

Chapter 2

Literature Review

2.1 Introduction

This chapter presents a literature review that is relevant to the study. The work of various authors using travel demand model for rail passenger services will be reviewed in Section 2.2. While Section 2.3 reviews existing studies on Keretapi Tanah Melayu Berhad's (KTMB) rail passenger services.

2.2 Travel Demand for Rail Passenger Services

In the year 1970, the Canadian Transport Commission Research Branch conducted a study on intercity passenger transport where the area included the intercity corridor between Quebec City and Windsor, Ontario. The emphasis of this research was placed on the intercity passenger travel requirements in Montreal, Ottawa and Toronto corridor. The purpose of the study was to evaluate and identify the intercity passenger transport technologies in Canada. A general travel demand model was built to forecast travel demand for different modes of transportation. The explanatory variables that were used in the formulation of the travel demand model consisted of population, income, cost, time, frequency and level of service. There were six development strategies recommended, stretching a period of twenty years. These strategies were later compared in terms of cost, revenue and passenger volume. The

first development strategy involved improvements in the present technology of the transportation system. While the second development strategy was the short takeoff and landing system. The third, fourth and fifth development strategy comprised three different high-speed rails which covered the Montreal and Toronto corridor. The last development strategy was the introduction of the tracked air cushion vehicle. The empirical results showed the most appropriate strategy was to utilize the existing railway system and introduce the Turbo train. This strategy produced the highest return in the analysis. It was not feasible to improve the existing railway system because it was too costly. Short take off and landing systems and tracked air cushion vehicle were suggested for further research and consideration because of their potential in comparison with other strategies.³

Gerald S. Cohen, Nathan S. Erlbaum and David T. Hartgen (1978) in “Intercity Rail Travel Model” developed binary competitions models to evaluate variables that influenced particular mode choices. The modes choices were either by rail, air, auto or bus. There were 31 city pairs included in their research. It was collected in 1975 where information of city size, spatial separation variables and modal service variables such as travel times, costs and frequencies were collected. The analysis included information about the quality of service that described the characteristics of the train and terminal service. The method of approach in the analysis was to forecast travel demand via rail, air, auto and bus between each city pair. The rail share was estimated from the travel demand model that was built. Pivot point was used to

³ Canadian Transport Commission Research Branch, Intercity Passenger Transport Study (Canada: GPO, September 1970).

adjust the forecast so that it did not contain the residual error. Rail was compared with air, auto and bus from the results generated. The study showed that planned rail service improvements in the New York City-Buffalo corridor would have a substantial effect on rail patronage. It also showed that rail traffic was sensitive to relative travel time. If there was any improvement in rail travel time, the diversion of mode choice would come primarily from auto. Improvements in the quality of service, frequency of travel and cost of rail service encouraged diversion. However the effect was less than the improvements in travel time. The solution to improve rail passenger service was by improving travel time.⁴

Ian S.Jones and Alan J.Nichols (1983) made an attempt to evaluate the demand for intercity rail travel in the United Kingdom. The results were based on the analysis of data on four-week ticket sales covering the period from the beginning of 1970 to the end of 1976 for each of the 17 main London-based flows. The demand function for each of the flows was estimated by means of ordinary least squares. The specification of the demand variable used in this research was constrained by data available. The ticket sales data was used as a proxy for total rail travel between city centre and city centre. The authors hypothesized that the demand for rail travel was a function of rail fare and level of service, costs and level of service on competing modes, population and employment at the trip ends and economic activity. The demand model was tested for the existence of seasonal variations in traffic volumes

⁴ Gerald S.Cohen, Nathan S.Erlbaum and David T.Hartgen, " Intercity Rail Travel Model" Transportation Research Record 673: Transportation Forecasting and Travel Behavior (Washington, D.C.: Transportation Research Board, 1978) 21-25.

through the inclusion of a set of twelve seasonal dummy variables for the thirteen four-weekly periods. It was found that demand was significantly affected by the level of average fare paid, deflated by the retail price index, by rail journey time, by the level of service offered on competing modes, by the level of cyclical economic activity and by seasonal factors. There was very limited evidence of a positive relationship between the demand for travel and population at the provincial end of the journey. There was no evidence that demand was significantly responsive to changes in train departure frequency within the range of the experiments observed sample and that the demand for rail travel was either positively or negatively related to variations in real GDP.⁵

