Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 96 (2013) 360 – 367

Procedia Social and Behavioral Sciences

13th COTA International Conference of Transportation Professionals (CICTP 2013)

Research on the cooperative game between tourist spot's public operational vehicles and private operational vehicles

Luan SU[a], Dawei HU[a]

[a] School of automobile;Automobile College of Chang' an University, P.O. Box 012, Middle Section, South No.2 Ring Road, Xi'an,Shaanxi;710064, China

Abstract

Tourist spot's public operational vehicles occupy the monopoly position in the market of tourist passenger transport, but they have a great defect of service quality which has a bad influence on the positive image of the tourist spot. Introducing private operational vehicles into the market is suggested which makes a corporate operation of public operational vehicles and private operational vehicles. Based on this, a cooperative game model is proposed and a kind of cooperation mode which makes the profit distribution reasonable and the alliance stable is sought. The results indicate that the formation of cooperative alliance can increase the profit of both sides and can increase the overall social benefits of tourist spot simultaneously.

Keywords: Cooperative Game; Tourist Spot; Passenger Transport; Private Operational Vehicles

1 Introduction

With the improvement of living standard，people's travel demand is increasing which results on the rapid growth of tourist spot's reception of tourists. Tourist passenger transport develops simultaneously as a part of tourist industry. Tourist passenger transport includes road tourist passenger transport and tourist spot passenger transport. Road tourist passenger transport is the displacement transfer process traveling from the residence to tourist destination; tourist spot passenger transport is the displacement transfer process traveling among the tourist attractions within tourist spot.

But the tourist spot passenger transport begins to confront a great challenge with the rapid development of tourist industry. Travelers have met a series of problems when they take tourism transportation, such as the overcrowded compartment, poor attitude of the staff, the single option of transport vehicle type and the vehicle's failure in departure or arrival on time which greatly reduce the satisfaction of the travelers on the tourist spot and is not conducive to the positive image transmission of tourist spot. Consequently, a good organization and coordination of the tourist passenger transport is of great significance.

* Corresponding author. Tel：（+86）15891484316.

E-mail address: 392079978@qq.com

doi:10.1016/j.sbspro.2013.08.043

At present, the research about tourist passenger transport is mainly on the road tourist passenger transport, theory research on tourist passenger transport[1], tourist passenger transport pricing[2][3], research on the behavior of tourist spot transport mode choice[4]. While the research about the tourist spot passenger transport is very few which only limited to the development and layout of the passenger line[5].

For the current phenomenon that tourist spot's public operational vehicles occupy monopoly situation, this paper recommends the full introduction of private operational vehicles to force the competition under cooperative condition. After analyzing the business behavior of both sides with cooperative theory, a cooperative game model aiming at the largest joint effectiveness is built. Finally, the Mount Emei Scenic Area, Sichuan, China is selected as a case study, then the best solution of the cooperative game model about tourist spot public operational vehicles and private operational vehicles is obtained.

*

2 About cooperative game theory

Cooperative game is a game that the interests of both sides increase or at least one party's interests increases in the condition that the other party will not be harmed, therefore the overall interests increases. Two-person bargain is the basic problem of cooperative game, it is a problem about how to divide the interrelated gains (profit) between two players, that is to say, achieve greater co-interest and self-interest of both sides by coordinating behaviors with a contract in the situation that they have common but not entirely consistent interests.

Public operational vehicles are owned by tourist spot and the operating income belongs to tourist spot, private operational vehicles are owned by individuals and the operating income belongs to individuals. Both incomes are related to the quantity of the passengers they carried. In fact, it is the segmentation of tourist spot passenger market. The competition between the tourist spot public operational vehicles and private operational vehicles is a kind of game, both sides are considering how to improve their income in the competitive process. Currently, public operational vehicles and private operational vehicles are in the opposite position and both sides are snatching passenger transport market through a variety of means. Some unreasonable behaviors lead to the dissatisfaction of tourists which will easily result in the loss of tourists causing the shrink of entire passenger travel market.

Actually, the relationship between tourist spot public operational vehicles and private operational vehicles can transform to cooperative game. If the overall passenger number increases, the income of both sides will increase, which is their common interests. However they differ in travel time and price when compete with each other, so their interests are not exactly consistent. Thus, the tourist spot public operational vehicles and private operational vehicles can be taken as a two-person bargaining game. If a cooperation agreement which offer a cooperative way to have a reasonable split of gains achieving the increase of interests of the two sides ultimately can be reached, then this cooperative method can be long-term implementation and the cooperative alliance can be stable, at the same time, the healthy development of the tourist spot passenger market can be promoted.

3 Game analysis on tourist spot's public operational vehicles and private operational vehicles

The basic elements of two-person bargain problem: (1) Feasible alternative set S. The feasible allocation set of two-person bargain is given by $S=\left\{(s_1,s_2)\middle|0\le s_i\le m, s_1+s_2\le m\right\}$, s_1 and s_2 represent the benefit of two sides respectively, m represents the maximum divisible benefits. (2) The expected utility of players is given by u_i. Generally,