Minutes of the
Emerging Methods and Developments in Urban Activity and Travel Analysis (ADB40(1)) Subcommittee Meeting

Subcommittee of the Passenger Travel Demand Forecasting (ADB40) Committee

January 12, 2004, 12:00-1:30 p.m.

83rd Annual Meeting of the Transportation Research Board
Hilton Washington Hotel and Towers, Farragut Room, Washington, D.C.

1. Introduction and Agenda: Co-chairs Karthik Srinivasan and Joan Walker introduced themselves and distributed copies of the meeting agenda (attached). The attendees introduced themselves. A total of 28 individuals were in attendance with 15 from the academia, 10 from consulting agencies and 3 from local, regional, state and federal transportation agencies. The list of attendees is attached.

2. Activities at the 2004 Annual Meeting: The sub-committee placed two calls for papers in the 2004 TRB Annual Meeting. Based on the papers received by the sub-committee two sessions were organized: Session 231: Choice Set Construction and Sampling of Alternatives, and Session 375: Dynamic Models of Decision Making. Both sessions were well attended. In addition, some of the papers on related themes were displayed in the Planning Mega Poster Session 440. The committee chair Chandra Bhat noted that a few calls were specifically in response to sub-committee calls, but several papers submitted to the parent committee were of relevance to the sub-committee. The reviews of the sub-committee sessions were handled directly by the committee for logistical reasons. Thanks for everyone for performing the reviews.

   The remainder of the meeting focused on potential activities of the sub-committee in this year, and on important emerging methods of interest. There was a lot of great discussion, and an attempt to capture the essence is given below. Apologies in advance for inaccuracies on who said what.

3. Open Discussions on Emerging Methodological Developments:
   Although the discussion raised several interesting points, for the most part it was focused on three major threads: applications, methodological, and validation/technology transfer from research to practice.

   Application/Behavior:
   Several participants commented that multi-agent decision making, complexity of inter-person interactions and between household interactions are not yet well understood (Mark Bradley, Peter Vovsha, Larry Blain). The computational complexity and challenges associated with such more flexible models were also mentioned in this context. Cognitive data and constraints associated with such models and resulting data issues were noted. Joan Walker mentioned that there was sort of a lagged response to the call for papers with several papers in the area of mixed logit models and flexible

structures. Similarly, several papers relating to spatial aspects and microsimulation were also received this year. Several papers in the planning mega poster session were also focused on dynamics, mainly timing, and scheduling of activities. Spatial aspects of choice set formation and construction are not as well understood. It was observed by Eric Miller that although dynamic models have been receiving growing attention from a methodological standpoint, they were not yet adequate in terms of the level of resolution (acceleration/deceleration cycles) needed for estimating air-quality emissions. Some participants including Chandra Bhat and Ken Cervenka noted that weekend travel has not received adequate attention.

Methods:

It was noted that endogeneity issues appear to be resurfacing as important methodological challenges time and again (IATBR, 2003). In this context it was observed there was a need to seriously re-examine how endogeneity issues are treated in current modeling practices, particularly in the context of activity-based models were several decision dimensions were strongly inter-dependent. Koppelman and Bhat indicated that conventional mixed logit models (Multinomial Logit + normal) were increasingly being adopted to capture flexible substitution patterns, but also indicated that combining the mixed but structured logit models (such as mixed nested logit with normal etc.) were quite promising and useful in certain contexts. It was mentioned that while the normal error term structure is flexible in certain respects, other non-conventional discrete model structures were not sufficiently investigated. For example, relatively little work has gone into applications and investigations using mass points mixed logit, non-normal and gamma mixtures with logit etc., log-normal mixtures used only for random taste variation currently, network GEV models, which may be more tractable and suitable in some empirical applications) and their properties. In the context of more sophisticated and non-conventional models, Koppelman observed that these models are often saddled with the problem of non-convexity in objective functions, flat log-likelihoods and multiple local optima. The methodological and empirical implications of these are not yet fully tested and understood. In the context of non-conventional models, the use of newer estimation techniques such as quasi-random and its variants, and generalized estimation techniques for panel data (which tends to obviate the need for Monte-Carlo draws altogether) were mentioned by Chandra and Karthik respectively.

