

4.0 THE APPROACH

4.1 Introduction

This chapter details the approach adopted for carrying out the research objectives, as stated in chapter 2.0. This chapter also provides a brief summary of the overall methodology employed for accomplishing various tasks involved in this research effort.

4.2 The Overall Approach

The original intent in this research was to use the readily available and easily accessible data in the Census Transportation Planning Package (CTPP) to establish a trip table for use as the target/seed in the synthetic models. However, this was not achieved. That is, the CTPP data could not be utilized in this case, since Pulaski was categorized under the statewide element of CTPP, and contained only aggregated data. The required disaggregated data at the TAZ level was not available. Accordingly, the approach employed the zone-specific socio-economic data relevant for application in the conventional trip generation stage of the four-step planning process. The output of the trip generation stage was used in the trip distribution phase to derive a trip table through the use of the gravity model. The trip table obtained was then fed into the synthetic O-D estimation models as a target/seed table, and the output tables were evaluated. The availability of tables developed from actual surveys in the town of Pulaski provided an opportunity to perform a true validation of the approach. The merit of the approach was that it combined the conventional wisdom that socio-economic characteristics (which are ignored by many synthetic models) generally influence trip-making behavior, with the fact that observed traffic volumes on the network provide information on the actual trips being made at the time of the data collection. In order to test the merits of the above table as input (target/seed) to selected synthetic O-D estimation models, again the link volumes were used as a major source

of information for running the models. The output tables obtained through this procedure were compared against the surveyed tables. The overall approach is depicted in Figure 4-1.

4.3 Methodology

To accomplish the objectives of this research effort, the basic steps that were followed are shown in Figure 4-2. The first step was to decide on the data requirements to be provided as input for trip generation and trip distribution applications. Since CTPP data could not be directly employed for the Pulaski case study, alternate data sources were explored. Zone-specific dwelling units and employment data were obtained from VDOT, and the town of Pulaski, respectively, for use in trip generation analysis. The output of trip generation step was utilized to perform trip distribution using the gravity model. The output table was then used as the target/seed table. MINUTP software was selected for carrying out these applications. These two steps of the four-step planning process were found to be sufficient to derive the target/seed tables for model runs. Trip tables were obtained for both the 24-hour and peak-hour cases. These tables were used as the target/seed for running the LP and THE models for 24-hour and peak-hour cases. The evaluation of the models consisted of matching the VDOT-surveyed trip table and observed link volumes, in terms of various measures of error rates. The modeled link volumes and trip tables, synthesized by the models' on using the superior target/seed table were also compared to the outputs from the use of a structural target table, which were available from the previous study. This comparison was of particular interest since the structural target table would be the choice in the absence of the tables derived through the proposed approach. The models were also tested for their sensitivity to varying percentages of available link volumes. The 60% and 50% link volumes were obtained by randomly removing the links from the 75% observed link volumes, provided by VDOT. Conclusions and inferences were then derived from these analyses for both models in terms of relative performance. Recommendations for future research and the potential areas for enhancing this research have also been included.

