, and more detailed case analysis.

Keywords: Sharing economy, Platforms, Business Models, Bike-sharing, Scooter sharing, micro-mobility, Europe.

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INTRODUCTION

The sharing economy phenomenon is emerging and is driven by the rapid development and proliferation of information and communication (hereafter: ICT) enabled engagement platforms (Breidbach & Brodie, 2017). However, this phenomenon can involve different products/ services that can be accessed or delivered through collaborative practices (Netter *et al.*, 2019). As a result, the sharing economy can cover many sectors such as mobility, healthcare, hospitality, financial services, food, fashion, telecommunications, construction (Acquier *et al.*, 2019; Netter *et al.*, 2019).

The notion of sustainable mobility gained popularity recently, as well as the use of micro-mobility services. Sustainable mobility can be achieved through several key objectives: fewer trips, modal shift, distance minimization, and enhanced efficiency (Cohen & Kietzmann, 2014). Moreover, previous studies on micro-mobility services rely mainly on literature reviews rather than empirical research (Hesselgren *et al.*, 2020). Some studies have focused on a single mobility mode, such as bike-sharing (Si *et al.*, 2019; van Waes *et al.*, 2018). Meanwhile, micro-mobility might cover a more extensive list of micro-mobility services, including bike-sharing, scooter-sharing, moto-sharing and car-sharing. Hence, the single platform that integrates all diverse services has enabled the concept of Mobility as a service (MaaS) (Arias-Molinares & García-Palomares, 2020). Furthermore, all these services might have diverse business models. Indeed, as Cohen and Kietzmann (2014) have highlighted, car-sharing services can possess three unique business models such as business-to-customer (B2C), business-to-customer (B2C), and pier-to-pier (P2P).

Notably, a study by Eckhardt *et al.* (2019) has highlighted that existing research studies in the sharing economy focus on business model innovations, mainly, diverse ways in which digital platforms entail value by empowering transactions between providers and users. Eckhardt *et al.* (2019) have noted that most sharing economy service' providers do offer identical products or services through their digital platforms. Hence, the question remains what kind of features sharing-economy micro-mobility companies integrate into their business models? Research is needed to reveal the key attributes of their business models. The current study aims to compare European micro-mobility services' business models by applying the business model canvas framework proposed by Osterwalder and Pigneur (2010).

The paper is organized as follows. First, the literature review is presented on the research's main constructs, namely micro-mobility in the context of the sharing economy and business models. The latest research related to business models of micro-mobility platforms or services is reviewed as well. Next, the research methodology applied in this research is described. Following, the summary of the comparison of business models of selected European micro-mobility services is presented. At the end of the paper, concluding remarks are made and limitations of the research and future research directions identified.

LITERATURE REVIEW

The conceptualization of Mobility as a Service (MaaS) represents one central assumption that services are "bundled into service packages for monthly payment, as in the tele-communication or media service sector" (Pangbourne *et al.*, 2020, p. 35). Thus, MaaS is an innovative transport concept that involves a range of transport modes and services that offer a user-oriented service through a single solution (Jittrapirom *et al.*, 2018). MaaS has its centerpiece in most countries where the shared modes of public transport are provided (e.g., Uber) (Hensher, 2020). Hensher (2020) notes that micro-mobility modes include e-scooters and bicycles, car sharing, which are mainly limited to short trips. For instance, trips of e-scooters and bicycles possibly are up to 5 kilometers. Hesselgren *et al*. (2020) and Zhao *et al*. (2020) suggested the even more specific term "Corporate Mobility as a Service (CMaaS)" in a setting that uses a business-to-employee (B2E) service model instead of a general model of business-to-consumer (B2C) model.

Diverse MaaS definitions cover several key components, including several transport modes integrated with ICT solutions and a digital platform, using a user-centric approach that offers a "one-stop-shop" of mobility and requiring registration or subscription (Hesselgren et al., 2020). Kamargianni & Goulding (2018) have proposed to define MaaS as "user-centric, multimodal, sustainable and intelligentmobility management and distribution system, in which a MaaS Provider brings together offerings of multiple mobility service providers (public and private) and provides end-users access to them through a digital inter-face, allowing them to seamlessly plan and pay for mobility". Therefore, the concept of MaaS could play an essential role in the shift towards a more sustainable shared transport system (Hesselgren *et al.*, 2020).

