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Retiring meters: A roadmap to encourage wider adoption of parking apps

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1 Introduction

Parking management is crucial for urban planning as it influences land use, traffic flow, and pollution (Dave et al., 2019; Shen et al., 2020). Effective strategies include pricing, time limits (Simićević et al., 2013), and advanced parking information systems (Parmar et al., 2020). Numerous cities are adopting parking apps, which began emerging in the early 2000s, providing real-time data and integrating with smart city technologies to optimize parking (Lin et al., 2017; Assemi et al., 2021). Despite advances, customer engagement remains critical yet challenging. Research into parking app preferences shows a need for user-friendly and integrated solutions to enhance adoption and satisfaction (Ma et al., 2018; Ye et al., 2021).

2 Background and methodology

Existing studies emphasise the importance of perceived usefulness, ease of use, and trust in driving adoption of parking apps (Yang et al., 2020). Factors such as privacy concerns, service costs, and technological readiness also play crucial roles (Lam and Yang, 2019; Ye et al., 2021). However, few studies address the impact of payment methods or the relationship between app adoption and continued meter use (Peng et al., 2021).

To understand user preferences, a survey was conducted with 309 respondents in Brisbane. The survey used a choice-based conjoint analysis, presenting respondents with various app configurations, each offering different combinations of payment methods, information features, and expiry reminders. The survey also included a dual-response question to validate genuine interest in the app options or preference for meters.

Attributes were classified into three categories: payment methods (tap-and-go, voice, and automatic), real-time information (availability and traffic updates), and reminders for parking session expiry. The survey design ensured a balanced representation of these attributes to evaluate their impact on user preferences and adoption rates.

A mixed logit model was used to analyse user choices, considering the random utility maximisation framework (Revelt and Train, 1998). This approach allows for individual-specific variations in preferences, capturing the effects of attributes like payment methods and service charges (McFadden and Train, 2000). The mixed logit model provides insights into how different app attributes contribute to adoption, with particular emphasis on tap-and-go and automatic payment methods.

3 Main findings

The models were developed using the extensive hypothesis testing approach and a statistical package Searchlogit (Beeramoole et al., 2022; Beeramoole, 2024). This package employs a bi-level optimization framework that allows simultaneous testing of multiple objectives and assumptions (Beeramoole et al., 2023; Paz et al., 2019).

Key findings from the MXL model include:

- Preferences for "automatic payment" and "tap and go" payment methods positively influenced app adoption.
- Absence of parking-related information and expiry reminders negatively affected app uptake.
- Parking meters significantly deterred app adoption, with their impact varying based on their availability.
- Higher service charges correlated with increased preference for parking meters.

4 Discussion

Our study explored the adoption of parking apps in Brisbane, Australia, utilising multinomial and Mixed Logit models along with simulations to understand the dynamics influencing app uptake and the effectiveness of various app features and payment options, and provided insights including:

- Differentiating app features for boosting app adoption, besides offering various payment options.
- Parking meters remain relevant despite app adoption, so a balanced approach is necessary.
- Supplementary services and guest checkout options influence app uptake.
- Careful pricing strategy alignment can drive users away from traditional parking meters.

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