H.McGeehan (1984) used ordinary least squares to forecast the demand for inter-urban railway travel in the Republic of Ireland from 1970 to 1982. The purpose of the paper was to derive a model capable of predicting passenger demand in the short run. He hypothesized that demand for inter-urban rail travel depended on variables such as the money cost of travel by rail, disposable income, car ownership, quality of service and seasonality. The dependent variable was the data on passenger miles. It was extracted from the combination of mileage matrix (distance between stations) and information on ticket sales. The independent variables were rail fare, income, car ownership, quality of service and seasonality. The index of Average Industrial Earning (index refers to gross income) was used to measure income. The volume of retail sales (records actual expenditure) was the second index used and tested in the

⁵ Ian S.Jones and Alan J.Nichols (1983), The Demand For Inter-City Rail Travel In The United Kingdom, Journal of Transport Economics and Policy, Vol 17.

regression analysis. Quality of service was measured through variables such as speed, comfort, suitability, frequency of train departures and journey times. Three dummy variables representing the second, third and fourth quarters were included in the analysis. There were considerable problems with autocorrelation in a linear formulation. The residual suggested a non-linear specification would be more appropriate. The most satisfactory result was obtained from double-log function. Variables that were expected to be of importance in determining demand were found to be not significant in the regression analysis. The variables were car ownership, the nominal rail fare relative to motoring costs, scheduled train miles operated and a seasonal dummy (fourth quarters). Demand for inter-urban railway travel in the Republic of Ireland Travel was found to be significantly affected by rail fares (deflated by Consumer Price index), real consumer expenditure, and seasonal dummies representing the second and third quarters. The coefficient on the real fare variable from the empirical results suggested that the demand for inter-urban travel was highly inelastic. From the policy point of view, an increase in real fare will reduce passenger miles but at the same time increase total revenue. There was a proportional relationship in the short run between passenger travel and consumer expenditure because the expenditure elasticity was found to be not significantly different from unity.⁶

⁶ H.McGeehan. (1984), Forecasting The Demand For Inter-Urban Railway Travel In The Republic of Ireland, Journal of Transport Economics and Policy, Vol 18.

2.3 KTMB's Rail Passenger Services

Mustafa Dakian (1995) examined the level of efficiency in Keretapi Tanah Melayu Berhad (KTMB) before and after it was privatized in his dissertation entitled “Penswastaaan dan Implikasinya Terhadap Kecekapan Peruntukan Sumber-sumber: Kajian Kes KTMB”. He tried to determine the level of efficiency of allocation of resources for rail passenger services from 1970 to 1990. An econometric model was built based on references from H. McGeehan (1993) and Solito.C.Monsod (1967). It comprised the demand and marginal cost function. It was estimated from the secondary data collected from government publications and the library of KTMB. He analysed the structure of the rail passenger services of KTMB and forecast the passenger demand from 1994 to 1998. Comparison was also made between different types of mode of transport in Malaysia such as bus, taxi, plane, train and private automobile in terms of the cost incurred. In his research, he concluded that KTMB had increased its competitiveness and the level of efficiency had improved after its privatization.⁷

Zaihal Hazri Bin Abdul Halim (1996/1997) in his research on Keretapi Tanah Melayu Berhad (KTMB) evaluated KTMB's efficiency in providing rail passenger services to consumers after its privatization. The researcher also evaluated the potential of rail passenger services in the transport sector in Peninsular Malaysia and its role in the future. From his analysis, he hoped to find the necessary improvements

⁷ Mustafa Dakian , Penswastaaan dan Implikasinya Terhadap Kecekapan Peruntukan Sumber-sumber : Kajian Kes KTMB , Dissertation (M.Ec), University of Malaya, 1996.

