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Modeling of Discretionary Activities of Non-Workers in a City in India

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Abstract

This paper concentrates on the decision of non-workers to participate in shopping and recreation in Calicut city, a major urban center in Kerala, in India. The non-workers in the present study comprise of homemakers and the retirees. Activity and travel details collected using home interview survey formed the data base for the study. Multinomial logit models are used for analyzing the participation behaviour of non-workers in these activities. Age, travel mode, availability of household vehicles, presence of school going children, day of the week and time of day are some of the variables influencing these choices. The outcome confirms the previous findings on factors affecting non-work participation behaviour of non-workers in these activities. These models have wide applicability in determining the travel behaviour of non-workers and can serve as a major input to travel demand forecast.

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Keywords: Participation, homemakers, retirees, shopping, recreation, multinomial logit, India;

1. Introduction

Travel is an indirect demand that arises from the needs of individuals to pursue different activities. It is very essential to ensure ones participation in various activities. Modelling of participation behaviour of any individual is

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essential for analyzing the travel behaviour and a major input to travel demand. Travel behaviour models should be developed by categorizing the entire population into groups with similar characteristics. This is necessary because the characteristics and duties of individual make them different from each other.

The models of activity travel behaviour analysis are plenty in developed countries, but very few studies attempted to model activity travel behaviour of individuals in the developing economies. Compared to the activity behaviour of workers little attempt had been given on travel analysis of non-workers, which can be a major input to the travel demand and transportation planning process. Also the accessibility and mobility requirements of non-workers are different from the working communities and the temporal fixities are less, this offers the non-workers more flexibility to participate in various activities.

The present work models the shopping and recreation of homemakers and retirees. These models consider all details of trips, activities, mode, place and time at which these activities are performed and the time taken for each activity engagement, along with the characteristics of individual and household. It requires an analysis of the complete sequence of activities engaged by each individual on the whole day. The non-workers who participate in at least one discretionary activity like shopping or recreation along with other activities is considered for modelling. Simple and complex activity pattern is used in the study. A simple activity pattern consists of only one activity engagement namely home-shop-home (H-S-H) or home-recreation-home (H-R-H). The complex pattern considered in the study is home-shop-other-home (H-S-O-H). A similar pattern is considered for recreation also.

1.1. Literature review

The literature pertaining to the analysis of travel behaviour of workers using activity based model have received extensive analysis and research [1] [2] [3] [4] [5] [6] [7]. Majority of the earlier work on activity-based research literature pertains to developed countries like the United States of America. Different methodologies were also developed by various researchers for modelling the various decisions to participate in activities. These models include binary logit models [8][9][10], regression models [11], probit models [12] and multinomial logit models [9]. The factors influencing these decisions were identified as household assets, presence of small children [10] [13] gender, age, education level, household size and number of workers [14]. Difference in travel behaviour of workers and non-workers were identified by [15] and [16]. Time budgets of non-workers in India are found to be different from workers in the developed world. [17] [18] understood that age and household size were not found to influence the travel time in the Indian city, and they explored the relationship between non-work activity duration of adult individuals in a household composed of two adult families in a city in India. The recent work on non-workers activity participation was done by [19] using a structural equation model. The present work considers different categories of non-workers including day of the week as a variable. In addition a wide variety of indirect variables were also incorporated in the model development. The interaction effects were also included in the model using certain dummy variables.

2. Study area and data collection

2.1. Study area

Calicut is one of the medium sized cities in Kerala in South India. It is located on the west coast of India. According to the 2011 census, the population of Calicut city is 6.022 lakhs and a population density of 5104 inhabitants per square kilometer. There are three national highways, NH-17, NH-212, and NH-213 passing through the city, which gratify to the main activity system of the city. The study area contains 71 electoral wards as per 2011 census.

2.2. Data collection

Home interview survey was conducted for data collection, using an activity travel diary that consisted of household information, personal information, and activity travel details. Details of every individual in the household were

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