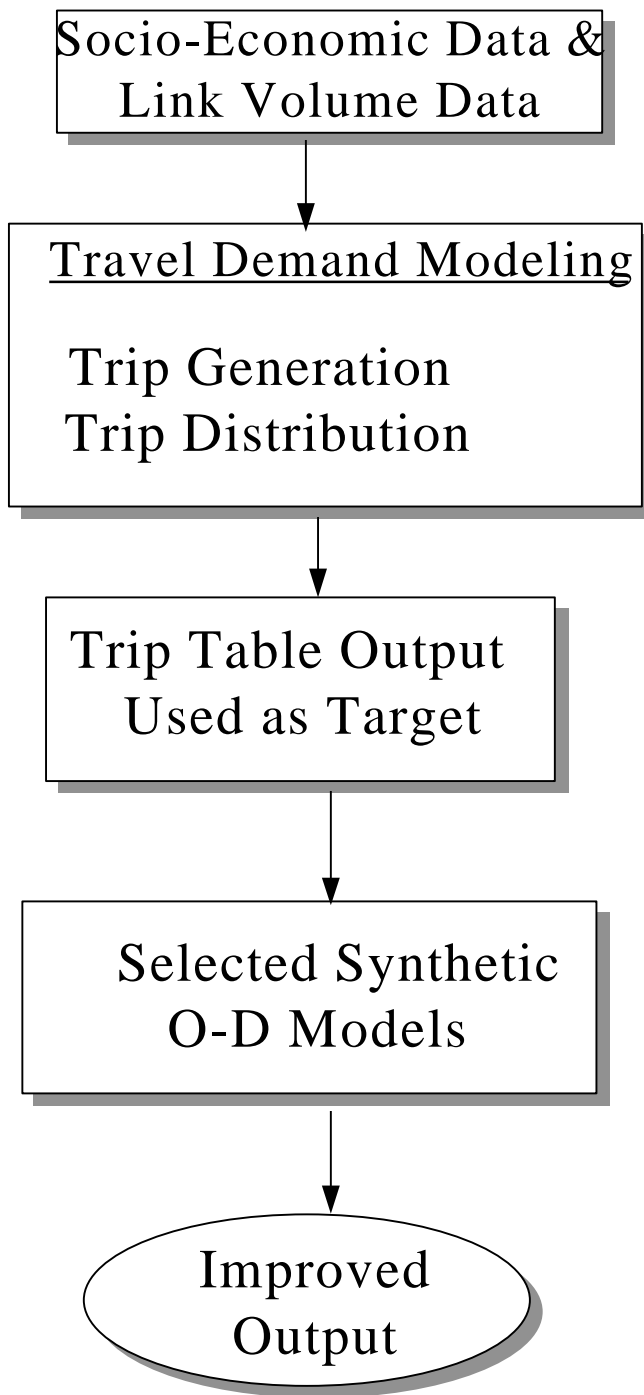


Figure 4-1 The Research Approach

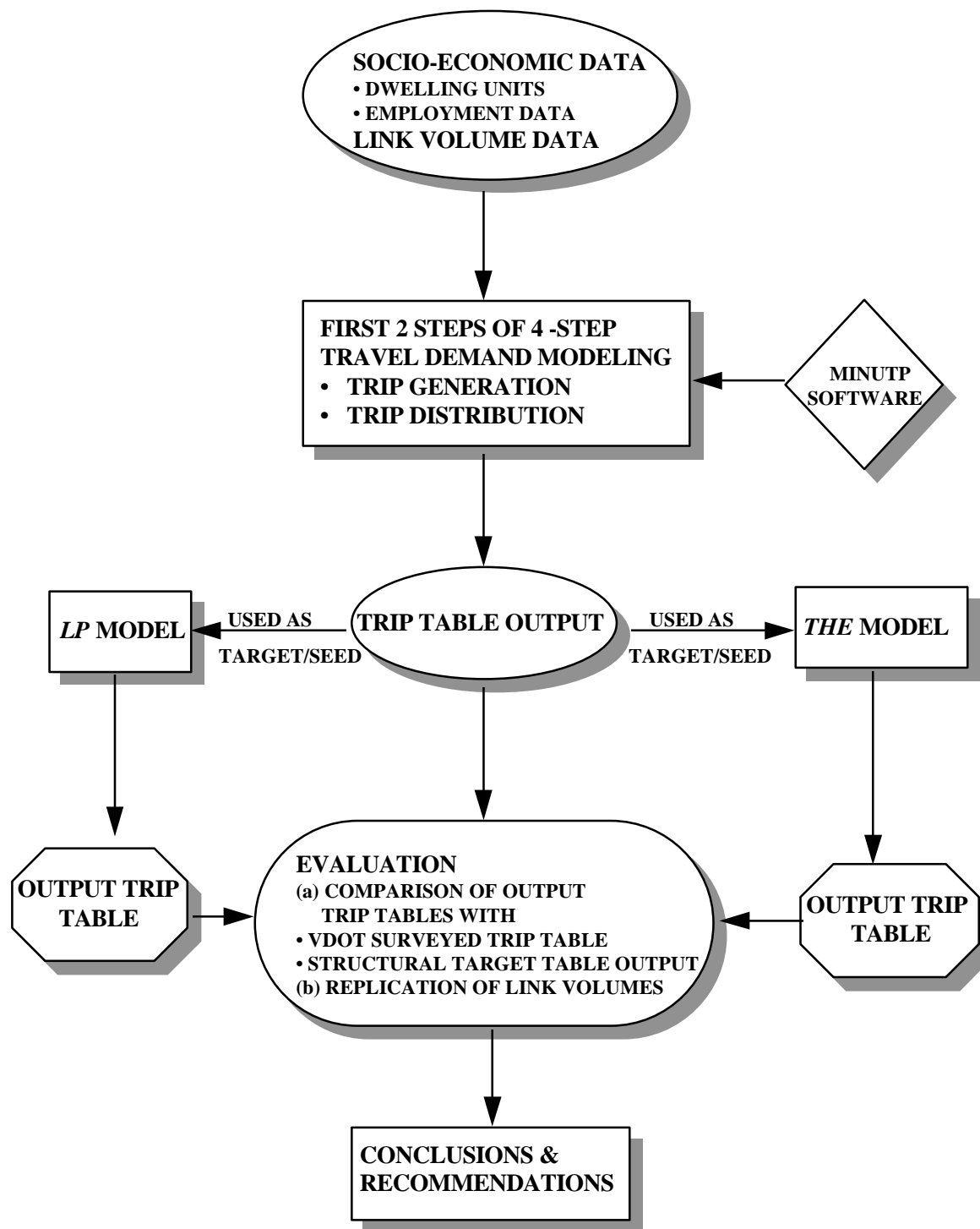


Figure 4-2 Methodology