Retos
Revista de Ciencias de Administración y Economía

April-September 2026
pp. 73-91
https://doi.org/10.17163/ret.n31.2026.05

Micromobility App adoption in Chile: Extended TAM and Collaborative Consumption

Adopción de aplicaciones de micromovilidad en Chile: TAM y Consumo Colaborativo

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Received on: 29/11/25 **Revised on:** 13/01/26 **Approved on:** 02/03/26 **Published on:** 01/04/26

Abstract: sustainable consumption has become an essential aspect of business, raising awareness of environmental care so that future generations can enjoy it. This study examines the factors that influence users' intention to use sustainable micromobility applications (bikes and e-scooters) in Chile, integrating the Technology Acceptance Model (TAM) with collaborative consumption perspectives. The proposed model deepens the understanding of consumer behavior in the adoption of mobile applications by integrating insights from collaborative consumption and the Technology Acceptance Model (TAM), thereby offering meaningful contributions to the existing literature on sustainable mobility and digital platforms. Based on data from 168 users in Chile and using a covariance-based structural equation model (CB-SEM), this study finds that perceived usefulness and enjoyment play the most important roles in influencing the intention to adopt sustainable transportation. This provides valuable insights into consumer preferences and behavior in Chile, which may be beneficial to mobile application companies already established or seeking to expand in the country. Moreover, the study offers implications for policymakers concerned with transportation planning, environmental sustainability, and the development of smart cities in emerging economies. In addition, this study presents several limitations and outlines avenues for future research aimed at deepening the analysis of sustainable transportation adoption in different socio-economic and technological contexts.

Keywords: consumption, motivation, technology acceptance model, sustainability, sustainable mobility.

Suggested citation: Mansilla-Obando, K. and Llanos, G. (2026). Micromobility app adoption in Chile: extended TAM and Collaborative Consumption. *Retos Revista de Ciencias de la Administración y Economía*, *16*(31), pp. 73-91. https://doi.org/10.17163/ret.n31.2026.05

Resumen: el consumo sostenible se ha convertido en un aspecto esencial de los negocios, con el objetivo de crear conciencia sobre el cuidado del medio ambiente para que las generaciones futuras puedan disfrutarlo. Este estudio examina los factores que influencian la intención de uso de aplicaciones de micromovilidad (bicicletas y scooters) en Chile, integrando el modelo de aceptación de tecnología (TAM) considerando la perspectiva del consumo colaborativo. El modelo propuesto profundiza en la comprensión del comportamiento del consumidor en la adopción de aplicaciones móviles, integrando aportes del consumo colaborativo y del Modelo de Aceptación Tecnológica (TAM), ofreciendo así contribuciones relevantes a la literatura sobre movilidad sostenible y plataformas digitales. Con base en datos de 168 usuarios en Chile y utilizando un modelo de ecuaciones estructurales basado en covarianza (CB-SEM), los hallazgos de este estudio destacan que la utilidad percibida y el disfrute desempeñan los roles más importantes en la influencia de la intención de adoptar un transporte sostenible. Esto proporciona valiosas perspectivas sobre las preferencias y el comportamiento del consumidor en Chile, lo cual puede resultar beneficioso tanto para las empresas de aplicaciones móviles ya instaladas como para aquellas que buscan expandirse en el país. Asimismo, el estudio ofrece implicancias para los responsables de políticas públicas vinculadas a la planificación del transporte, la sostenibilidad ambiental y el desarrollo de ciudades inteligentes en economías emergentes. Finalmente, el estudio presenta diversas limitaciones y propone líneas de investigación futura orientadas a profundizar el análisis de la adopción del transporte sostenible en distintos contextos socioeconómicos y tecnológicos.

Palabras clave: consumo, motivación, modelo de aceptación tecnológica, sostenibilidad, transporte sostenible.

Introduction

The pursuit of alternative transportation methods is crucial to advancing cleaner, smarter cities. Acknowledging transportation options is therefore essential. The planet is currently facing a climate crisis driven by global warming, stemming from the overexploitation of natural resources and greenhouse gas (GHG) emissions from various sectors, including transportation.

The transportation sector is one of the major contributors to global carbon emissions and, therefore, to environmental pollution, which underscores the urgent need for collaborative approaches to reduce emissions (Siriwardana & Nong, 2021). The bigger the cities, the greater their contribution to carbon emissions and energy consumption, and the greater the opportunity to contribute through sustainable mobility, which requires infrastructural, technological, and behavioral changes (Winkler *et al.*, 2023).

In Chile, the most recent National GHG Inventory report indicates that the land transportation sector accounts for 24.1% of the country's total GHG emissions, equivalent to 37 million tons of CO2 (Ministerio del Medio Ambiente, 2023). Considering the concentration of people in its capital city, Santiago, with about 20 million inhabitants, it is important to consider different paths to reduce its carbon emissions. Beyond investment in green hydrogen and the promotion of electric vehicles, technology plays an essential role in the transition to sustainability. In this context, mobile applications have facilitated the use of sustainable transport.

Awareness of this situation has motivated the country to take action. In Chile, platforms such as Bike Itaú, Lime, and Grin have registered a remarkable boom. Lime, for example, reached 1 million trips in just 9 months, doubling that figure in the following 6 months, according to national media reports. Zhu *et al*. (2023) and Coppola and Lobo (2022) noted that micromobility (such as bike-sharing and scooter-sharing) is crucial for sustainable development and for reducing urban environmental impacts, especially in mitigating car dependence. Collaborative consumption represents a significant paradigm shift emphasizing access over ownership. This phenomenon, enabled by digital platforms, extends across various sectors, including sustainable transportation (Anthony Jr., 2023; Suryawan *et al.*, 2026; Karami *et al.*, 2025), leaving some effects, such as growing user interest in more flexible, economical, clean, and efficient transportation options, underscores the importance of understanding the drivers behind their adoption.