Validation and Transfer of Technology:

A significant part of the discussion focused on validation and the need for consistent and credible validation of the new and emerging activity based methods and models, in order to clearly demonstrate their value and flexibility. In particular, it was stressed by several attendees that there was a need to apply the two sets of models (four step and activity based models) to better understand and compare the policy implications, sensitivity and other metrics involved with real-world data and/or retrospective studies (Peter Vovsha, John Bowman, Ken Cervenka, Maren Outwater). Joan commented on the need for more careful identification of coefficients especially with newer models where identification conditions tend to be more involved than earlier discrete choice models. The need for practical data identification was also raised by Eric Miller, especially the issue of how much complexity can the data really support, even if the model is statistically identified.

Some attendees suggested that although the activity-based models were perhaps better conceptually, and theoretically than four-step models, the practical implications may not be fully reflected using conventional validation metrics such as probability of choice, likelihood etc. Chandra Bhat noted that the research community is increasingly focused towards including validation metrics in activity-based models, although there was still scope for improvement in this respect. Karthik Srinivasan expressed the view that organizing and establishing standard test data sets (synthetic and real-world) may serve as a helpful basis for validation and testing. In particular, the need to distinguish mis-specification issues from structural effects was emphasized by Frank Koppelman. In this regard, Joan Walker suggested the possibility of assembling and analyzing a body of collective evidence from the diverse streams of activity-based models developed thus far to identify common threads, and divergent issues as a means to further analyze and validate activity based models. Ken Cervenka and Maren Outwater felt that topic was of sufficient interest and importance to warrant exploring the possibility of conducting a mid-year workshop or a TRB Sunday workshop focused on comparing and validating activity-based planning models and applications with four-step model applications and policy recommendations.

4. Action items for 2004

i) Pursue call for papers for TRB 2004 on the following areas:

a) Models of activity decisions that capture within household interactions and inter-household interactions (perhaps in the context of weekend and weekday travel)

b) Non-conventional modeling and estimation techniques in activity and travel demand modeling (for example, joint mixed and nested models, non-normal mixed logit, mass points mixed logit, generalized estimating equations, models handling endogeneity, initial conditions etc.)

ii) Co-sponsor a TRB Sunday workshop or mid-year workshop focused on practical application and comparison of activity-based methods in comparison with other planning practices (four-step) for real-world planning applications.

The co-chairs will coordinate in drafting calls for papers for TRB 2003 based on these areas. The co-chairs will coordinate with the parent committee chair Chandra Bhat, and the organizational sub-committee chair Rick Donnelly regarding the Sunday workshop.

5. Conference Reports/News

Announcements were made regarding the following upcoming conferences:

i) Conference on Women's issues in transportation, Nov.18-20, Chicago

ii) Transportation Science and Technology Congress, Sep 1-5, 2004, Athens

iii) International Steering Committee for Travel Survey Conference, Aug 1-7, Costa Rica.

Chandra also made an announcement regarding nomination for the IATBR Eric Pas dissertation prize.

6. There no other discussions and the meeting was adjourned

Minutes Prepared by: Karthik Srinivasan

AGENDA

Emerging Methods Subcommittee A1C02(1)

of the Passenger Travel Demand Forecasting Committee A1C02

"Fostering Innovations on Emerging Methods"

2004 TRB Annual Meeting

Monday, January 12th, 12:00 - 1:30 p.m. at the Hilton (Farragut)

1. Welcome and Introductions
2. Initiatives from the 2003 Meeting
   - TRB Midyear Workshop on Microsimulation

     Microsimulation Methods: A Retrospective and Prospective Assessment of Theoretical Issues and Practical Considerations
     (Organized by the A1C02 Activities Coordination Subcommittee)
   - Calls for Papers

     Choice Set Construction

     Dynamics and Models of Decision-Making in a Temporal Context
   - TRB 2004 Sessions

