Results of Financial Model Literature Scan

Potential financial planning tools may include technical models for forecasting expenses, revenues, and risk. The Volpe Center conducted a literature review to assess the state of the financial forecasting practice and potentially to expand the body of knowledge concerning the development and use of these tools. The results of the literature scan, presented in the table below, were narrowed from a wide search of academic and research literature written from 2008 to the present concerning: financial planning, revenue and cost forecasting, fiscal constraint, financial-constraint, and financial planning tools and models. The search revealed that there is not a great deal of literature available on recent new applications, models, techniques, or best practices in transportation financial planning. Among the most relevant articles and reports were two reports on standardized financial models in Texas: the *TRENDS (Transportation Revenue Estimator and Needs Determination System)* model and the *JACK (Joint Analysis using Combined Knowledge)*, both of which address highway finances only. The literature also documents a study of the estimation of statewide project funding shortfalls based on information in long-range plans and discussion of some of the challenges faced by States when forecasting revenue.

Article	Author(s)	Year	Abstract	Relevance
Development of the Transportation Revenue Estimator And Needs Determination System (TRENDS) Forecasting Model: MPO Sub-Models And Maintenance Link: http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/5-6395-01-1.pdf	Ellis, David; Glover, Brianne; Norboge, Nicolas	2011	This report summarizes the technical work performed developing and incorporating MPO sub-models into the existing Texas Revenue Estimator and Needs Determination System (TRENDS) model. Additionally, this report explains the maintenance and monthly updates performed on the TRENDS model. The TRENDS model is designed to provide transportation planners, policy makers, and the public with a tool to forecast revenues and expenses for the Texas Department of Transportation for the period 2010 through 2035 based on a user-defined	• Highlights statewide model that can be used by each of 25 local MPOs • Customizable for users, and allows variation in assumptions ranging from statewide needs to taxes, and fees. • Includes new feature - local option revenue model for use by each of 25 MPOs

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			level of transportation investment. The user, through interactive windows, can control a number of variables related to assumptions regarding statewide transportation needs, population growth rates, fuel efficiency, federal reimbursement rates, inflation rates, taxes, fees, and other elements. The output is a set of tables and graphs showing a forecast of revenues, expenditures, and fund balances for each year of the analysis period based on the user-defined assumptions.	
Estimating a Statewide Transportation Infrastructure Funding Shortfall Using Long-Range Plans of Metropolitan Planning Organizations Link: http://trb.metapress.com/content/av4356466pu4370x/fulltext.pdf	Bond, Alex; Kramer, Jeff	2010	The information contained in long-range plans of metropolitan planning organizations (MPOs) can be amalgamated to estimate a statewide, metropolitan, 20-year transportation infrastructure funding shortfall. This article describes the methodology used to calculate such a shortfall in Florida, with information from all 26 MPOs in the state. The cost of needed projects and the dollar amount of anticipated revenue were extracted from each MPO plan. The difference between the two figures is the shortfall from that MPO. The methodology included steps taken to	• Describes methodology for states to use long-range transportation plans to project funding shortfalls

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			normalize the data for differing plan lengths, analysis base years, and rates of inflation. The results of the study show that Florida is expected to experience a $62.5 billion shortfall over the period 2005 to 2025. This is an annualized shortfall of $3.1 billion and represents a total statewide shortfall of 42.9%. The study concluded that Florida's shortfall has been increasing since the study was first conducted in 1997. Further, the data suggest the rate of increase may be accelerating. Shortfalls were not uniform in MPOs. In fact, they were observed to be smaller in MPO regions with slower population growth rates or dedicated sources of local funding such as impact fees or fully enacted local option gas taxes. Florida's transportation leaders have found this project useful in communicating the funding circumstances in the state. A statewide shortfall can help decision makers see how dramatic the shortfalls are and direct available resources toward urban areas.	
Scan 08-01 Best Practices in Managing STIPs, TIPs, And Metropolitan Transportation Plans In Response To Fiscal Constraints Link: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_08-01.pdf	National Highway Cooperative Research Program/AASHTO	2010	The scan was initiated to identify some of the best practices that states and MPOs are using to comply	• Provides additional examples of best practices for financial planning at

