Journal of Traffic and Transportation Engineering 14 (2026) 73-78
doi: 10.17265/2328-2142/2026.02.004

Study of Consumer Behaviors on Real Time Traffic Information Service

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Abstract: Real-time traffic information is a real-time traffic information reporting system for presenting data to travelers to be used in making traffic decisions. Reported data differs by the area of the country, mode of travel, characteristics of travelers and travel objectives. The objective of research is to study demographic characteristics, travel behavior and information that travelers want. The traffic information was designed and offer to travelers. The consumer behaviors theory was conducted using in-depth study. According to the findings, most of the sample group comprised private car owners and used private car for work and recreation trips. Furthermore, some of the samples were found to have cars but parked them at home and opted for via public transportation. The traveler's behaviors have been divided by mode of travel. Persons traveling with private car have higher average monthly incomes than persons traveling by public transportation with slightly shorter distances and less time spent traveling. According to the results from presenting traffic information for mixed and matched by travelers, found that the types of information in high demand consisted of information about shortcuts to avoid traffic jams, warnings when delays occurred on travel routes, notification of incidents occurring throughout the travel route and systems for planning personal travels. Different objectives caused the sample group to desire different types of information.

Key words: Real time traffic information, traveler behavior, information package.

1. Problem Statement

Traffic information systems are systems for reporting data to the public, which is important to travelers. People all around the world use communication technology and guide systems to provide information in support of travel decisions. Most traffic information provided on the Internet and GPS devices of vehicles comprise systems with maps, routes, traffic conditions and weather reports, which comprises real-time information for the most part. Use of traffic report systems are gaining popularity daily, thereby causing the business and government sectors of some countries to emphasize the development of information systems in response to increasing user demands, whether in terms of information reliability or constant updates. Although travelers generally require traffic information, different characteristics and behaviors of travelers cause needs for different types of information. For example, travelers who are European or American need weather information on the thickness of fog or snow, while travelers who are Asian may need information about the amount of rain. In addition, different travel objectives also result in diverse travel information needs. The presentation of data to meet information needs will help users fully benefit from information. Studies on behaviors about requirement implementation of marketing principles or consumer behavior studies to acquire in-depth information and use the information obtained. This study was conducted with the objective of studying information about the socio-demographic characteristics of travelers, traveler behaviors and information packages required by travelers. Furthermore, this study also addresses the details and characteristics of consumers requiring various types of information.

Corresponding author: Malai Potipun, Doctor, research fields: travel behavior, consumer adoption of ITS services, discrete choice modeling, transportation demand management.

2. Literature Review

The marketing concept called the "Consumer Behavior Theory" is an expression of each person directly related to the use of economic goods and services, including decision-making processes with impacts on expressions. Understanding of consumer behavior will help build understanding of factors influencing the decisions of consumers to purchase products, thereby enabling the development of markets, goods and services in response to consumer needs. Studies on consumer behavior toward information services via online systems originated due to forces caused by current expansions of internet accessibility, thereby causing many consumers to turn to the online world in search of information about products and services in order to compare properties and make use of information. Therefore, business growth in providing information services or systems for the sale of businesses via the Internet and communications instruments have opened opportunities for entrepreneurs to expand customer bases or seek new customers. As markets rapidly expand, e-commerce strategies need to be more complex. Online producers and distributors require greater understanding of consumer behaviors and needs in order to be able to respond to consumer needs.