that were needed to improve its current services. Survey questionnaires were in the form of open-ended and close-ended questions. The target respondents included the management of KTMB and its passengers. The factors that were used in the analysis were the opinions of passengers regarding train fare in comparison with other modes of travel (e.g. taxi, bus, plane), should there be a reduction in the current train fare, the level of cleanliness of toilets on board coaches, the level of condition of seating and beds of coaches, the level of cleanliness of the canteen, the prices of food and drinks provided, the punctuality of train, the safety of passengers including their belongings and the level of service provided by the staff. The analysis was based on the qualitative response given by respondents. From this research, it was found that most passengers were satisfied with the level of service provided by KTMB but there were several issues that needed attention. The passengers were more concerned about the safety of their well-being including their belongings on board coaches. The food and drinks provided on board were expensive. Facilities should be kept clean and staffs should provide the necessary assistance to passengers.⁸

Wahida Ayob (1997) in her research entitled “Kajian Perkhidmatan Keretapi KTM Komuter (Lembah Klang)” examined the role played by Keretapi Tanah Melayu (KTM) commuter service in fulfilling the public transport needs of residents in Lembah Klang. This research oversees the existing problem in public transport sector and the planning of transportation in Kuala Lumpur. The objective of the study was to evaluate the organization and the level of service provided by KTM

⁸ Zaihal Hazri Bin Abdul Halim, Ke Arah Penswastaan : Sejauhmanakah Memberi Kesan Kepada Perkhidmatan penumpang Keretapi Tanah Melayu Berhad, Academic Exercise (B.Ec). University of Malaya, 1996/1997.

commuter. The quality of service was being measured through variables such as commuter fare, comfort and frequency of trips. Primary data was collected through interview and survey. Officials from “Jabatan Perkhidmatan Korporat Keretapi Tanah Melayu”, workers for KTM at the commuter stations, officials from “Dewan Bandaraya Kuala Lumpur”, “Jabatan Pengangkutan Bandar” and passengers of KTM commuter were interviewed. The survey concentrated on the perception of respondents on the quality of service provided by the KTM commuter. The main hypothesis was to prove that there was a relationship between ownership of vehicle and users of KTM commuter service. Using Yule’s Q Analysis, it showed that there was a weak positive relationship whereby usage of KTM commuter service did not depend on vehicle ownership. Factors or variables that influenced the usage of KTM commuter service that were proven in the analysis were the level of income, vehicle ownership, distance between home and the workplace, mode of transport to the station, purpose of journey, waiting time and journey time. As a conclusion, most of the passengers were satisfied with the current level of service provided by the KTM commuter. The process of urbanization, population, income, employment and use of land influenced the transport system in Kuala Lumpur in terms of planning and future developments.⁹

Wan Azhari Wan Yusoff (1999/2000) studied the level of satisfaction of passengers towards the quality of service provided by Wau Express of Keretapi Tanah Melayu Berhad (KTMB). In his research he also evaluated the potential of the public

⁹ Wahida Ayob, Kajian Perkhidmatan Keretapi KTM Komuter (Lembah Klang), Academic Exercise (B.A). University of Malaya, 1997.

transport system in Malaysia. From this research, the writer examined the weaknesses and shortcomings of the level of service provided by Wau Express. The scope of analysis covered the operation of Wau Express travelling from Kuala Lumpur to Tumpat and vice versa. The questionnaire was set in a way to include questions about the level of service and level of satisfaction of passengers who travelled by Wau Express. Passengers as well as officials from KTMB were interviewed. The information gathered from the survey was presented in the forms of tables and percentages, which included demographic information of respondents and quality of service provided by KTMB. The quality of service was measured through variables such as fare, comfort, facilities, food, safety and the issue of delay. The study found that the level of service provided by the staff needed to be uplifted, the food and drinks being sold on board were expensive and the facilities on coaches needed to be in good and clean condition. Besides that, railway stations should be situated in strategic places and the safety of passengers needed assurance in order to attract more people to use the rail passenger service.¹⁰

¹⁰ Wan Azhari Wan Yusoff, Pengangkutan Awam : Satu Kajian Mengenai Kepuasan Pelanggan Terhadap Mutu Perkhidmatan Ekspres Wau (KTMB), Academic Exercise (B.A), University of Malaya, 1999/2000.