Traditionally, the term "sharing" includes practices such as gifting, renting, swapping, or bartering and takes place at the individual or community level (Constantiou *et al.*, 2017). To indicate the entirety of actors and transactions occurring in the application of such practices, the "Sharing economy" term is often used. Sharing economy can also describe various organizations that connect users/renters and owner/providers via (digital) platforms either customer-to-customer (C2C) (e.g., Uber, Airbnb) or business-to-customer (B2C), enabling different users rentals in more flexible ways (Parente *et al.*, 2018). The notion of sharing economy can also be denoted as an umbrella term that entails various initiatives that create diverse economic, environmental, and social value (Acquier *et al.*, 2019). For example, ride-sharing platforms can promise reduced parking infrastructure in cities and create social interactions between strangers. Acquier *et al.* (2019) identified that narrow and broad approaches are used to define the sharing economy. The narrow definition states that "*tend to start from a normative characterization of sharing in order to frame the sharing economy as a more specific, restricted, and workable empirical object*" (Acquier *et al.*, 2019, p. 7). The broad definition includes both peer-to-peer (P2P) and business-to-peer (B2P) initiatives that entail market and non-market mechanisms (Acquier *et al.*, 2019).

Similarly, Netter *et al.* (2019), based on Acquier *et al.* (2017), have suggested that a definition of sharing economy should be considered as an umbrella construct that does not provide a universal definition and instead requires a detailed discourse about its different meanings and functions. According to the authors, the definition of the sharing economy needs more nuanced analysis and discussions. Therefore, Netter *et al.* (2019) have provided a new framework that emphasizes sharing models' organizational characteristics (e.g., membership, hierarchy, rules, monitoring, sanctioning) within distinctions between user-driven/communal and platform-driven/commercial models (e.g., signing up).

According to Breidbach and Brodie (2017), the sharing economy context includes four key tenets such as access rather than ownership, the use of ICT enabled engagement platforms, financial rewards for resources' sharing, and among numerous actors who engage in the exchange process through service ecosystems. Similarly, Parente *et al*. (2018) have proposed that there are three main characteristics of sharing economy companies: "(1) the business focuses in the unlocking the value of unused or underutilized assets; (2) consumers pay for temporary access instead of ownership using an internet-based platform and (3) it relies on network effects and social interactions between users/suppliers for growth" (p. 54). These definitions tend to follow the broad approach to the sharing economy and involve its complexity (e.g., includes both for-profit and non-profit initiates, both B2B and B2C). In this research, we follow Netter *et al.* (2019) notion of sharing economy that is an umbrella construct for for-profit and non-profit, B2C, peer-to-peer (P2P) (also called C2C) models that allow the compartmentalization of usership and ownership of goods, services and skills.

Previous studies on micro-mobility related research focus mainly on literature reviews rather than empirical research (Hesselgren *et al.*, 2020). For instance, Mátrai and Tóth (2020) have done a scientometric analysis of 208 articles and identified four bike-sharing service clusters: purely public, purely private, mixed, and other. The public systems denote that both the operator and owner of the system are public institutions. In a similar vein, both the operator and owner of the system are private companies (Mátrai & Tóth, 2020). The mixed system represents a system when the system owner is a public entity (e.g., a city or transport operators) while the operators are private companies. The other system entails services that are not classified under the mentioned systems. For instance, Chinese companies operate differently due to their specific political structure (Mátrai & Tóth, 2020).

According to Si *et al.* (2019), the leading knowledge domains of the studies on bike-sharing published from 2010 to 2018 can be classified based on diverse generations of programs. The third and fourth generations of programs cover domains related to factors and barriers, system optimization, behavior and impact, safety and health (Si *et al.*, 2019). The fifth generation of programs covers domains classified into three types: factor and barriers, system optimization, and sharing economy (Si *et al.*, 2019). Indeed, previous studies have focused on many diverse issues related to bike-sharing, but not on bike-sharing BMs (Mátrai & Tóth, 2020). Consistent partially with (Zhao *et al.*, 2020), this research considers a business model (BM) perspective to investigate MaaS.