     Choice Set Construction and Sampling of Alternatives (231)
     Monday 8:00-9:45 AM Hilton Monroe East

     Dynamic Models of Decision Making (375)
     Monday 7:30-9:30 PM Hilton Thoroughbred
3. Open Discussion of Emerging Methodological Developments
   (See history of CFPs on next page)
4. Discussion of Initiatives for 2004
   - TRB 2004 (Workshops/Calls for Papers/Review Process)
   - Collaboration with Other TRB Committees/Subcommittees
   - Activities beyond TRB… Summer Workshops/Sessions?
5. Conference Reports / News / Other Business
6. Adjourn

Contact Karthik Srinivasan (karthik.k.srinivasan@vanderbilt.edu) or Joan Walker (joan@caliper.com) if you would like to add something to the agenda.

History of Calls for Papers from A1C02(1)

2000	Application of Microsimulation Techniques in Activity-Travel Pattern Analysis
	Modeling Time-Space Interactions in Individual Activity-Travel Patterns
2001	Uncertainty Analysis
	Spatial Analysis in Travel Demand Modeling
	Allocation of Activities within Individuals in Households
	Practical Implications of Activity-Based Modeling
2002	Applications of Mixed Logit Models in Activity-Travel Demand Analysis
	Spatial Analysis Methods in Urban Activity and Travel Demand Modeling
2003	Discrete Choice Model Formulations: Interrelationships, Applicability, and Issues
	Dynamic Models and Processes in Activity-Based Analysis
	Microsimulation Models and Methods for Activity-Based Forecasting and Planning Applications
2004	Choice Set Construction
	Dynamics and Models of Decision-Making in a Temporal Context
	(Microsimulation midyear workshop)
2005	???

List of Attendees

NAME	AFFILIATION	E-MAIL
Chandra Bhat	University of Texas, Austin	bhat@mail.utexas.edu
Larry Blain	Puget Sound Regional Council	lblain@psrc.org
John Bowman		John_L_Bowman@alum.mit.edu
Mark Bradley	MBRC	Mark_Bradley@cox.net
John Castiglione		castiglione@mindspring.com
Ken Cervenka	NCTCOG	kcervenka@nctcog.org
Kimon Choi	Maryland DOT	kchoi@mdp.state.md.us
Robert Friis	Summit Systems Design, Colorado	rfriis@sfsato.com
Laurie Garrow	Northwestern University	l-bowler@northwestern.edu
Stephen Greaves	Monash University	Stephen.greaves@eng.monash.edu.au
Zhiyong Guo	Vanderbilt University	zhiyong.guo@vanderbilt.edu
N. Janarthanan (Jana)	Mirai Associates, Seattle	jana@miraiassociates.com
Sungyop Kim	University of Washington	sungyop@u.washington.edu
Tae-Gyu Kim	Penn State University (PTI)	txk23@psu.edu
Frank Koppelman	Northwestern University	f-koppelman@northwestern.edu
Jang-Ho Lee	Seoul National University	transwho@freechal.com
Eric Miller	University of Toronto, Canada	miller@civ.utoronto.ca
Abolfazl (Kouros) Mohammadian	University of Illinois, Chicago	kouros@uic.edu
Nobuaki Ohmori	The University of Tokyo, Japan	nobuak@ut.t.u-tokyo.ac.jp
Niels Van Oorf	HTM, the Hague	n.van.oorf@htm.net
Maren Outwater	Cambridge Systematics	moutwater@camsys.com
Emily Parkany	Villanova University	Emily.Parkany@villanova.edu

Scott Smith	Volpe Center, USDOT	smiths@volpe.dot.gov
Karthik Srinivasan	Vanderbilt University	karthik.k.srinivasan@vanberbilt.edu
Peter Stopher	University of Sydney, Australia	peters@its.usyd.edu.au
Gudmundur Ulfarsson	Washington University in St. Louis	gfu@wustl.edu
Peter Vovsha	PB Consult	vovsha@pbworld.com
Joan Walker	Caliper Corporation	joan@caliper.com