Incorporating Transit Service Decisions into Express Lane Programs

presented by
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Outline


- Background
- Purpose
- Objectives
- Tasks
  - Case Study Objectives
  - Proposed Approach
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Background

FDOT is developing statewide system of Express Lanes

EL programs provide new opportunities for transit services

Ridership increase is observed on Express Buss Services

Purpose


- Given the significant benefits that transit service could bring in contributing to the overall project goals in reducing congestion, enhancing system performance, improving environmental, economic and social concerns, FDOT is in need of a standard approach that enables the incorporation of transit service goals and benefit considerations into EL programs.

Purpose


- This research aims to equip FDOT, as the national leader in the creation of networks of ELs, with better tools and methods to facilitate the assessment of investment decisions for transit services to be provided in conjunction with EL projects, and to maximize project benefits and system efficiency through both highway and transit alternatives.

Objectives

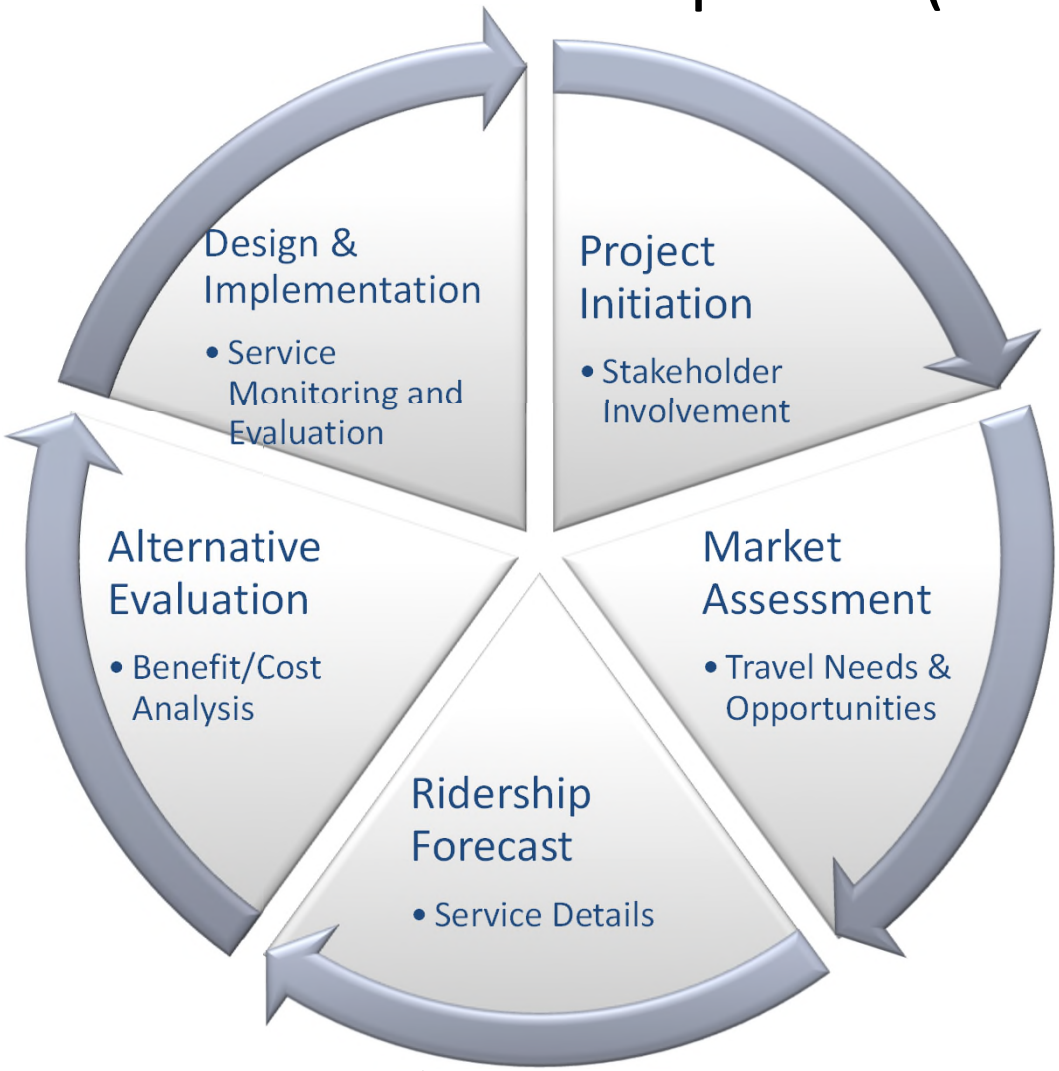

- To recommend a framework for transit ridership forecasting within the EL context, including analysis needs, forecasting methodology, data requirements, tool development efforts, performance measures, etc.
- To develop a methodology for transit ridership forecasting (number of buses, bus sizes, frequency and headways) using I-95 Express case study, taking advantage of existing tools such as FSUTMS, specifically the Express Lane Time of Day (ELTOD) model, STOPS, T-BEST, or other software/models as appropriate.

Project Tasks


- Task 1 Literature Review (March 2016)
  - A wealth of knowledge in transit ridership forecast (TCRP Sythesis 66, TCRP 95, TCRP 118, TCRP 167)
  - Very few studies in the EL context
  - Compile relevant literature in terms of ridership forecast methods, approaches, data needs, capabilities and limitations.
  - Identify and review existing tools in use by FDOT

Project Tasks

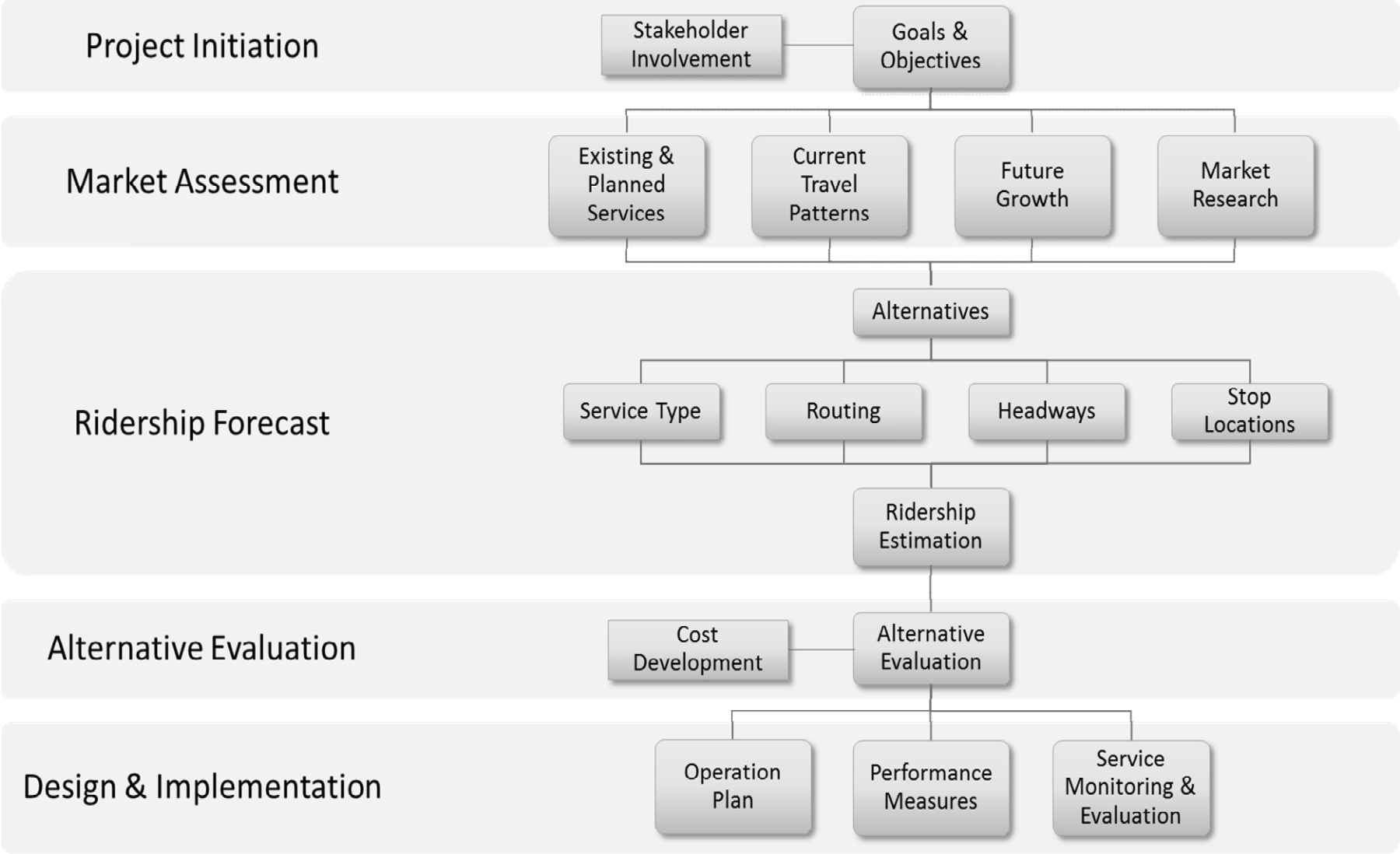
- Task 2 Framework Development (June 2017)



