



MEMORANDUM

TO: TPB Technical Committee
FROM: Tim Canan, Planning Data and Research Program Director
SUBJECT: Big Data Evaluation Project
DATE: August 30, 2019

The emergence of Big Data holds the potential for significant and widespread application in regional travel behavior analysis and modeling. *Big Data* is characterized as an information asset with such high volume, velocity, and variety that specific technology and analytical methods are required for its transformation into value.¹ With processing and analytics tools, Big Data can illustrate patterns and trends in human behavior and activity. Big Data sources with transportation planning applications include but are not limited to passively collected data from mobile applications, including GPS traces and location-based services, on-board vehicle sensors, traffic sensors and cameras, unmanned aircraft/space-based radar used to monitor traffic flow, and smart card data.

Despite this potential, it still is unclear if, or the extent to which, Big Data analytics can be readily deployed within TPB analytical and modeling processes. More needs to be known and understood before TPB should prudently invest significant resources into Big Data.

As a result, in Fiscal Year 2019, TPB commissioned a study for a consultant to conduct an independent evaluation of Big Data and its use and limitations in regional travel and mobility analyses and modeling. This study was initially developed through the UPWP Technical Assistance Program in coordination with the District of Columbia Department of Transportation (DDOT), the Maryland Department of Transportation (MDOT), the Virginia Department of Transportation (VDOT), the Virginia Department of Rail and Public Transportation (DRPT), and WMATA.

FY 2019 project activities entailed developing the scope of work of the study, releasing a Request for Proposal, and conducting the consultant selection process. In early FY 2020, Kimley Horn was selected to conduct the evaluation, which will formally commence in September 2019. In general, the key activities for this project include:

- Establishing a Technical Advisory Committee
- Developing an understanding of TPB programmatic requirements and analytical/modeling processes
- Reviewing the state of the practice with respect to Big Data use and applications by other metropolitan planning organizations (MPOs)
- Conducting an independent evaluation of Big Data sources for their potential in supporting TPB staff in meeting its programmatic requirements
- Recommending options and considerations to TPB for acquiring Big Data

¹ De Mauro, Greco, Grimaldi, (2016) "A formal definition of Big Data based on its essential features", *Library Review*, Vol. 65 Issue: 3, pp.122-135, <https://doi.org/10.1108/LR-06-2015-0061>

The project will be completed during the first half of 2020. At its September 6, 2019 meeting, the TPB Technical Committee will be briefed on the scope, activities, and schedule of the Big Data Evaluation project. The Technical Committee and other technical subcommittees will receive periodic briefings at key milestones during the performance of the evaluation.

BIG DATA EVALUATION

Framework for Evaluating Big Data in Regional Travel and Mobility Analyses

Timothy Canan, AICP
Planning Data and Research Program Director

TPB Technical Committee
September 6, 2019

Agenda Item 6



What is *Big Data*?

Big Data is an information asset with such high volume, velocity, and variety that specific technology and analytical methods are required for its transformation into value.¹

¹De Mauro, Greco, Grimaldi, (2016) "A formal definition of Big Data based on its essential features", *Library Review*, Vol. 65 Issue: 3, pp.122-135, <https://doi.org/10.1108/LR-06-2015-0061>

Framework for Evaluating Big Data in Regional Travel and Mobility Analyses

- Conduct an independent evaluation of Big Data and its use and limitations in regional travel and mobility analyses and modelling.
- With processing and analytics tools, **Big Data can illustrate patterns and trends in human behavior and activity.**
- Big Data **sources** with transportation planning applications include passively collected data from mobile applications, including GPS traces and location-based services, on-board vehicle sensors, traffic sensors and cameras, unmanned aircraft/space-based radar used to monitor traffic flow, and smart card data, among others.

Project Background and Development

- Scope of work **collaboratively developed** with DDOT, MDOT, VDOT, DRPT, and WMATA through the TPB State Technical Working Group
- Prompted by interest to acquire Big Data to better understand impact of emerging regional travel trends such as TNC use and micro-mobility
- Initially implemented as a UPWP Technical Assistance project in FY 2019, but will be carried out primarily as UPWP Core Program project during FY 2020



Key Questions

- Is Big Data the magic bullet and solution to all of our research challenges?
- Can Big Data be used to supplement or possibly replace TPB's methods and procedures used for transportation data analysis?
- Can Big Data be used to estimate, calibrate, and validate the regional travel demand model?
- How can Big Data be used to understand emerging trends and uncertainties?
- What are the costs (and opportunity costs) of investing in very expensive Big Data sources?
- What staff capabilities are necessary to develop a robust Big Data program? What training will be needed?



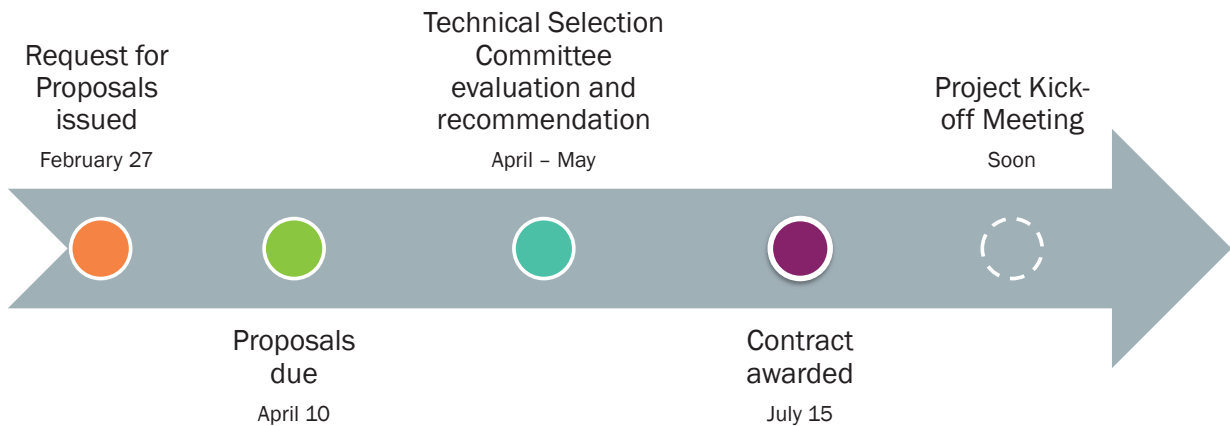
Research Considerations

The RFP identified a preliminary list of nearly 50 potential research considerations for the consultant to investigate. These considerations are grouped into seven (7) general categories:

1. Travel Demand Modelling
2. Transportation Network Companies (TNCs)
3. Travel Demand Management (TDM)
4. Connected Autonomous Vehicles (CAVs)
5. Traffic Counts
6. System Performance/Congestion Management
7. Other Research



Project Kick-off Meeting Soon!



Scope

1. Establish Technical Advisory Committee (membership, responsibilities, and meeting schedule) and study work plan
2. Develop understanding of TPB programmatic requirements and analytical/modelling processes
3. Review state of the practice of Big Data use and applications by other MPOs
4. Conduct an independent evaluation of Big Data sources for their potential in supporting TPB staff in meeting its programmatic requirements
5. Recommend options and considerations for acquiring Big Data
6. Prepare a final report

Committee Engagement

- The Technical Committee and other technical subcommittees will receive periodic briefings at key milestones during the performance of the evaluation.
- Stakeholders will have opportunity to provide input and comments.

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