Although academic studies analyze consumers' reasons for using sustainable transportation applications (Pamidimukkala *et al.*, 2025; Karami *et al.*, 2025; Çallı & Çallı 2024; Suryawan *et al.*, 2026; Razali *et al.*, 2021; Wu 2019), research in emerging economies, particularly in Latin America, remains limited (as in Llanos *et al.*, 2023). In this sense, Santiago de Chile presents itself as an ideal context for this study, being recognized as the city with the highest sustainability and quality of life scores in the region (IESE Business School, 2022), and as the epicenter of the main sustainable transportation mobile apps. The expansion of Intelligent Transporta-

Print ISSN: 1390-6291; Electronic ISSN: 1390-8618

tion Systems is recognized globally as a revolutionary force aimed at improving network efficiency, safety, and environmental friendliness, and their components contribute to the sustainable smart cities (Elassy *et al*., 2024).

This research contributes to the management and economics conversation on sustainable business models and digital transformation in urban mobility. Specifically, it examines technology adoption in platform-mediated services through an extended Technology Acceptance Model (TAM) and a collaborative consumption (sharing economy) perspective, using evidence from Chile as an emerging market. In doing so, the study offers insights for both platform strategy and public management aimed at accelerating sustainable mobility transitions.

The study advances prior research by moving beyond a single-theory explanation of micromobility adoption. We propose and test an integrated framework that combines TAM beliefs with collaborative consumption mechanisms and enabling conditions, thereby capturing both perceived value and the practical feasibility of use. By validating this framework in Chile, the article extends the boundary conditions of micromobility adoption research and offers a basis for comparative studies in other emerging economies.

Therefore, this study seeks to identify the determinants/drivers of intention to use sustainable transport mobile applications in an emerging economy. In particular, it aims to explore the factors influencing Chilean consumers' intention to use mobile applications for sustainable transport, specifically electric bicycles and scooters.

Using a quantitative methodology based on a covariance-based structural equation model (CB-SEM) and elements of the Technology Acceptance Model (TAM), data collected from 168 users were analyzed using a convenience sample. This methodological approach, widely recognized for its simplicity and theoretical robustness, allows for the explanation of technological adoption across various contexts and environments (Palos *et al*., 2019), as observed in Wu (2019).

The results of this study demonstrate the relevance of Perceived Usefulness and Enjoyment in the Intention to Use sustainable transportation technologies. These findings aim to contribute to the collaborative consumption literature by examining mobile application use in emerging Latin American countries. Additionally, they offer practical implications for sustainable transportation companies in Chile, helping them better understand their market and make more informed strategic decisions. Furthermore, these insights are valuable to policymakers aiming to promote the use of bicycles and electric scooters as part of a vision for more sustainable, smarter cities.

This document is organized as follows: first, the literature review; second, the theoretical framework and development of the hypotheses; third, the research methodology; fourth, the analysis of results; and finally, the discussion and conclusions.

Literature Review: Sustainable Development in Cities

The rapid pace of urbanization is one of the main factors driving increased energy consumption, which, in turn, increases transport demand, leads to biodiversity loss, and makes it more challenging to achieve sustainable development (United Nations, 2018). According to the United Nations (2018), 55% of people worldwide live in cities, and this figure is projected to increase to 13% by 2050, posing a challenge.

The concept of eco-city or smart city was coined in 1975 by Richard Register, who defines it as "a city balanced with nature" (Roseland, 1997). Based on this idea, several authors have defined this concept (Bibri, 2020; Camero & Alba, 2019; Brilhante & Klaas, 2018; Saad *et al*., 2017; Jabareen, 2006; Khan, 2006; Roseland, 1997). From this perspective, the priorities of urban ecology include promoting public transportation, walking, and cycling; social justice; local agriculture; recycling; ecological education; and environmental awareness, while simultaneously discouraging private vehicle use, pollution, and waste generation (Wang, 2018).

According to Camero and Alba (2019), smart city initiatives are classified into six key dimensions:

- **Smart Economy:** Focuses on productivity, labor market flexibility, innovation, and entrepreneurship.
- **Smart Environment:** Aims at environmental protection, pollution reduction, and sustainable resource management.
- **Smart Governance:** Encourages transparent government, citizen participation in decision-making, access to information, and inclusive political strategies.
- **Smart Living:** Ensures access to public services, quality housing, cultural and educational institutions, while improving lifestyles and providing a safe, attractive urban environment for citizens.
- **Smart Mobility:** Advocates for transportation systems, information and communication technology (ICT) infrastructure, and accessible, innovative, sustainable, and safe transportation systems.
- **Smart People:** Emphasizes citizen engagement, creativity, and innovation to build an intelligent city.

Also, in exploring this transition, global research highlights that city-level sustainability is heavily influenced by local psychological and regulatory environments. For example, in countries as Irán, a densely populated urban center, Karami *et al.* (2025) investigated the adoption of shared e-scooters by examining the impact of personality traits. Their results indicate that trust and social influence are the strongest predictors of usage intention, while personality traits like "openness to experience" positively impact adoption and "neuroticism" acts as a barrier. Similarly, in Indonesia, a megacity facing extreme traffic congestion, Suryawan *et al.* (2026) studied e-scooter adoption from a consumer perspective. Utilizing probit and logit regression models, they found that income is the most significant predictor; contrary to trends in developed nations, lower-income groups in Jakarta show a much higher inclination toward e-scooters as a cost-effective alternative to traditional transit.

Furthermore, the role of policy in urban sustainability was examined in United States, in Pamidimukkala *et al*. (2025) applied an extended Theory of Planned Behavior (TPB) to evaluate the adoption of electric vehicles. Their findings reveal that while positive attitudes and moral norms drive intention, monetary incentives (such as tax credits) are the primary catalyst for the consumer shift toward green technology, whereas non-monetary incentives often fail due to bureaucratic friction. These studies underscore that sustainable development is not a one-size-fits-all technological shift but an alignment of individual traits, socioeconomics, and government incentives tailored to specific urban contexts.

This highlights that the creation of smart cities is primarily concentrated in these regions and remains limited in Latin America, which, according to IESE (2022), has the highest urban concentration on the planet.