Transit service planning process on an ongoing basis

Project Tasks

- Task 2 Framework Development (June 2017)

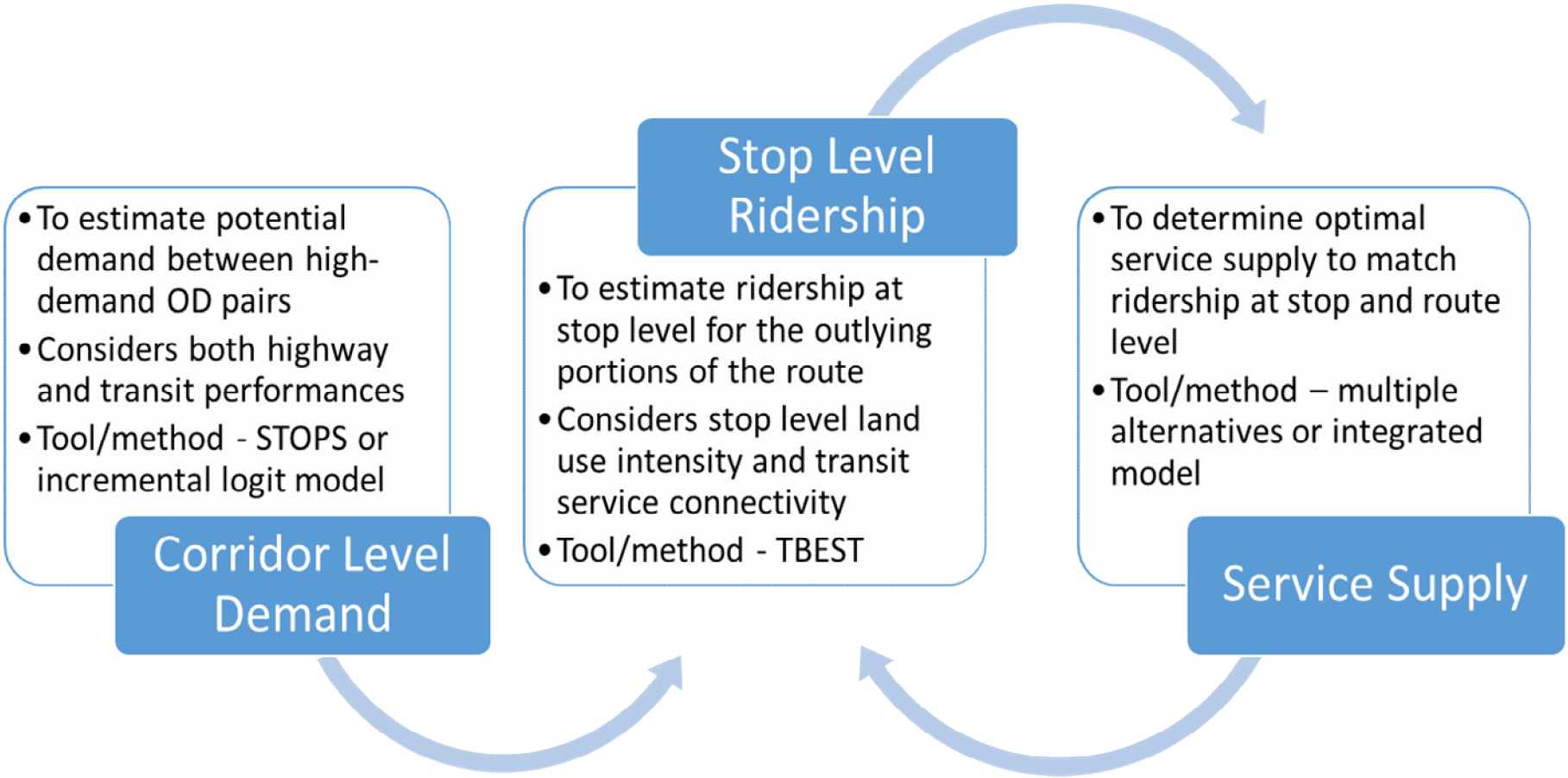


Project Tasks


- Task 3 Methodology Development (Feb 2017)
  - Consider the use of existing tools
  - Desired Capabilities
    - Capture key demographic segments to be served
    - Correspond to the spatial distribution as well as level of major activities
    - Provide stop and route level ridership estimates for peak and off-peak conditions
    - Consider various service details
    - Recognize the unique physical and operating features of Express Bus services
    - Reflect the influence of price and service characteristics of competing and complementary modes
    - Capture choice users and “new” trips
    - Represent the interrelationship/equilibrium between supply (service details) and demand (ridership)

Project Tasks

- Task 3 Methodology Development (Feb 2017)



Project Tasks


- Task 4 Case Study and Data Analysis
  - Use I-95 Express program as a case study
  - Evaluate and demonstrate the methodology(ies) developed from the previous task
  - Data acquisition and preparation
  - Performance measures (ridership, peak load, running time, etc.)

Case Study Objectives


- Assess the capabilities and user features of the tools
  - Accuracy of ridership estimation
  - Sensitivity to service attributes to facilitate service planning decisions
  - User efforts to prepare inputs, perform model runs and analyze results

STOPS


- A simplified travel demand model
- User inputs: CTPP flow, GTFS, highway skims, P&R by service miles, route type, service attributes
- Limitations: does not consider accessibility, does not consider fare or tolls, or parking capacity directly
- Mainly aims for commute market
- Approach
  - Sensitivity scenario analysis
  - Before/after study

TBEST


- More as a generation model rather than mode choice model
- User inputs: GTFS, SED, land use, route type, BRT adjustment, service attributes
- Limitations: does not consider driving access, does not consider highway performance
- Approach
  - Modify SED at stop level to reflect larger market potentials
  - Sensitivity analysis

Direct Estimation Method


- Regression models to predict ridership based on demographics, land use, and LOS attributes.
- User inputs: existing express bus services (or other services alike) characteristics and ridership, land use, demographics, etc.
- Limitations: spatial transferability, small sample size, collinearity, etc.
- Approach
  - compile a database with service attributes and ridership
  - explore patterns and derive relationships

Action Items


- Data acquisition and preparation
- Modify model input and conduct scenario runs
- Analyze results and derive performance measures (ridership, peak load, running time, etc.)
- Recommendation and final report

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