A growing body of literature on business models in the sharing economy emphasizes specific model attributes that companies make to run business. The business model represents "the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value" (Teece, 2010, p. 173). In a business model design, diverse elements can be indicated, such as technologies selected and features that should be involved in products, benefits to customers from using these products, market segments that should be targeted, revenue streams, and mechanisms to capture value (Teece, 2010). Meanwhile, Osterwalder and Pigneur (2010) propose identifying the business model based on nine building blocks: Customer Segments, Value Propositions, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure. This approach is further applied in this study, as it is the most used and widely cited framework for its practical relevance (Ritter & Schanz, 2019; Nußholz, 2017).

METHODOLOGY

This research aims to identify the core differentiating aspects of business models of European micro-mobility sharing platforms. The following sections provide details on selected approaches to compare the business models, selecting the cases of European micro-mobility online services and data collection.

Comparison criteria. The authors chose a comparative analysis based on the Business Model Canvas (Osterwalder & Pigneur, 2010) as the main framework. Thus, the comparison is based on these nine building blocks of Business Model Canvas as the main criteria. The selected cases were first analyzed separately to describe their business model and then developed business model canvases were compared.

Case selection. The cases were selected based on the following criteria: 1) they have to be providing micro-mobility service, 2) they have to be established in Europe; and 3) customers access the service using an internet-based platform. Crunchbase database was used to identify the cases for the analysis in this study. Crunchbase is a database of innovative start-ups and companies widely used by researchers due to the content provided on companies and linkability to other data sources (Dalle *et al.*, 2017; Ferrati & Muffatto, 2020). Query Builder of the database was used to filter the companies. First, the filter was applied to identify the companies related to micro-mobility by searching terms "Micro mobility," "Micromobility" as well as more specific terms "Bike sharing," "Bicycle sharing," "Bikesharing," and "Scooter sharing." Next filter applied: headquarter location in Europe. Finally, expecting higher numbers of visits to platform-based service websites, a filter of monthly website visits was applied (greater or equal to 10,000). The search for the cases was carried out on 13/11/2020; search results are presented in Table 1.

Table 1: The selection of characteristics of the European micro-mobility sharing platforms using a Crunchbase database

Parameter	Rule	Restriction values	Number of results after each step	Query URL
Description	Contains any	Bike sharing; Bikesharing; Bicycle sharing; Scooter sharing; Micro mobility; Micromobility	206	https://www.crunchbase.com/search/organization.companies/96bb3b4d9b6a7bc5d728f2219ad37e29
Headquarters Location	Includes any	Europe	86	https://www.crunchbase.com/search/organization.companies/873f45c63aeb4ae0456cccd0baa8f78b
Web traffic by SEMrush: Monthly visits	Greater than or equal to	10,000	9	https://www.crunchbase.com/search/organization.companies/271f7599994962a9d0397e5666fd9b88

Source: This study.

For analysis in this paper, the top four services by monthly website traffic were selected (see Table 2): Bolt (an international ride-hailing service), Nextbike (international bike-sharing service), CityBee (regional free-floating car-sharing service), and TIER Mobility (regional scooter sharing service).

Table 2: Summary of European micro-mobility sharing companies identified on Crunchbase

Platform	Headquarters location	Monthly website visits*	Services	Geography
Bolt	Tallinn, Estonia	1,827,546	Core service: Ride-hailing. Other services: Scooter Sharing and Food Delivery	Global
Nextbike	Leipzig, Germany	158,003	Core service: Bike-sharing	Global
CityBee	Vilnius, Lithuania	51,567	Core service: Car sharing. Other services: Bike-sharing, Scooter sharing	Regional: Baltic Sea Region
TIER Mobility	Berlin, Germany	39,600	Core service: Scooter sharing	Regional: Europe
REKOLA Bikesharing	Praha, Czech Republic	13,708	Core service: Bike-sharing	Local: Czech Republic (little presence in Finland)
dott	Amsterdam, The Netherlands	13,643	Core service: Bike-sharing, Scooter sharing	Regional: Europe
Wind Mobility	Barcelona, Spain	12,014	Core service: Scooter sharing	Regional: Europe
Urent	Sovetskaya, Russian Federation	10,697	Core service: Scooter sharing	Russian Federation
Sherlock	Torino, Italy	15,192	Core service: Bike protection from theft solution.	

Source: This study. *Note*: *SEMrush data available on Crunchbase, as recorded on 13/11/2020.

Data collection. The qualitative research design was applied following Täuscher and Laudien (2018) to gain deep insights into business models of micro-mobility platforms. This approach ensures the collection of rich data and a more in-depth understanding of platform-based business models. Following Constantiou *et al.* (2017), the data was collected from diverse online sources.