Sustainable transportation in Chile

The sustainable transport applications currently operating in Chile are Lime, Grin, Bike Itaú, and Uber, the latter offering the Lime scooter and bicycle service on its platform. Lime is an American transportation rental company that arrived in Santiago de Chile in November 2018. In just 15 months, it achieved 2 million trips, making Chile the first country in Latin America to reach this milestone. The Lime app lets you rent electric bicycles or scooters by the trip, with a $500 unlock fee and $160 per minute of use. In addition, it offers flat rates that let you buy travel passes to save money, as well as the option to sign up for Lime Prime, a monthly subscription service with additional benefits.

Since February 2021, Lime electric scooters and bicycles have been available for rent through the Uber application in the Las Condes commune. This option is in the application's main menu, under the name "Two Wheels." The rental prices are similar to those in the Lime app (Uber Newsroom, 2021).

For its part, Grin is a Mexican electric scooter rental company that arrived in Chile in January 2019 (Diario Sustentable, 2019). It currently op-

Print ISSN: 1390-6291; Electronic ISSN: 1390-8618

erates in Santiago and Viña del Mar, where its rates are $350 for unlocking, $225 per minute of use, or $500 for unlocking for 10 minutes, with an additional $175 per minute.

The Bike Itaú app, operated by the Brazilian company Tembici, arrived in Santiago in 2013 (Sachs *et al*., 2024). Today, the city has 2,500 electric bicycles and 190 stations. The app offers three service plans: daily, monthly, and annual, with costs of $1,990 for up to 60 minutes for 24 hours; $3,990 for up to 120 minutes for one month, and $31,990 for up to 120 minutes for one year.

Literature review: collaborative consumption and shared micromobility

Collaborative consumption describes market arrangements where access temporarily replaces ownership, usually mediated by digital platforms that reduce transaction costs. In urban mobility, this logic underpins bike-sharing and e-scooter services, where platforms coordinate fleet availability, pricing, and payments, enabling trips that can complement public transport and reduce private car dependence (Coppola & Lobo, 2022; Zhu *et al.*, 2023).

Prior evidence suggests that shared micromobility adoption depends not only on functional value (cost, time, convenience) but also on symbolic and experiential value, including enjoyment and lifestyle. For example, studies on bike-sharing highlight that platforms can materialize sustainable collaborative consumption by combining digital affordances with physical infrastructure, which shape perceived value and continued use (Da Silveira *et al*., 2021).

Evidence from emerging markets remains scarce, despite the rapid diffusion of platform-mediated services. Research in Latin America shows that collaborative consumption adoption is sensitive to contextual factors such as economic uncertainty, trust, and infrastructure conditions, which can amplify or constrain the value of platform offerings (Llanos *et al.*, 2023). This gap is especially relevant for micromobility apps because their success depends on both user perceptions and enabling conditions (e.g., safety, bike lanes, parking rules, service reliability).

Building on this literature, our study positions micromobility apps as a form of sustainable collaborative consumption and integrates a technology-adoption lens (extended TAM) with enabling conditions to explain intention to use in Chile. This helps connect platform strategy questions with public management questions and provides a basis for comparison with other emerging economies.

Theoretical framework and hypothesis development

In previous research on the use of micromobility via mobile applications, the most widely used model has been the Technology Acceptance Model (TAM). Proposed by Davis (1985), this model analyzes people's acceptance of new technologies, focusing on two primary constructs that affect intention to use: perceived ease of use and perceived usefulness (King & He, 2006). The TAM provides a solid basis for assessing the impact of external variables on the intention to use a system, highlighting perceived ease of use and perceived usefulness as key factors for analyzing ICT adoption (Legris *et al*., 2003).

Since its creation, the TAM has been tested and extended across multiple investigations, consolidating its status as one of the most effective models for predicting the use of information systems. According to Legris *et al*. (2003), this model has proven capable of explaining approximately 40% of the variation in the use of information systems, thanks to its simplicity, adaptability, and theoretical robustness. These characteristics have made the TAM the most widely employed technology acceptance model today (Palos *et al*., 2019).

From a consumer behavior perspective, we focus on adoption-related motivations captured through TAM constructs (e.g., perceived usefulness, enjoyment, ease of use) and enabling conditions. In this study, "motivation" is therefore treated as a set of belief-based drivers of technology adoption, consistent with established

TAM extensions. Prior studies have extended TAM by incorporating motivation-related constructs (e.g., intrinsic enjoyment and extrinsic usefulness) to explain intention to use in mobility contexts (e.g., Wu *et al*., 2019). Extending the core TAM constructs is essential for shared mobility studies (Akel & Bayir, 2025).

The motivation model defines intrinsic motivation as performing an activity for the simple pleasure of doing it, without external reward expectations. In contrast, extrinsic motivation refers to performing an activity to obtain a valuable or tangible result (Davis *et al*., 1992). According to the authors, to adequately analyze intention to use, it is crucial to consider the effects of intrinsic motivations, which are influenced by factors such as self-efficacy, perceived competence, and self-determination. These aspects are derived from self-determination theory, which holds that these feelings are key determinants of intrinsic motivation (Davis *et al*., 1992).

The measurement constructs considered in the TAM and the main hypotheses of this study are presented below.

Perceived usefulness

Perceived usefulness is one of the primary constructs of the TAM and represents users' extrinsic motivation. According to Davis (1985), subjective perceptions indicate that using a system will improve a user's performance on a specific task, such as renting bicycles or scooters via mobile applications.

In the context of sustainable transportation, perceived usefulness manifests itself in various aspects. Wu *et al*. (2019) note that, for shared bicycles, users value benefits such as their positive environmental impact, cost savings, speed, and their contribution to a healthy lifestyle. On the other hand, electric scooters offer advantages such as time savings, overcoming the limitations of public transport, and their environmentally friendly nature, as they reduce fuel use and prevent pollution (Razali *et al*., 2021).

The analysis of perceived usefulness is crucial because, as Wu *et al*. (2019) highlight, when users perceive that a system meets their expectations, they consider it useful, which significantly influences their intention to use it. In this model, the perceived benefits of sustainable transport serve as key motivators for users to adopt it. Based on the above, the following hypothesis is proposed:

H1. Perceived usefulness has a direct positive effect on the intention to use sustainable transportation applications.