Travelers' decision to select modes of travel may depend on a number of factors, such as the characteristics of travel such as distance and travel objectives, which may be divided into commuters or non-commuters (Assd, 2003). According to past study (Stephane, 2007), the factors concerning the characteristics of travelers refer to the economic and social conditions of travelers. Related variables comprise income, vehicle ownership, and type and location of work. The factors concerned with transportation systems comprise travel time, expenses, accessibility and convenience. When the time required for traveling by public transportation increases, people prefer to travel by private vehicles. When traveling expenses by public transportation are compared with expenses incurred in traveling by private vehicles, travelers may select the less expensive mode of travel (Button, 1993). Traffic conditions are another important factor with impact on the travel behaviors of most people. The final factor is traffic information, which is a new factor appearing with the development of vehicle, information and communication technology. Traffic information and guide systems were another factor influencing decisions of travelers to travel on or avoid various routes (Chuorus, 2007; Rong-Chang, 2006). This new factor comes with direct and indirect service fees. However, if the information helps travelers travel more conveniently, the expenses should be worth the reduced travel time, especially in large cities with congested traffic. Travelers also give importance to traffic conditions by checking traffic information through various media in order to select the route with the most flexible traffic and travelers are ready to change routes when the route traveled is congested. In the past research found that traveler preference for real-time transport information via a call center and identification of their preferences in payment for services on monthly basis or a call-by-call base. Furthermore, travelers are willing to pay up to $1 (USD) per call and up to $7 (USD) per month (Wolinetz (2001). The findings of this survey concurred with other researcher (Eric, 2006). In addition, the factor of information has also been found to have influence on travels in concurrence with other researchers (Henk, 1997; David, 2003; Wenjing, 2010; Song, 2012).

3. Method

This study collected data from sample group of travelers in Bangkok (N=200). The instrumentation comprised questionnaires comprising the demographic data of respondents, travel behaviors and the desired type of information. This study emphasized consumer needs for various types of traffic information. Therefore, the questionnaires were designed in steps so the respondents would think according to the following steps: The first step set the type of traffic information for the service area and asked respondents whether or not they were interested in this basic information

Offer the best rout and other routs to the destinations. (5 Baht/time)

Route	Distance (km.)	Time (min)
1	15	20
2	18	23
3	22	30

Fig. 1 The basic information service.

service. The proposed basic information consisted of proposed routes from the point of departure to the destination by the shortest and least time-consuming route. Furthermore, two additional routes were also proposed as alternative routes. The information will be updated every five minutes with the starting expense of five baht per use. The aforementioned information can be summarized in the Figure 1.

At the next step, the researcher presented additional types of traffic information comprising six types of information, such as information on shortcuts to avoid congested routes, reminders about delays on travel routes, notification of events throughout the travel routes, systems for planning personal trips, travel forecasts, information on parking facilities and empty spaces. The aforementioned information can be summarized according to the Figure 2.

Once the type of promotional information had been determined, the researcher had the respondents to make "Mixed and Matched" selections by setting the conditions of allowing respondents to select no more than three types for each travel objective according to the needs of respondents. The selection of each type of information had the additional condition that respondents were required to pay additional service fees at three baht per type. After obtaining data from the questionnaires, the data was entered in a computer program package to analyze the findings and summarize the survey results. The instrument used in this analysis consisted of percentage for displaying the ratios and percentage of questionnaire respondents. After learning about the demands for types of information, specific customer characteristics of the most frequently selected packages were studied. This is known as a "target customer group study" according to marketing concepts.

4. Results

According to Figure 3 showing the sample group according to vehicle ownership characteristics and travel objectives, most of the sample group (62%) was found to comprise private car and most preferred to use them for traveling to work and relaxation more than using public transportation. Someone parked in their house and traveled to work by using public transportation but preferred to use private vehicles for traveling on vacation, possibly because travelers sought the convenience of private vehicles, space for storing luggage and increased numbers of traveling companions, thereby causing the samples to prefer private vehicles for traveling on vacation.

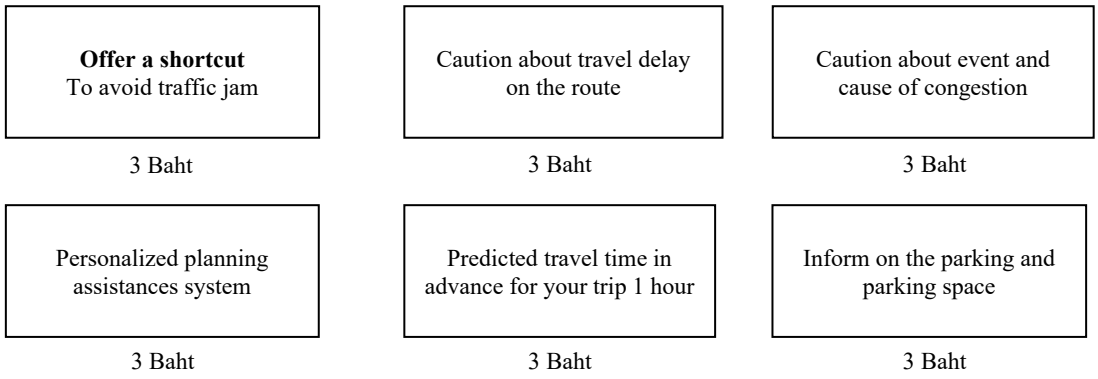

Fig. 2 The additional types of traffic information.