To collect the data for the comparison of the selected cases, authors have searched titles, keywords, and abstracts for brand names of selected European micro-mobility cases (i.e., Nextbike, CityBee, "TIER Mobility"; in combination with Bolt brand name, it's earlier brand name Taxify, and "scooter" was used in queries, as otherwise search resulted in too many sources not related to the brand, but rather to other subjects) and "business model" through Google Scholar. Researchers reviewed sources one by one and narrowed the list of references based on their availability, relevance to the study's main focus, and ones that were more recent and up-to-date. For each case, the content of selected sources was analyzed and used until sufficient information for the description of nine building blocks of business models was reached. Additionally, the brand's Crunchbase profile and information on their online properties (such as website, apps) were checked to ensure the resulting business model canvas is based on the business's up-to-date state.

Table 3. An overview of secondary sources selected

Secondary sources	Bolt	Nextbike	CityBee	TIER Mobility
Research publications	Čulík *et al.* (2020); Joller (2020)	Bieliński *et al.* (2020); Petzer *et al.* (2020); Ritter & Schanz (2019)	N/A	N/A
Company's online presence	Bolt (2020)	Nextbike (2020)	CityBee (2020); Modus Group (2019)	TIER (2020)
Crunchbase Company Profile	Crunchbase (2020a)	Crunchbase (2020b)	Crunchbase (2020c)	Crunchbase (2020d)

Source: This study. *Notes*: N/A – not available.

As seen from Table 3, this study uses various information sources sufficient to define business models (Hartmann *et al.*, 2016).

RESULTS SUMMARY

In this section, the authors summarize the outcomes of the analysis carried out on each case analyzed. First, we present the cases highlighting their micro-mobility services. Next, in Table 4, we summarize the key aspects of each case's business model canvas.

Bolt (was known as Taxify until rebranding in 2019) is a global transportation platform offering ride-hailing, micro-mobility (primarily e-scooter sharing, introducing e-bike sharing as well), and food delivery from restaurants (Bolt, 2020). The company's

legal name is Bolt Technology OÜ, established in 2013 with headquarters in Tallinn, Estonia. Currently, business counts "over 50M happy customers in 40+ countries, from Europe to Latam to Africa" (Crunchbase, 2020a). The company intends to become a micro-mobility leader in Europe by the end of 2021 by offering e-scooter sharing in over 100 cities (compared to 45 cities serviced by the end of 2019) and increasing the micro-mobility fleet to 130000 e-scooters and e-bikes (Bolt, 2020).

The primary customers of Bolt business are car-hailers on one side and car drivers to do the driving on the other side. Both are connected via the platform on an app, with trip route and price dynamically calculated in the back end (Joller, 2020). Company diversifies by providing other solutions like micro-mobility sharing (e-scooters, and since this year introducing e-bikes, serving short distance city riders) and food delivery (connecting restaurants, food orderers and couriers) to private customers, and possibilities to car or scooter fleet owners to "employ" their fleets and drivers for extra revenues, as well as franchise licenses. In car-hailing service, car maintenance costs fall under drivers responsibility, and Bolt pays the drivers only for the distance customers are driven. Čulík *et al.* (2020) research found out drivers driving for Bolt only start to pay off after more than one hundred riders per month. In micro-mobility sharing service, e-scooter and e-bike fleet development and its maintenance (distributing, charging, collecting, re-distributing, repairing, and replacing) is a significant part of costs.

Nextbike is the European market leader in bike-sharing (Nextbike, 2020). The company (legal name Nextbike GmbH) was established in 2004 with headquarters in Leipzig, Germany (Crunchbase, 2020b). Its micro-mobility systems are offered in over 300 cities worldwide. Nextbike develops and produces bicycles, rental station terminals, and related IT solutions. Nextbike (2020) claims that their business model does not rely on rental revenues of a single transaction model (as identified by Ritter & Schanz, 2019) only but is instead based on long-lasting B2B relationships with public transport operators, universities, or sustainability friendly employers. Since 2018 Nextbike added e-bikes to their bike-sharing solutions (Nextbike, 2020).

