Journal of Transport Geography xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Transport Geography

journal homepage: www.elsevier.com/locate/jtrangeo

Book review

Public Transport Planning With Smart Card Data, F. Kurauchi, JD. Schmöcker (Eds.), Boca Raton: CRC Press, (£114.00 (Hardback) £44.79 (eBook)) ISBN 9781498726580

Smart card data (SCD) has been increasingly highlighted and employed as a valuable data source for transportation research. Its strength relates to the ability to provide detailed spatial and temporal information of transit trips at the individual level. Yet, the large quantity of SCD and its lack of personal information have created new analytic challenges for transport researchers. It is against this setting that Kurauchi and Schmöcker have edited this 13 chapter volume that showcases cutting-edge research that draws on SCD with a view to better supporting public transport planning.

In the opening chapter, the editors concisely explain the origin and features of SCD along with key challenges and opportunities for transportation research, providing an introductory text of the area. Furthermore, the editors underscore that a key intent of the text is to provide a bridge that helps translate knowledge derived from SCD into a suite of planning tools for transit systems-a salient point throughout the rest of the book.

The remaining 12 chapters represent contributions by scholars from Asia, North and South America and Europe, with each presenting case studies thereof. These chapters are organised under three broad sections on interrelated topics. Section 1 (Chapters 2 to 4) deals with the estimation of transit origin-destination (OD) matrices, activity type (trip purpose) and route choice that are fundamental for predicting demand for transit services. Chapter 2 provides a review of the methods to infer OD matrices and the other behavioural dimensions using SCD in the literature. Chapter 3 presents an example of estimating transit trip destination and purposes using decision trees and rule-based models. This is followed by the modelling of route choice within a multimodal transit network in Chapter 4. Although not particularly ground-breaking, these three chapters collectively enable readers to gain a broad understanding of what has been tackled in current SCD-based studies.

Section 2 (Chapters 5 to 8) showcases some data fusion methods to combine SCD with survey data. This is an important undertaking given that incomplete information has been highlighted as a critical barrier for fully exploiting the potential of SCD. Chapter 5 details a probabilistic approach to link SCD with survey data. The integrated data was employed to impute long-term trip purposes of transit users, which would be challenging with either SCD or survey data alone. In Chapters 6 and 7, smart card holders were surveyed to reveal whether they would change their transit use under market interventions (e.g., introducing a point loyalty scheme). Soft marketing strategies to promote transit use may draw implications from these two chapters. Chapter 8 embarks on a relatively complex task of using SCD to simulate bus usage and bunching effects under a hypothesised service change over the course of a day. The graphs in this chapter are helpful to scaffold a broad understanding of the modelling approach. With some further improvement, the simulation method can be useful for transit operators to evaluate and determine service adjustments under different scenarios.

The last section of the book (Chapters 9 to 12) focuses on the utility of SCD in evaluating a transit system. Chapters 9 and 10 present an array of service quality indicators that can be extracted from SCD, which are shown to be hands-on tools for continuous monitoring of the level-of-service and operation of a transit system over space and time. Chapters 11 and 12 respectively focus on ridership prediction for a tram system and traffic-bottleneck detection at bus stops, both of which have practical implications. The prediction of tram-ridership in Chapter 11 is based on conventional variables (e.g., in-vehicle and waiting time, fare) as well as comfort - an important yet less considered dimension. However, the authors did not assess the accuracy of predictions especially after including the comfort variable. While it may be challenging for a hypothesised scenario, identifying a possible accuracy test would still be helpful. Chapter 12 presents a simple yet useful methodology to identify bus stops where blockage of traffic occurs using SCD and 'probe car data' (a type of vehicle-tracking data), showing the potential of SCD to assist road traffic management.

Finally, Chapter 13 concludes the book by revisiting the emergence of SCD, Automated Data Collection Systems (ADCS) and their challenges for research. Some of this part may better fit in Chapter 1. The authors also highlight investigating price elasticity using SCD as an important area for future research. Another under-studied area that may be worth highlighting is inter-city mobility and long-distance commutes, given that some smart cards can be used to pay for public transport nationwide (e.g., the Dutch smart card, as indicated in Chapter 11). A conceptual framework is next established that specifies the role of ADCS in assisting off-line planning and real-time operation, and above that, data-driven decision-making related to transit systems. This last chapter, however, will be a more cohesive read, if more links are made between the framework and the contents in previous chapters.

From the introduction, the editors make it clear that they aim to provide an overview at the forefront of transportation scholarship that helps realise the practical value of SCD for public transport planning. To me, they have certainly achieved this goal. The case studies covered presented a variety of tools and methods to analyse SCD and tackle issues that are closely related to the operation and planning of transit systems. The works presented in this book are, of course, not without limitations - a point that the contributors are well aware of. In most chapters, particularly in Sections 2 and 3, areas for future improvement were clearly identified. This may open up avenues for future research, and stimulate more new ideas about utilising SCD to better understand public transport systems and support related decision-making.

In sum, despite some minor issues, *Public Transport Planning with Smart Card Data* is a timely and worthy addition to the accumulating literature on SCD and the exploitation of its utility within the public transport context. It is well structured and highly practice-oriented, and overall, a useful reference book for transport practitioners and researchers both new to and experienced with SCD.

Sui Tao

Institute of Future Cities, The Chinese University of Hong Kong, Hong Kong
Room 406B, Wong Foo Yuan Building, Chung Chi College, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong
E-mail address: s.tao@cuhk.edu.hk

https://doi.org/10.1016/j.jtrangeo.2018.03.008

0966-6923/