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MaaS acceptance in global South cities: comparison of Bogota and Barranquilla (Colombia) and Manila (Philippines)

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This work addresses the following topic(s) from the Call for Contributions:
(Please check at least one box)

☐ Placemaking to integrate urban spaces and mobility
☒ Promoting sustainable mobility choices in metropolitan regions
☐ Governing responsible mobility innovations
☐ Shaping the transition towards mobility justice
☐ System analysis, design, and evaluation
☐ other: _____

Extended Abstract

1. Problem statement

Due to rapid population growth, urbanization, and high levels of motorization, many regions in the global South face severe mobility problems such as congestion, accidents, noise and air pollution, and decreasing accessibility (Pojani and Stead, 2017). This has far-reaching negative impacts on people's health and well-being, as well as on their overall quality of life. For instance, while Bogotá and Manila are among the top ten most congested cities worldwide according to the TomTom Traffic Index (TomTom, 2022), they also score relatively poorly in Mercer's quality of life rankings (128th and 137th respectively out of 231) (Mercer, 2019). It therefore requires solutions to make transport systems in such cities more efficient and sustainable.

A potential solution could be a shift towards Mobility as Service (MaaS). However, MaaS is a concept that has been mainly studied in the context of high-income cities with extensive available transport infrastructures, mainly in Europe and Australia (Butler, Yigitcanlar and Paz, 2021). Hence, in addition to studies from the global South that focus on potential barriers and required policies (Kayikci and Kabadurmus, 2022; Hasselwander *et al.*, 2023) as well as necessary adaptations and supply-side considerations (Pickford and Chung, 2019; Dzisi *et al.*, 2023), it is of utmost importance to analyze users' preferences and intentions with regards to changing mobility behaviors under MaaS. This would enable informed planning of MaaS schemes and pilots in developing cities, with the goal of actively driving a paradigm shift in mode choices and mobility behaviors to mitigate transport's negative externalities.

2. Research objectives and study contributions

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The research objective of this study is twofold: First, we intend to (i) measure the interest on MaaS in global South cities and understand factors that contribute to citizens' adoption intention. Second, using the case of Bogota, Barranquilla, and Manila, we intend to (ii) compare results from different contexts to better outline different user preferences across various population groups in different cities to derive better insights into the overall potential of MaaS in the global South.

To this end, the expected results of this study also make several contributions to the scientific body of knowledge.

- In the transportation literature, previous studies have mainly used different regression and cluster analysis techniques to analyze user demand for MaaS, while mostly relying on sociodemographic and mobility related variables as predictors for the adoption intention (Kriswardhana and Esztergár-Kiss, 2023). We complement these studies by integrating psychological constructs in order to gain better insights into the structural relationship between the adoption intention and both measurable and latent variables.

- According to the literature review by Hasselwander and Bigotte (2023), only one study has previously studied the demand for MaaS in Latin American context. However, Gandia et al. ((2021), using the case of Lavras, Brazil, has only focused on a particular sub-sample of the potential MaaS users (i.e. university students). To the best of our knowledge, our study is therefore the first to present comprehensive insights on MaaS demand in major cities in Latin America.

- Similarly, only two studies have so far focused on MaaS demand in Southeast Asian context. However, these studies only present preliminary results (Hasselwander *et al.*, 2022) or proposed a different setting and use case for MaaS, i.e. to build safety awareness and enhance road traffic safety (Khaimook *et al.*, 2019). Hence, we also make a sound contribution to a better understanding of the demand for MaaS in these regions.

3. Methodological approach

To achieve our goal, we employed a comprehensive approach by designing a reveal and stated preferences survey. This survey was based on the Extended Technology Acceptance Model (Venkatesh, Thong, and Xu, 2012) and the Multimodal Commuter Stress Scale (MCSS) (Useche, Marin, and Llamazares, 2023). To facilitate the survey process, we utilized the Limesurvey platform hosted on our research group server.