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			with current law and regulation for fiscal constraint and Year of Expenditure dollar requirements. The scan team reviewed selected state and MPO practices to identify best practices. The report provides a number of recommendations for achieving the broad objectives of fiscal constraint.	the state and MPO-levels • Does not focus on technical aspects of financial forecasting but identifies broad approaches and concerns of MPOs, such as excessive compounding and similar complications of YOE cost estimates. An example of findings related to the forecasting of revenue is the value of coordinating assumptions and estimates at the State level. The importance of coordination and working relationships among the MPOs and the State DOT is another conclusion.
Freight Transportation Planning: Best Practices and Benchmarking Survey http://trb.metapress.com/content/v2397ku7562044r6/fulltext.pdf?page=1 http://trb.metapress.com/content/v2397ku7562044r6/?p=f02b4cb827124ec3bb2522cf40f6be8a&pi=1	Schank, Joshua; Hirschman, Ira; Elliott, Preston	2008	The U.S. economy is increasingly reliant on freight movement. Unfortunately, freight movement in the United States is constrained to some extent by its lack of exposure and an emphasis by politicians and the public on passengers. Thus freight has taken a backseat in regional planning by metropolitan planning organizations (MPOs).	• Research found that only five MPOs included any kind of financial planning component in freight planning work. Several cited financial constraints of overall planning process, but did not identify financial planning issues specific to freight.

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			Metropolitan regions wanting to improve their economies, however, cannot do so without embracing freight, but these regions may not have attempted to plan for freight regionally and thus do not know how to start or what to do. Therefore, if MPOs better understand how to conduct effective freight planning, they can implement successful freight planning programs in their regions. A useful way to do this is to survey existing MPO freight planning processes. Several MPOs have substantial freight components and plan for freight effectively. A nationwide benchmarking and best-practices survey of freight transportation planning of MPOs was conducted. The survey and resulting analysis provide guidelines, ideas, and strategies for MPOs that want to set up or improve current freight transportation planning practices.	
Forecasting North Dakota Fuel Tax Revenue and License and Registration Fee Revenue Link: Link: http://www.ugpti.org/pubs/pdf/DP249.pdf	Berwick, Mark; Malchose, Don	2012	A literature review was conducted to determine the level and methods of forecasting used by states for fuel tax revenue collections and license and registration fees. The literature revealed that most	• Highlights the challenges states face in using models to forecast revenue • Contains results of a 50-state scan through 2010 of fuel-tax revenue

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			state DOTs use statistical or econometric models to forecast revenue of fuel tax and license and registration fee revenue. A survey was conducted to ask states about their models. All states responding to the survey use a statistical or econometric model to forecast. It was also found that most states have some problem with forecasting error in times of economic recession or other economic shock. The survey revealed results similar to the literature review and also revealed that states model cash flow in an attempt to estimate cash balances. Models were fit to the North Dakota data to estimate fuel tax and license and registration fees. The models provide reasonable forecasts, however the model for the license and registration fees does not seem to be as good a fit as the fuel model because of variations in the data.	models and highlights • Demonstrates a model and makes recommendations for improving North Dakota's models moving forward
In-Depth Analysis of the JACK Model Link: http://www.utexas.edu/research/ctr/pdf_reports/0_6395_P3.pdf	Khali R. Persad, Khali; Loftus-Otway, Lisa; Harrison, Robert; Chi, Seokho; Franco, Patricia; Singh, Prakash; Cruz-Ross, Alejandra	2009	Recently, as part of a comprehensive analysis of budget and funding options, a Texas Department of Transportation (TxDOT) special task force has examined the agency's current financial forecasting methods and has developed	• Provides a detailed overview of model development including assumptions , inputs, and performance • The JACK model includes two major

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			a model designed to estimate future State Highway Fund revenues and expenditures. The Joint Analysis using Combined Knowledge (JACK) model is capable of projecting future TxDOT revenues and expenditures. One part of the model includes estimation of revenue diversions. This report provides an in-depth analysis of the JACK model.	calculation processes: one for revenue forecasting and the other for expenditure projection. • Total available revenue is estimated as a function of vehicle registration fees, state motor fuel taxes, returns on federal motor fuel taxes, mobility funds and proposition bonds, other agency revenues, and other federal reimbursements. - Total expenditure is projected based on construction expenditures (lettings, including bridges), maintenance and overhead expenses, bond payback amounts, and mobility fund restoration