Enjoyment

Enjoyment represents a significant emotional dimension that influences users' intrinsic motivations. In the case of sustainable transportation applications, enjoyment plays an essential role, as it is not linked to obtaining an external reward, as with perceived usefulness, but rather to the pleasure inherent in the activity itself.

According to Wu *et al*. (2019), shared transportation options like bicycles and electric scooters cater to various motivations, with relaxation and enjoyment being particularly significant. These modes of transport not only serve as functional alternatives for commuting but also offer recreational experiences. For instance, Zhang *et al*. (2015) emphasize that tourists are drawn to using bicycles to explore cities, as it enables them to take in the scenery in greater detail and enjoy the surrounding environment.

The enjoyment derived from using sustainable transportation applications can stem from recreational rides alone or with friends, as well as from tourist experiences. In this sense, when users experience pleasure when using these systems, their intention to use them increases.

Since we decided to focus our research on young users (Generation Z), it is essential to recognize that Attitude toward responsible consumption positively influences responsible consumption habits and purchasing behavior. This attitude highlights that the decision to use sustainable transport apps may be deeply rooted in broader pro-environmental and ethical beliefs, linking intrinsic motivations (Enjoyment) to actual purchasing behavior (Cristancho-Triana *et al*., 2024).

Print ISSN: 1390-6291; Electronic ISSN: 1390-8618

Based on this relationship, the following hypothesis is proposed:

H2. Enjoyment has a direct positive effect on the intention to use sustainable transportation applications.

Perceived ease of use

Perceived ease of use is one of the central variables in TAM. This concept refers to the degree to which a user perceives that using a system does not require significant effort (Davis *et al*., 1989), or, more specifically, to the perception that a system facilitates the development of an activity by requiring less effort (Venkatesh *et al*., 2003). According to several studies, the easier a system is to use, the greater the probability that people will adopt it, since simplicity reduces psychological and operational barriers. Given the above, the following hypothesis is presented:

H3. Perceived ease of use has a direct positive effect on the intention to use sustainable transportation applications.

In addition to the direct impact on intention to use, perceived ease of use also has an indirect effect, mediated by perceived usefulness and enjoyment (Wu *et al*., 2019).

When users perceive that a system, such as a sustainable transportation application, is easy to use and requires little effort, their perceived usefulness increases. In contrast, if the system is complex and challenging to manage, the intention to use it decreases significantly. Ease of use also influences enjoyment, as a simple, smooth experience enhances the positive emotions associated with using the system. In this context, if users find applications intuitive and accessible, their enjoyment increases, encouraging recurrent use. Therefore, the following hypotheses are generated:

H4. Perceived ease of use has a direct positive effect on enjoyment.
H5. Perceived ease of use has a direct positive effect on perceived usefulness.

Enabling conditions

Facilitating conditions refer to external factors that simplify and support the use of a system by the user (Venkatesh *et al*., 2003). In this context, these factors are focused on the environment that facilitates the use of sustainable transport applications, either through public infrastructure such as special lanes for bicycle and scooter use, parking lots, technological support provided by operators, such as the operating system and stable service of the application (Wu *et al*., 2019).

According to Wu *et al*. (2019), facilitating conditions do not directly influence intention to use, but affect perceived usefulness, enjoyment, and perceived ease of use.

Akel and Bayır (2025) found that Perceived Values (including Green Value) significantly affect Perceived Ease of Use and Perceived Usefulness in car-sharing adoption. They also included Privacy Concern (PC) as a key factor influencing Intention to Use. While our study primarily focused on Perceived Usefulness and Enjoyment, future research on Chilean micro-mobility adoption should examine how Green Value and PC influence intention, given the inherent data sensitivity of these app-based services.

The presence of enabling conditions, such as adequate infrastructure and reliable technological services, facilitates system use, reducing users' effort and increasing perceived ease of use. On the other hand, facilitating conditions also affect perceived usefulness. A well-designed infrastructure and efficient technical support increase the perceived benefits of the system. However, inadequate conditions may decrease the user's perception of usefulness. Given this, the following hypothesis is proposed:

H6. Facilitating conditions positively affect perceived ease of use.

H7. Facilitating conditions positively affect perceived usefulness.

Facilitating conditions also influence users' enjoyment. When these are favorable, such as having access to secure infrastructure and reli-

able technological services, the user experience becomes more pleasant, which motivates users to use the system regularly; on the other hand, if the enabling conditions are not favorable, they can negatively affect enjoyment and intention to use. On the other hand, although the direct impact of facilitating conditions on intention to use is limited, they influence intention to use indirectly by improving ease of use, perceived usefulness, and enjoyment. When users perceive a favorable environment, their willingness to adopt the system increases considerably.

Given the above, the following hypothesis is put forward:

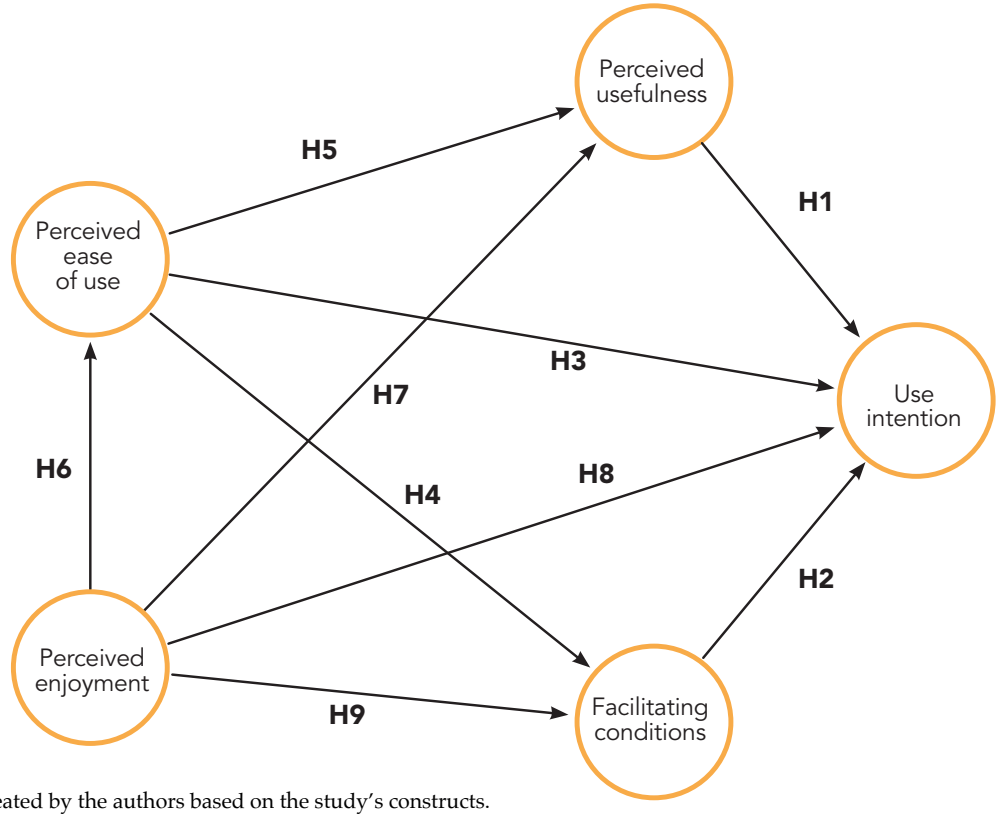
H8: Facilitating conditions positively influence the intention to use sustainable transportation applications.

H9: Facilitating conditions positively influence the perceived enjoyment.

Figure 1 represents the theoretical model for testing.

Figure 1

Proposed model to be tested



Note. Created by the authors based on the study's constructs.

Materials and Methods

The aim of this study is to examine the determinants of Chilean consumers' intention to use sustainable micromobility applications (bikes and e-scooters), integrating an extended Technology Acceptance Model (TAM), collaborative consumption factors, and enabling conditions.

This study employs a quantitative methodology, analyzing data collected through a survey instrument using SmartPLS software, which facilitates structural equation modeling (CB-SEM). SmartPLS offers a user-friendly interface

Print ISSN: 1390-6291; Electronic ISSN: 1390-8618

and advanced reporting capabilities (Kwong, 2013), making it an effective tool for evaluating construct relationships (De Souza & Da Silva, 2019). This will be done using the experiences of previous studies on TAM items and the determination of factors affecting intention to use (Ozmen, 2023; Karami *et al*., 2025).

Instrument: Survey

The survey instrument was built from previously validated scales commonly used in technology adoption research (TAM-based measures and related extensions). It was developed based on the authors Davis *et al*. (1989), Davis *et al*. (1992), Thompson *et al*. (1991), and Ashraf *et al*. (2014), from which the scales for the respective constructs used to measure the intention to use sustainable bicycle and/or scooter transport were obtained. The questionnaire consisted of two parts. First, the study participants were asked for sociodemographic information such as age, occupation, income range, applications they use to get around, and reasons for using those applications; and second, they were asked about constructs that could explain the drivers for using sustainable transport. In the first section, the questions were multiple-choice. In contrast, in the second section, the questions used a 5-point Likert scale: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = totally agree. The details are presented in Table 2.

The instrument was prepared in Spanish since the potential respondents were native Spanish speakers. Therefore, the instrument was prepared based on the authors mentioned above, translated into Spanish, validated by experts in the marketing field, and five pilot tests were conducted to evaluate the consistency of the questions. The questionnaire was then ready to be used.

Sample

Data were collected in Chile using a non-probabilistic sampling approach, targeting adult users with familiarity or experience with app-based micromobility services (bikes and e-scooters). The questionnaire was administered online, participation was voluntary and anonymous, and responses were collected anonymously. At the beginning of the survey, respondents were informed of the study's academic purpose and provided consent to participate. To ensure data quality, incomplete responses were removed, and additional screening criteria were applied (e.g., eliminating duplicate entries and responses with evident lack of engagement, such as straight-lining patterns or unrealistically short completion times).

A total of 172 responses were obtained, of which only 168 were used because their answers were consistent across all items in the instrument. The participants were people aged 18 or older, primarily students and employees, who indicated that they mainly used the service to reach their educational centers or workplaces, though at different frequencies. The potential participants had to be located in the capital of the Latin American country, Santiago, since that is where the main mobile applications for sustainable transport are concentrated: bicycles and scooters.

Data collection was conducted by the research team using a non-probabilistic approach. First, potential participants were invited through social networks (e.g., posts and direct messages) to reach adults who were familiar with app-based micromobility services. Second, to complement online recruitment and increase access to active users, in-person invitations were carried out in two high-traffic areas of Santiago where micromobility use is concentrated: the surroundings of Costanera Center (the largest shopping center in Chile) and the El Golf neighborhood in the Las Condes district. In both recruitment modes, respondents accessed the same online questionnaire via a survey link/QR code and participated voluntarily and anonymously.

After data collection, the database was reviewed, and missing responses were removed, leaving N=168 respondents. Table 1 below provides details of the participants in this study.

Table 1
Study Survey Sample

Respondents		Total	%
Gender	Female	80	46,51
	Male	89	51,74
	I would rather not say	1	0,58
	No answer	2	1,16
Age	18-22	27	15,70
	22-28	71	41,28
	28-34	36	20,93
	34-40	14	8,14
	40-46	12	6,98
	46-52	6	3,49
	52-58	3	1,74
	58-64	2	1,16
	64-70	1	0,58
Occupation	Student	57	33,14
	Employee	86	50,00
	Self-employed	22	12,79
	Others	7	4,07
Revenue*	Less than 500	45	26,16
	Between $500 and $1,000	51	29,65
	Between $1,000 and $1,500	28	16,28
	Between $1,500 and $2,000	13	7,56
	Between $2,000 and $2,500	14	8,14
	Others	21	12,21
Reasons	Healthy lifestyle	49	28,49
	Affordable	57	33,14
	Eco-friendly	30	17,44
	Other	36	20,93
Applications	Lime	55	31,98
	Uber	52	30,23
	Bike Itaú	47	27,33
	Grin	18	10,47
Frequency	Every day	14	8,14
	3 to 5 times a week	29	16,86
	1 to 3 times a week	35	20,35
	Occasionally	94	54,65

* Values in thousands of Chilean pesos.