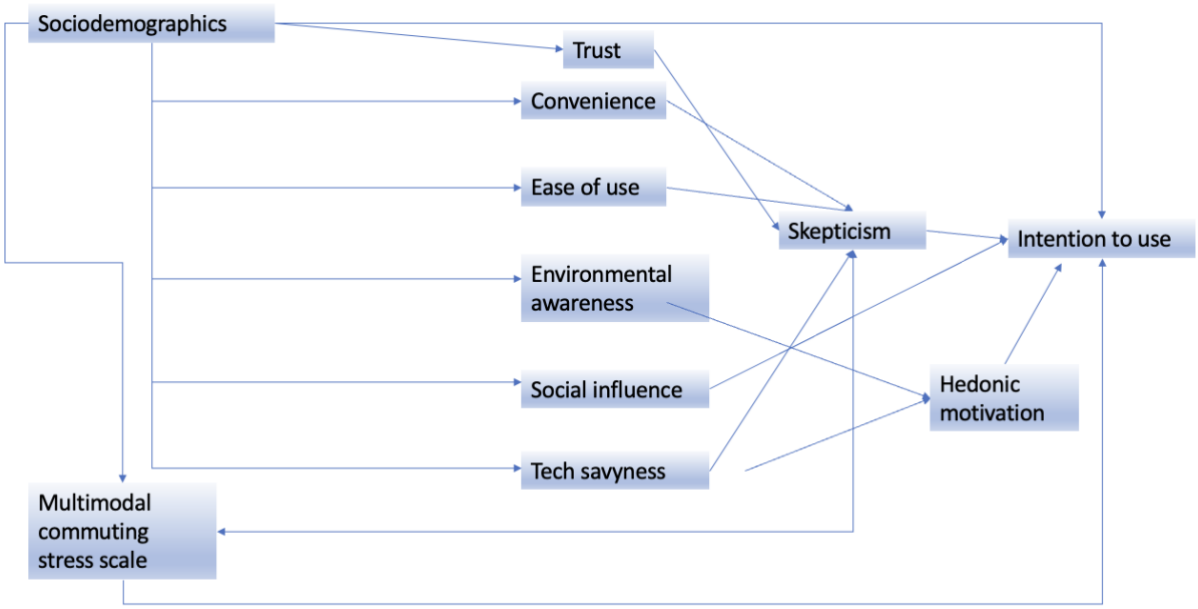
In order to obtain a diverse range of responses, we distributed the survey through both online channels (such as Linkedin, WhatsApp, and Facebook) and face-to-face interactions. Our team visited public places such as public transport stations, shopping malls, and universities, where we administered the survey using tablets. The survey was applied in Bogota, Barranquilla, and Manila. Specifically, we gathered a total of 753, 549, and 865 responses from these respective cities. Out of these responses, we attained 467, 316, and 473 complete responses respectively.

Although the survey required approximately 20 minutes to complete, which may have contributed to the low completion rate, we implemented an incentive to encourage respondents with a raffle of Amazon gift cards.

The survey structure was organized into six sections: Firstly, users were asked about their familiarity with the MaaS concept. Secondly, travel patterns and vehicle ownership. The third section consisted of Likert-scale questions aimed at measuring participants' acceptance of MaaS. In the fourth section, respondents were given an opportunity to build their own mobility package by allocating 100% of their existing budget across different services, while also indicating their preferences for specific MaaS characteristics. We then applied the MCSS in the fifth section, followed by collecting sociodemographic information in the final section.

The proposed model, presented in Figure 1, employed structural equation modeling to measure the intention to use MaaS. The Lavaan package in R was utilized for this purpose, ensuring a robust approach to data analysis.

Figure 1. Model proposal



4. Expected results

The estimated models provide clear insights into the impact of each latent variable considered and the crucial role these variables play in the intention to use MaaS in the global south. This implies that when deploying MaaS, it is important to assess not only physical accessibility but also digital accessibility, as it can act as an unseen barrier that hampers MaaS adoption. Furthermore, it demonstrates that user preferences and settings vary even within cities in the global south (and even within the same nation), lending credence to the often discussed notion in the literature that MaaS should be created with context in mind.

These findings also support the decision-making process regarding the inclusion of additional services beyond commuting, such as online shopping, food delivery, and, notably, pet-friendly services, which, to the best of our knowledge, have not been previously evaluated.

In the global south, where transport authorities face distinct challenges compared to European cities, including informal transport, as observed in our case studies, MaaS could play a crucial role in integrating this form of transport. This integration should both embrace its potential and provide means for controlling and mitigating its negative impacts(Orozco-Fontalvo and Moura, 2023).

To gain a comprehensive understanding of the differences and commonalities between various regions, this research should be expanded to include more cities worldwide. This would provide valuable insights for MaaS stakeholders in their decision-making processes.

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