Australasian Transport Research Forum 2024 Proceedings
27-29 November, Melbourne, Australia
Publication website: https://australasiantransportresearchforum.org.au/

User preferences for on-demand transport in Melbourne: Insights from stated preference surveys

Sohani Liyanage[1], Hussein Dia[1]

[1]Swinburne University of Technology, Melbourne, Australia

Email for correspondence (presenting author): sliyanage@swin.edu.au

1 Introduction

Technological advancements and digital platforms create new mobility solutions to complement existing public transport systems (Chandakas, 2020; Liyanage, 2020; Liyanage, 2019). These innovations address poor performance outside peak hours and the demand for better user experiences. Historically, policies supporting private vehicles have led to unsustainable urban transport practices, while public transport has suffered from under-investment (Joël Hazan, 2019; Goodwill & Carapella, 2008; Linda, 2003, Mageean and Nelson, 2003). However, digital solutions like on-demand public transport offer flexible, user-driven alternatives, operating without fixed routes or schedules. This study explores Melbourne's travellers' willingness to adopt on-demand public transport through a behavioural survey, focusing on travel patterns, response to new modes, and strategies for influencing mode choice.

The study aims to explore travellers' behaviour and willingness to adopt demand-responsive public transport for daily travel in Melbourne. Specifically, this study aims to:

1. Understand current travel patterns across various transport modes, including commuting and leisure trips.
2. Assess how introducing demand-responsive shared public transport influences individuals' travel behaviour.
3. Evaluate strategies for disseminating information that impacts passenger behaviour and mode choice.

By investigating these factors, the study offers insights into optimising the acceptance of on-demand public transport services among Melbourne's diverse population.

2 Methodology

To understand passenger behaviour regarding on-demand public transport, an online behavioural survey was developed using Qualtrics (Qualtrics, 2019). The survey targeted adults residing or commuting within the Melbourne metropolitan area, capturing demographics, travel habits, and preferences for transport modes during and post-COVID-19. The survey included 51 questions, took 15-20 minutes, and targeted adults living or commuting in Melbourne, resulting in 327 eligible responses from 510 participants.

The methodology collected:

- Revealed preferences: Respondents' current travel choices.
- Stated preferences: Future travel preferences in the context of proposed on-demand services.

By comparing these two datasets, the survey offered insights into the mode-switching potential and passenger acceptance of on-demand transport services.

3 Statistical Analysis

The survey respondents primarily comprised males (54.1%) and those aged between 23 and 40 years. Most respondents (75.2%) owned vehicles, with many having flexible work schedules. Their usual morning trips were predominantly from home to work (69.4%), and 60% preferred private vehicles due to convenience, no waiting times, and shorter travel times.

Public transport was used by 53% of respondents, with the primary attraction being the avoidance of parking issues. Respondents expressed satisfaction with public transport frequency but highlighted concerns about crowding and cost.

4 Discrete Choice Model Development

This study uses stated preference survey data to evaluate passenger acceptance of on-demand transit through binary choice and neural network models. The models analyse factors such as travel cost, waiting time, and journey duration to assess willingness to adopt these services.

Respondents were presented with four scenarios with varying travel attributes, and four datasets were used for model development as follows:

- Scenario 1 – sample size 248
- Scenario 2 – sample size 247
- Scenario 3 – sample size 271
- Scenario 4 – sample size 258

Binary logistic regression was applied to compare on-demand and scheduled transit options. Based on the Hosmer and Lemeshow test, the model performed well, with classification rates ranging from 64% to 72%.

Key findings:

- **Travel cost**: Negative and significant for mode choice.
- **Waiting time**: Positive and significant.
- **Journey time**, **walking distance/time**, and **journey distance**: Less significant.

Results indicated that the model is a good fit for predicting transit mode preferences across the four scenarios.

5 Discussion

Based on a Melbourne-based survey, this study provides insights into passenger behaviour and preferences for on-demand public transport services. Key findings show that private vehicle use remains dominant despite environmental concerns due to its convenience and flexibility. Issues such as waiting times, crowding, and public transport reliability continue to impact user satisfaction, suggesting a need for service improvements.

Post-pandemic travel patterns, with an increase in remote work, highlight the importance of flexible transport solutions. Passengers expressed a willingness to adopt new mobility options, with factors such as reduced waiting times and personalised services playing a significant role. The binary choice model used in this study effectively captured the impact of travel cost (negative) and waiting time (positive) on transport mode choice, with a classification accuracy of 64% to 72%.

For future research, the study suggests expanding survey methods and addressing practical challenges in on-demand transport implementation, particularly for users unfamiliar with digital technologies.

Author contributions

Liyanage and Dia: Survey design and methodology. Liyanage: Researching, Results analysis, and Writing the paper content. Dia: Reviewing, editing, and structuring the paper.

Research ethics clearance

This work was conducted in accordance with Swinburne University's Human Research Ethics Guidelines. Project ref: 20226637-11316.

6 References

CHANDAKAS, E. 2020. On demand forecasting of demand-responsive paratransit services with prior reservations. *Transportation Research Part C: Emerging Technologies,* 120**,** 102817-102817.

GOODWILL, J. A. & CARAPELLA, H. 2008. Creative ways to manage paratransit costs. National Center for Transit Research (US).

JOËL HAZAN , N. L., AUGUSTIN K. WEGSCHEIDER, AND BENJAMIN FASSENOT. 2019. *On-Demand Transit Can Unlock Urban Mobility* [Online]. Available: https://www.bcg.com/en-au/publications/2019/on-demand-transit-can-unlock-urban-mobility.aspx [Accessed 20 February 2020].

LINDA, S. 2003. Can public transport compete with the private car? *Iatss Research,* 27**,** 27-35.

LIYANAGE, S. & DIA, H. 2020. An agent-based simulation approach for evaluating the performance of on-demand bus services. *Sustainability,* 12**,** 4117-4117.

LIYANAGE, S., DIA, H., ABDULJABBAR, R. & BAGLOEE, S. A. 2019. Flexible Mobility On-Demand: An Environmental Scan. *Sustainability,* 11**,** 1262.

MAGEEAN, J. & NELSON, J. D. 2003. The evaluation of demand responsive transport services in Europe. *Journal of Transport Geography,* 11**,** 255-270.

QUALTRICS. 2019. *Survey, Research & Experience Management - Qualtrics* [Online]. Available: https://www.qualtrics.com/au/ [Accessed 1 November 2019].