Print ISSN: 1390-6291; Electronic ISSN: 1390-8618

Table 2
Measurement scales for the study constructs

Constructs	Items	Source
Perceived Usefulness (PU)	Using sustainable transportation apps allows you to reach your destination faster.	Davis *et al.* (1989)
	Using sustainable transportation apps saves time.	
	Using sustainable transportation apps increases travel efficiency.	
	Using sustainable transportation apps makes traveling easier.	
	Using sustainable transportation apps is very useful for traveling.	
Enjoyment (ENJ)	Using sustainable transportation apps is pleasant.	Davis *et al.* (1992)
	Using sustainable transportation apps is enjoyable.	
	Using sustainable transportation apps is fun.	
Perceived Ease of Use (PEOU)	Sustainable transportation apps are clear.	Davis *et al.* (1989)
	Sustainable transportation apps are understandable.	
	It will be easy to become proficient with sustainable transportation apps.	
	Sustainable transportation apps are easy to handle.	
	Sustainable transportation apps are easy to use.	
	Sustainable transportation apps are convenient.	
Facilitating Conditions (FC)	Bike lanes are available for you when using sustainable transportation apps.	Thompson *et al.* (1991)
	Sustainable transportation apps let you leave the vehicle on the street when you are finished using them.	
	Technical services for the apps are available to you when using sustainable transportation apps.	
	Usage instructions for the transportation app are provided within the sustainable transportation app.	
	Support for the sustainable transportation app is available if you have any difficulties.	
Intention to use (INT)	You predict that you will use sustainable transportation apps for your short-distance trips in the future.	Ashraf *et al.* (2014)
	You plan to use sustainable transportation apps for your short-distance trips in the future.	
	You intend to use sustainable transportation apps in the future if they are available.	

Note. Prepared by the author based on various sources.

Results and discussion

Before testing the proposed model, rigorous evaluations are conducted to assess the reliability and validity of the constructs. These use metrics such as Cronbach's Alpha and Average Variance Extracted (AVE). All constructs reach values over 0.8 for Cronbach's Alpha and values over 0.5 for AVE, indicating reliability. This is detailed in Table 3. Then, the discriminant validity of the constructs is assessed using the Heterotrait-Monotrait Ratio and the

Fornell-Larcker Criterion. For the latter, diagonal values are larger than other values in their row and column, which shows validity. Tables 4 and 5 present these values. The constructs meet the established criteria for conventional reliability and validity.

Table 3

Reliability and Validity of the Constructs

	Cronbach's alpha (standardized)	Cronbach's alpha (unstandardized)	Composite reliability (rho_c)	Average variance extracted (AVE)
Facilitating Conditions	0.808	0.808	0.817	0.596
Enjoyment	0.842	0.842	0.853	0.656
Perceived Ease of Use	0.921	0.92	0.921	0.749
Intention to use	0.877	0.877	0.886	0.717
Perceived Usefulness	0.868	0.867	0.866	0.622

Table 4

Discriminant validity: heterotraits-monotraits ratio

	Facilitating Conditions		Perceived Ease of Use	Intention to use	Perceived Usefulness
Facilitating Conditions					
Enjoyment	0.549				
Perceived Ease of Use	0.661	0.585			
Intention to use	0.511	0.621	0.586		
Perceived Usefulness	0.520	0.516	0.602	0.574	

Table 5

Discriminant validity: Fornell-Larcker criterion

	Facilitating Conditions	Enjoyment	Perceived Ease of Use	Intention to use	Perceived Usefulness
Facilitating Conditions	0,772				
Enjoyment	0,542	0,810			
Perceived Ease of Use	0,600	0,559	0,865		
Intention to use	0,496	0,531	0,530	0,847	
Perceived Usefulness	0,524	0,387	0,597	0,531	0,788

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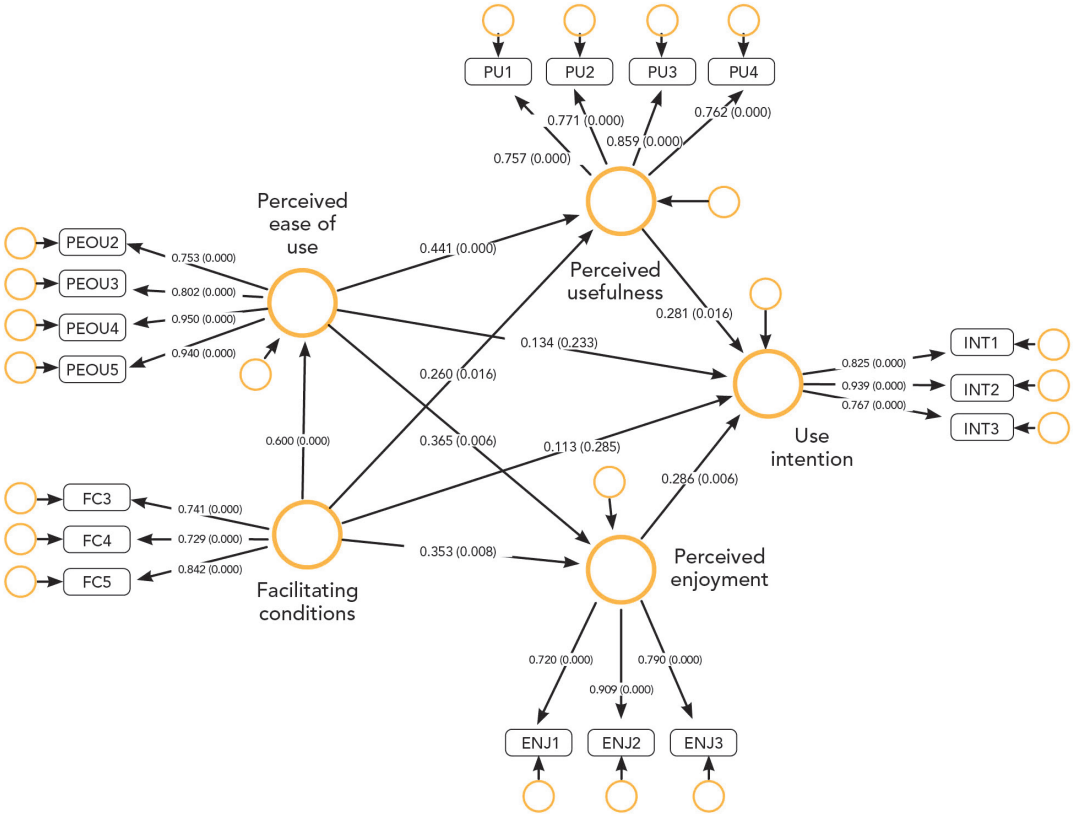
The result of the proposed model is presented in Figure 2.