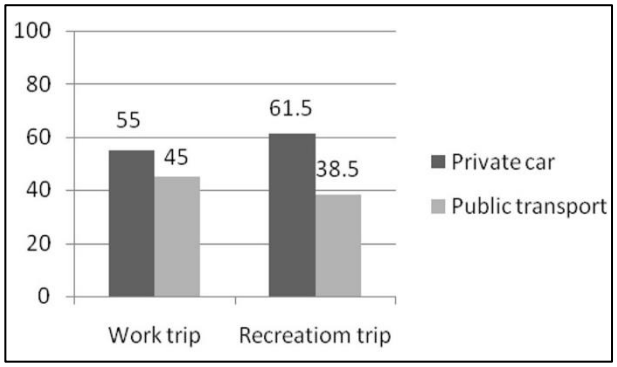

Fig. 3 The vehicle ownership characteristics and travel objectives.

4.2 Travel Behaviour

The sample group had travel behaviors according to vehicle ownership and modes of travel according to Table 1.

According to Table 1on travel behaviors, travelers with private car were found to have higher average monthly incomes than the people who traveled by public transportation with only slightly shorter travel distance and spent less time in traveling. However, expenses in traveling via public transportation are noticeably cheaper. It might be said that travelers will be able to save money by 21% if they change their mode of travel from private car to public transportation. In cases involving traveling for recreation, traveler travel by using private car will travel farther and spend more time traveling than travelers who used public transportation. Most of the travelers who used public transportation used bus and BTS/MRT to work at similar ratios. However, when traveling for relex, the travelers in this group used taxis at a higher ratio.

4.3 Real Time Traffic Information Demand

According to the presentation of basic types of real-time traffic information to accompany travel decisions and the setting of stareting service fees at five baht per five minutes of service information. The result is 70% of sample group interested basic information. Furthermore, according to the presentation six additional types of information, the results from the completion of the questionnaires were obtained as follows figure 4.

According to Figure 4, found that the travelers have the greatest need for the P1 (information on shortcuts), regardless of traveling objectives, followed by P2 (reminders when there are delays on travel routes) and P3 (notification of events throughout the routes). However, the interesting data from this survey found the sample group to have a need for P6 (information regarding parking facilities and empty spaces) in the objective of travel for leisure, which possibly because each workplace usually has parking areas to support corporate employees, thereby causing travelers to have no need to look for parking facility information.

Table 1 The traveler behavior according to mode and objective to travel.

Factors	Mode: private Car		Mode: Public transportation	
	Work	Recreaction	Work	Recreaction
Income/month	21,383 Baht	20,738 Baht	17,365 Baht	17,718 Baht
Distance/day	23 Kilometers	29 Kilometers	26 Kilometers	22 Kilometers
Travel time/day	33 Minutes	38 Minutes	35 Minutes	30 Minutes
Travel cost/day	109 Bath	143 Bath	86 Bath	143 Bath
The worst traffic jam	132 Minutes	136 Minutes	150 Minutes	100 Minutes
Checking traffic information before trip	Check (65 %)	Check (62 %)	No (58 %)	No (62 %)
Destination	-	Modern trade (70 %)	-	Modern trade (74 %)
Mode travel			- Bus (49 %) - BTS/MRT (48 %) - Taxi (3 %)	- Bus (49 %) - BTS/MRT (34 %) - Taxi (17 %)