Nextbike offers a variety of tailored solutions to its B2B customers from advertising space on bicycles and mobile apps to advertisers, discounted usage fees for students of universities or employees of companies, sustainable first and last mile micro-mobility service complimenting intermodal public transportation system for public transport companies or cities and even regions (e.g., Bieliński *et al.*, 2020; Petzer *et al.*, 2020). Nextbike (2020) states that 90% of bike riders rent the bike using their app and have high satisfaction with the service, which is indicated with a 4.4 average App Store rating. The value creation side of the Nextbike business model is building on in-house development and production of high quality bikes and bike-sharing systems and maintaining the fleet throughout docked, dock-less, and virtual (free-floating) stations. The use of high-quality components (e.g., Shimano gear boxes, e-bikes engines produced by automotive supplier Brose) for bicycle production ensures the durability of bicycles, thus reducing fleet maintenance costs long term (Nextbike, 2020). Meanwhile, own production facilities allow fast and flexible production of customized designing of sponsored bike-sharing systems and placing advertising on bicycles.

CityBee (legal name Prime Leasing, Ltd) is primarily a car-sharing service provider, established in 2010 in Vilnius, Lithuania (Crunchbase, 2020c). It operates in Lithuania, Latvia, Estonia, and Poland by offering various free-floating cars (1300 cars, 150 vans) for short to long term rent. In 2019 CityBee had launched an electric scooter sharing service and became the leading micro-mobility service provider in the three Baltics countries: Lithuania, Latvia, and Estonia (Modus.group, 2019). Throughout the 2019 season, 156 thousand of CityBee's scooter users made 468 700 trips. Bike-sharing was introduced in 2016 and originally initiated on a condition by Kaunas city municipality, who in return allowed free parking to the CityBee cars within the city. Currently, bike-sharing service is served by a fleet of 200 bicycles in some Lithuanian cities (CityBee, 2020).

CityBee (2020) app allows its users to locate and unlock the nearest available vehicle and pay for it. As users of the service are driving cars, registration requires a valid driving license. Use is charged in combining the subscription fee and usage fees (based on mileage for car renting and based on time for bike and e-scooter renting). Special prices and discounts are offered to users of business customers and in partnerships with various organizations. Vehicle maintenance, insurance, and fueling are taken care of by the company (CityBee, 2020). Meanwhile, the car fleet is sourced via dealers, while branded micro-mobility vehicles are sourced directly from producers.

TIER Mobility (also known as TIER or TIER Scooters) is a Berlin (Germany) based provider of micro-mobility sharing solutions established in 2018 (Crunchbase, 2020d). Since its establishment, it has deployed 60 000 e-scooter in 80 cities in ten countries (Ben-Hutta, 2020). In 2020 company launched an innovation – swappable batter on their micro-mobility vehicles, which can be swapped by a user at the nearest retailer shop on the Charging Network (TIER, 2020).

Business users can view and manage their employees' usage of e-scooter renting via dedicated dashboards on the platform (TIER, 2020). Private and business users can locate, unlock, and pay for use via apps. Like Nextbike, the company cooperates with public transport companies or cities offering micro-mobility services to complement intermodal public transportation systems (Crunchbase, 2020d). The charging network offers retailers to install Charging boxes for swappable batteries. Installation and maintenance of the box are cost-free to the retailer (TIER Mobility even pays for electricity used to charge batteries). In return, it brings customers (the TIER (2020) estimates that installing the box brings on average 1,500 EUR more in revenues to the retail

location). Meanwhile, users get a discount in bonus ride time for changing the empty battery to a charged one. The solution helps the company reduce costs on maintaining their e-scooter fleet (TIER, 2020).

Table 4. Summary of European micro-mobility online services business model comparison