The chi-square for the basic model was 614.626 (df = 43: $p < 0.001$) and some relevant indices for the analysis were CFI = 0.923, TLI = 0.905, NFI = 0.908, all above the cut-off point of 0.9 (Hair *et al*., 2010) and RMSEA = 0.091, a value slightly above the conventional indicator (Hair *et al*., 2010).

The above model suggests a positive and significant relationship ($p < 0.001$) between the constructs and the hypothesized relationships.

Table 6 shows the estimated parameters, the significance levels, and whether the results support the hypotheses. Overall, seven of the nine hypotheses were supported. Perceived usefulness (H1) and enjoyment (H2) were significant direct drivers of intention to use, reinforcing that users adopt micromobility apps when they perceive both instrumental benefits (time/efficiency) and hedonic value (fun/pleasant experience) in the service (Wu *et al*., 2019; Rejali *et al*., 2021). Perceived ease of use did not show a significant direct effect on intention (H3), but it did increase both usefulness (H5) and enjoyment (H4), indicating an indirect pathway consistent with TAM extensions in mobility contexts.

Figure 2
Model Results



Facilitating conditions were strongly related to perceived ease of use (H6) and also contributed to usefulness (H7) and enjoyment (H9). However, their direct effect on intention (H8) was not significant, suggesting that infrastructure and service support primarily operate as 'enablers'

that improve the user experience rather than as independent motivators.

This study investigated the drivers/determinants of intention to use sustainable transportation applications, incorporating elements of the TAM model. The results validate the measurement model, demonstrating that the constructs exhibit strong reliability and validity, ensuring that the items effectively capture the intended dimensions.

The analysis reveals that the intention to use construct is significantly influenced by other factors, with at least 80.04% of respondents expressing willingness to use such applications. Among these factors, perceived ease of use has the most substantial impact on intention to use. Additionally, enjoyment plays a critical role in shaping user behavior toward sustainable transportation applications. It not only affects the intention to use but is also valued by 80.43% of respondents, highlighting its importance in enhancing user engagement and adoption. After analyzing each construct, support was found for the proposed hypotheses.

While perceived usefulness and enjoyment were the strongest predictors of intention in the Chilean context, other studies examining car-sharing reveal that perceived values (functional, social, green) and privacy concern are also critical predictors of behavioral intention. Future research should measure these dimensions (e.g., green value and privacy concern) in the context of micro-mobility to gain a more holistic understanding of user motivations beyond standard TAM predictors (Akel & Bayir, 2025). On the other hand, Llanos *et al*. (2023) indicate that enjoyment plays a significant role in shaping Uber consumers' behavioral intentions.

Regarding the constructs of the TAM model, except the Facilitating Conditions construct, the option with the highest percentage is 5 (totally agree), where the constructs with the highest percentage are Enjoyment (52.13%) and Intention to Use (52.13%), which shows that the vast majority of people enjoy using sustainable transport applications and intend to use them. The following constructs have the highest percentages: Perceived Usefulness (40.12%) and Perceived Ease of Use (40.81%), indicating that people find sustainable transport applications helpful and easy to use. Finally, for the Facilitating Conditions construct, the percentage corresponding to option 5 is 23.64%, but the highest percentages for this construct are for option 4 (28.49%) and option 3 (27.91%).

Our finding that facilitating conditions show mixed agreement and a less direct impact on intention to use highlights the existing infrastructure gaps in emerging markets. This contrasts with the imperative for intelligent transportation system development in smart cities globally, where real-time data from sensors and cameras, along with communication systems like 5G, are essential for traffic management and enhancing safety. Effective intelligent transportation system integration is key to achieving significant sustainability benefits, such as reducing travel time and greenhouse gas emissions, as demonstrated in cities like Los Angeles, United States, and Barcelona, Spain (Elassy *et al*., 2024).

Regarding Perceived Usefulness, on the one hand, question 1, "Using sustainable transport applications allows you to get to your destination faster," is the one with which people agree the most, with 42.44%. On the other hand, question 3, "Using sustainable transport applications increases the efficiency of trips," has the lowest percentage for the option "Totally agree," at 37.79%.

For the construct of Enjoyment, on the one hand, question 3, "Using sustainable transport applications is fun," is the one with which people agree the most, at 56.40%. On the other hand, question 2, "Using sustainable transport applications is pleasurable," has the lowest percentage for the "Totally agree" option at 47.09%.

The positive adoption rates observed in Santiago, driven by utility and enjoyment, support the literature emphasizing that mobility solutions enabled by ICT can encourage a modal diversion away from private vehicles. Policymakers should leverage these findings to design systems that improve accessibility and overcome persistent car-dependency habits (Coppola & Lobo, 2022).

