

A STUDY OF ALTERNATIVE LAND USE FORECASTING MODELS

PROBLEM STATEMENT

The Florida Standard Urban Transportation Modeling Structure (FSUTMS) requires socioeconomic data to predict future travel demand and transportation needs. Future socioeconomic data are estimated based on future land use forecasts, sometimes with the aid of a land use model. These forecasts are based on an array of factors such as changes in population, demographics, structure of local economy, real estate market, land use, growth policies, and environmental constraints. The accuracy of a land use forecast greatly affects the accuracy of a demand forecast model. As travel demand models continue to improve, planners seek to improve model input, especially for future forecast years, due to the lack of reliable economic statistics and various uncertainties. Currently, urban areas in Florida use different methods for land use forecasting; the Florida Department of Transportation would like to identify a suitable land use model that may support land use and transportation planning efforts across the state.

OBJECTIVES

This project reviewed an array of land use models and selected the model UrbanSim for a detailed study for its potential applications in Florida. The objectives of this research include:

1. Understanding the state-of-the-art and state-of-the-practice of land use models;
2. Determining the data requirements and identifying application issues related to UrbanSim;
3. Investigating the need for developing additional computer programs for data processing and interfacing UrbanSim with the FSUTMS; and
4. Identifying future research and implementation issues.

FINDINGS AND CONCLUSIONS

In this study, researchers calibrated an UrbanSim model for Volusia County. Five scenarios of land use development and transportation improvements are tested. The results are described in terms of V/C ratios, traffic volumes, accessibility, households, population, and employment. They are compared to the forecast land use data from the 2020 Long Range Transportation Plan (LRTP) adopted by Volusia County. The following are the findings from this study:

- UrbanSim has been found to simulate land use changes reasonably well, although there are differences between the model results and the projections by Volusia County. These differences are expected, since these projections are produced using different methods.
- Many urban areas go through a consensus building process when allocating growth to different municipalities. Community visions of future growth need to be presented in more concrete terms of possible developments so that they may be included in UrbanSim.
- Consultations with local government agencies are desirable when developing model specifications and estimating model parameters. Location choice models and developer models reflect the behavior of local activities. Consultation with local agencies will help improve model performance.
- Feedback from the travel model to UrbanSim influences the land development patterns. Therefore, it will be useful to measure the sensitivity of UrbanSim to accessibility to determine the necessary frequency of the feedback. Through feedback, UrbanSim also has the potential of testing the effects of different project schedules on both land use and transportation.
- UrbanSim is designed to be integrated with lifestyle travel models, therefore, is a natural fit to lifestyle models and activity-based models.
- Development of an UrbanSim model requires expertise in both GIS and statistics, the latter for estimating discrete choice models. Some MPOs may not have in-house expertise and may need to rely on services provided by consultants.

BENEFITS

If adopted in Florida, UrbanSim would be useful for estimating future land use forecasts and for providing socioeconomic data for FSUTMS models. Integration of UrbanSim with FSUTMS would improve the accuracy of future travel demand and transportation needs, which would, in turn, improve the model validation and forecast results.

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