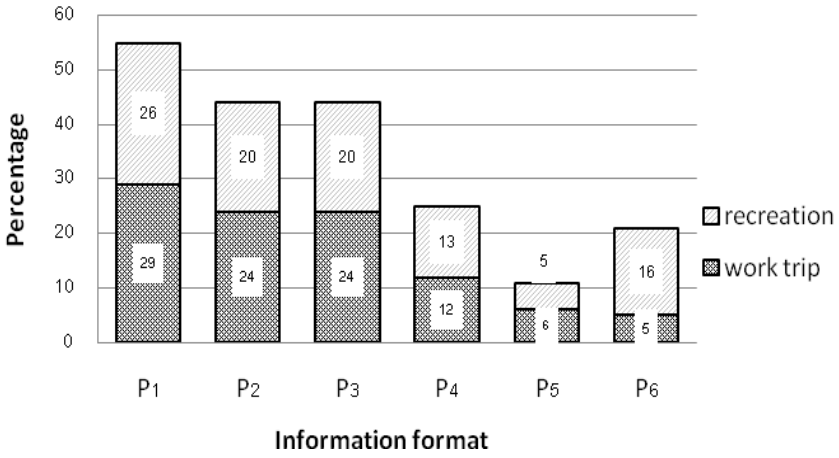

Fig. 4 Ratio of interest in traffic information services.

Table 2 Amount and percentage of needs for Information in cases work trips.

Package			N	Percentage
Offer a shortcut To avoid traffic jam	**Caution about travel delay on the route**	**Caution about event and cause of congestion**	93	46.50
Offer a shortcut To avoid traffic jam	**Caution about event and cause of congestion**	**Personalized planning assistances system**	25	12.5
Offer a shortcut To avoid traffic jam	**Caution about travel delay on the route**	**Personalized planning assistances system**	19	9.5

Table 3 Amount and percentage of information needed in cases recreation trip

Package			N	Percentage
Offer a shortcut To avoid traffic jam	**Caution about travel delay on the route**	**Caution about event and cause of congestion**	46	23
Offer a shortcut To avoid traffic jam	**Offer a shortcut To avoid traffic jam**	**Offer a shortcut To avoid traffic jam**	26	13
Offer a shortcut To avoid traffic jam	**Caution about event and cause of congestion**	**Personalized planning assistances system**	22	11

According to table 2, the hypothesis on mixed and matched marketing strategy for the sample group to select three types of information found that three types of information most frequently selected among the nineteen packages, the outcome showed most travelers to need traffic information consisting of information on shortcuts to avoid congested routes, reminders about delays on travel routes, notification of events throughout travel routes and systems for planning private trips. According to the aforementioned survey results, 137 samples selected all three packages (68.5%), most of whom had private vehicles, were

females with an average age of forty years, average monthly income of 19,800 baht and travels amounting to an average of twenty-five kilometers per day by using an average travel time of thirty-six minutes.

According to Table 3 showing the three most frequently selected types of information among twenty packages, the results showed most travelers to need traffic information consisting of information concerning shortcuts to avoid congested routes, reminders about delays on travel routes, notification of events throughout travel routes, systems for planning personal trips and information about parking facilities and empty spaces. According to the aforementioned survey results, ninety-four samples selected this package (47%), most of them had their own vehicles and were females and males with an average age of thirty-eight years, average monthly incomes of 19,600 baht, average daily travel distances of twenty-three kilometers and an average travel time of thirty-four minutes.

5. Conclusion

This study was conducted with the objective of raising awareness about the characteristics of information needed by travelers to accompany their trips. The findings concluded that most travelers in Bangkok (60%) owned vehicles and preferred to use private vehicles in traveling to regular jobs and travels for leisure. Most or approximately 70% of travelers were interested in traffic information and checked information before leaving. Most of the samples owned private vehicles and preferred to use private vehicles in traveling for work and leisure. In addition, some of the samples were found to have vehicles but parked them at home and decided to travel to work via public transportation. The travel behaviors of travelers were divided by mode of travel. The people who traveled with private vehicles had higher average monthly incomes than the people who traveled via public transportation and had only slightly shorter distances together with using less time in traveling. According to the results from presenting traffic information for the sample group to select, the sample group was found to be interested in the information presented. The types of information in high demand include information regarding shortcuts to avoid congested routes, reminders about delays on travel routes, notification of events occurring throughout travel routes and systems for planning personal trips. Different objectives resulted in needs for different types of information.

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