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Table 6

Hypotheses, Parameters, and Significances

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	H	Support Hypothesis
Perceived Usefulness→ Intention to use	0,319	0,320	0,136	2,337	0,020	1	Supported Supported
Enjoyment→ Intention to use	0,345	0,351	0,135	2,549	0,011	2	Supported
Perceived Ease of Use→ Intention to use	0,146	0,134	0,125	1,167	0,244	3	Not Supported
Perceived Ease of Use→ Enjoyment	0,329	0,324	0,130	2,528	0,012	4	Supported
Perceived Ease of Use→ Perceived Usefulness	0,423	0,421	0,115	3,679	0,000	5	
Facilitating Conditions → Perceived Ease of Use	0,512	0,518	0,082	6,270	0,000	6	Supported
Facilitating Conditions→ Perceived Usefulness	0,213	0,215	0,095	2,249	0,025	7	Supported
Facilitating Conditions→ Intention to use	0,105	0,113	0,105	0,998	0,319	8	Not Supported
Facilitating Conditions→ Enjoyment	0,248	0,258	0,105	2,353	0,019	9	Supported

The strong influence of enjoyment and perceived usefulness supports the premise that digital platforms effectively provide the required features and benefits (nonhuman actors) to realize sustainable collaborative consumption. As shown in bike-sharing case studies, digital platforms and physical infrastructure mediate connections and inducements that stimulate alternative mobility through health, sustainability, and cost-effectiveness (Da Silveira *et al*., 2021).

In the Perceived Ease of Use construct, on the one hand, question 3, "It would be easy for you to become proficient in sustainable transport applications," is the one with which people agree the most, at 50.00%. On the other hand, question 2, on whether "Sustainable transport applications are understandable," had the lowest percentage for the "Totally agree" option at 31.98%.

In the Facilitating Conditions construct, question 4, "Instructions on the use of transport are offered in the sustainable transport application," is the one with which people agree the most, at 31.40%. On the other hand, question 3, "The technical services of the applications are available to you when you use sustainable transport applications," has the lowest percentage in the "Totally agree" option at 18.60%.

In the construct Intention to Use, on the one hand, question 3, regarding whether "The person predicts using sustainable transport applications in the future if available," is the one with which people agree the most, with 58.72%. On the other hand, question 1, which asks whether "The person predicts that they will use sustainable transport applications in the future on short-distance trips," has the lowest percentage for the "Totally agree" option at 47.67%.

From a collaborative consumption perspective, these results align with the idea that digital platforms and physical urban systems jointly 'materialize' access-based mobility. When platform interfaces are intuitive and cities reduce friction (lanes, parking rules, safety), users experience the service as both useful and enjoyable, reinforcing sustainable collaborative consumption outcomes (Da Silveira *et al.*, 2021). This may be particularly important in emerging markets, where uncertainty and uneven infrastructure can otherwise constrain the perceived reliability and attractiveness of shared services (Llanos *et al.*, 2023).

Conclusions

This study contributes original evidence on micromobility app adoption by testing an integrated extended TAM–collaborative consumption framework with enabling conditions in Chile, an under-studied emerging-market context. Specifically, the article makes three contributions: (1) Extending the literature on TAM in sustainable transport contexts. By integrating key elements of the model that allow understanding of user behavior towards sustainable transport applications. These findings reinforce the relevance of constructs such as ease of use, perceived usefulness, and enjoyment in emerging markets, such as Latin America. (2) Contributing to sustainability and collaborative consumption by connecting collaborative consumption with sustainable practices and highlighting how transportation apps can support smarter cities and potentially reduce environmental impact. (3) Exploring enjoyment as a key factor in sustainable transport. This finding not only affects usage intention but also complements the functional usefulness of these applications, highlighting their impact on users' emotional engagement.

This study also offers practical implications for sustainable transport companies. The results offer valuable insights for sustainable transport companies to design and optimize applications that balance ease of use and user experience. This can help companies better engage their target market and encourage greater adoption of sustainable services.

Furthermore, the empirical evidence provided by this study not only helps understand the drivers/determinants of intention to use of sustainable transport but also serves as a tool for public policymakers to design targeted strategies, such as subsidies, adequate infrastructure, and awareness campaigns.

Given the environmental challenges associated with urban transport, app-based micromobility offers a promising approach to promoting low-emission travel alternatives for short-distance trips. The findings in this study show that the intention to use these services is shaped by Technology Acceptance Model (TAM) beliefs, including perceived usefulness, ease of use, and enjoyment, as well as by enabling conditions that support practical adoption.

In line with the study objective, the evidence indicates that the intention to use micromobility apps in Chile is best explained by a dual value logic: users seek practical performance gains (usefulness) while also valuing the experience (enjoyment). Strategically, this means that operators should treat the product as a service platform, not only a transport utility: UX design, gamified engagement, transparent pricing, and reliability initiatives can be as adoption-critical as fleet size or coverage.

For public management, the findings suggest a 'complementor' role for cities: enabling conditions improve perceptions that ultimately drive intention, even if they are not direct motivators. Policies that standardize parking, expand protected lanes, and improve safety communication can increase perceived ease of use, which then cascades into higher usefulness and enjoyment. Future research should extend this framework by incorporating perceived risk, trust, green value, and privacy concern as additional platform-relevant mechanisms, and by testing the model with larger, more diverse samples and longitudinal designs to connect intention to actual usage behavior (Akel & Bayir, 2025).

Also, this study is not without limitations. The sample size and composition, together with

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the reliance on self-reported data and a cross-sectional design, may affect the generalizability and precision of the findings. Moreover, important variables such as perceived risk, trust in the use of transportation applications, and concerns regarding information privacy were not included. Future research could incorporate larger and more diverse samples, longitudinal designs, and additional constructs to further advance the understanding of the determinants of actual use of sustainable transportation applications.

Acknowledgments

The authors would like to thank the students Benjamín Fuentes, Javiera Huina, and Sofía Vergara for their participation in survey administration, which was essential to the development of this study.

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Authorship Statement - CRediT Taxonomy

Authors	Contributions
Katherine Mansilla-Obando	Conceptualization, research, methodology, supervision, writing. Original draft, writing, revision, and editing.
Gonzalo Llanos-Herrera	Formal analysis, research, methodology, writing. Original draft, writing. Review and editing.

Statement on the use of artificial intelligence

The authors **DECLARE** that in the preparation of the article titled: "Adoption of micromobility applications in Chile: Extended TAM and collaborative consumption," Artificial Intelligence (AI) was used to assist in the preparation of the manuscript. The authors declare that they reviewed and validated the content and assume full responsibility for the final version of the article.