Business model building blocks	Bolt	Nextbike	CityBee	TIER Mobility
Customer Segments	Car drivers Private and business car-hailers Individual scooter riders Food orderers Couriers Restaurants Franchise/fleet owners	Universities Companies Municipalities Individual bike riders	Private and business car-renters Bike and scooter riders	Private and business scooter riders Companies
Value Propositions	Ride-hailing Extra income by driving/delivering Short distance mobility Food delivery service Extra revenues for employing own fleet of cars/drivers/scooters	(e-)Bike-sharing service Bike-sharing solution Advertising space (on bicycles and mobile apps)	Short to long term on-demand mobility with diverse vehicles (e.g., electric cars, cargo vans besides regular cars) Short distance mobility on scooters	Short distance mobility Customer traffic MyTIER Go e-scooters
Channels	Website/platform Apps (iOS, Android) for ride-hailing, scooters, and food Social media profiles	Website/platform Apps (iOS, Android, Microsoft) Terminals Bicycles Social media profiles	Website/platform Apps (iOS, Android) Social media profiles	Website/platform Apps (iOS, Android) Battery charging network Social media profiles
Customer Relationships	Automated & self-service Active social media communities	Automated & self-service Tailored business customer service Active social media communities	Automated & self-service B2B customer service Active and loyal social media community	Automated & self-service B2B customer service Active social media communities
Revenue Streams	Usage fee (dynamic car-hailing fee, scooter share charge time based) Franchise license fee	Subscription fees Usage fee (time-based) Sponsorship Advertising	Subscription fees in combination with usage fees (time/distance based)	Fixed unlock fee in combination with usage fees (time-based) E-scooter sales
Key Resources	Platform E-scooter/e-bike fleet Platform maintenance and customer relations staff	Production facilities and materials Platform Terminals (e-)Bicycle fleet IT and customer support staff	Platform Car/bike/e-scooter fleet Bike stations	Platform E-scooter (now e-moped also) fleet (with swappable batteries) Charging network (for swappable batteries)
Key Activities	Platform maintenance Marketing Scooter fleet maintenance	Development and production Platform maintenance Fleet maintenance and customization Rental terminal maintenance Marketing	Platform maintenance Fleet maintenance Customer relationships management/service Marketing	Platform maintenance Fleet maintenance Marketing Charging network maintenance
Key Partnerships	Municipalities Technology providers (51 diverse e-platforms/apps) Branded equipment producers (scooters, courier equipment)	Municipalities Public transport IT technology providers (29 diverse e-platforms/apps) Component/material providers (e.g., Shimano,	Municipalities Technology providers (41 diverse e-platforms/apps) Vehicle suppliers Car cleaning and repair service providers	Municipalities Technology providers (50 diverse e-platforms/apps) Producers of TIER equipment or components (batteries,

Business model building blocks	Bolt	Nextbike	CityBee	TIER Mobility
	Insurance providers	Brose)	Insurance providers Petrol station chain	scooters, charging boxes, helmets, etc.)
Cost Structure	Marketing Platform maintenance and customer relations Fleet maintenance	Marketing Platform maintenance and customer relations Bike fleet and terminal maintenance	Platform maintenance and customer relations Fleet maintenance Marketing	Platform maintenance and customer relations Fleet maintenance Marketing

Source: This study.

All four analyzed cases emphasize their contributions to sustainability goals by describing their ways and initiatives of staying carbon neutral (Bolt, 2020; Nextbike, 2020; CityBee, 2020; TIER, 2020). All four businesses also emphasize that as one of the core benefits for business customers, they use their services to show their customers and employees that they are responsible and aim to contribute to sustainability. As that is not unique to any of the cases, sustainability was not discussed separately.

CONCLUDING REMARKS

The findings reveal that European micro-mobility services are offered both as stand-alone core services (Nextbike and TIER Mobility) and additional offerings to supplement other urban mobility services (Bolt and CityBee). None of the companies analyzed rely on micro-mobility vehicle rent as the primary source of revenues. Companies with micro-mobility as a core service seem to rely stronger on business customers and partnerships with public transport companies. Naturally, the companies with micro-mobility as additional service balance out the bike and scooter usage off-season with revenues from their core activity. Micro-mobility equipment maintenance builds costs in case of all cases analyzed. However, TIER Mobility distinguishes itself with an innovative solution to reduce maintenance costs by installing swappable batteries on e-scooters, developing a charging network with local businesses, and transferring some of the efforts to charge e-scooters on users. The analysis also revealed that it is not an option in the European micro-mobility service landscape not to be sustainability conscious.

Limitations of this research are related to the scope and depth of the analysis. Business models of only four micro-mobility online services were compared: a comprehensive study of a larger sample of such platforms would lead to more conclusive findings of which aspects are most differentiating. The analysis relied on secondary sources only, and mostly only sources in English were accessed. Analysis of primary data and information available in local languages where companies operate would increase detail, especially revealing possible differences of service throughout the markets served. The study's authors intend to cover a broader range of cases, interviews of the micro-mobility platform's representatives, surveys of their users, and more detailed case analysis in future research.

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