

# Study on User Satisfaction of Public Transport Services in Yangon

**Aye Hnin Hnin Naing** - Student, Department of Civil Engineering, Yangon Technological University, Yangon, Republic of the Union of Myanmar.

**Email** - ayehnhinninnaing@gmail.com

**Abstract:** Customer or user satisfaction is very important for any service not only in transport market, but also in other communities. Nowadays, public transportation system becomes an essential role from the environmental point of view. Furthermore, it is found to enforce all citizens to use public transport system instead of private one. Therefore, it is needed to evaluate public transport users' satisfaction on transport system. In this paper, the satisfaction of current transport users is firstly reviewed. After that, the efficiency factors on public transport system are defined using simple linear regression equation. By using factor analysis, these efficiency factors are divided into four groups. These groups are again tested according to reliability analysis. Finally, customer satisfaction index of four public transport modes is calculated using mean and weight method.

**Key Words:** customer satisfaction, efficiency factors, public transport system, satisfaction index.

## INTRODUCTION :

Satisfaction is defined as the customer's requirement. The measurement of customer's satisfaction level is to make an adjustment between supplier and user. It is also a performance measurement to make an effective decision. To achieve targeted criteria, specified parameters of public transport service are usually needed to measure and monitor. The analysis of performance or modification of customers' responses on public transport service is a way to improve the service quality of public transportation systems. It is also a medium between theory and practice. Therefore, this measurement is very important not only for private but also for public organizations. Moreover, it is also important to define the factors affecting on satisfaction level.

Satisfaction factors are indirectly related to efficiency factors of public transport system. Efficiency of a transport mode is defined as use of transport mode in term of effectively within short period. Efficiency factors such as speed, safety, adequacy, frequency and reliability contribute to customer perceptions and levels of satisfaction with service. If some of these factors are weak, there is a strong impact on dissatisfaction level and presence of others tend to better service with higher satisfaction level.

The level of satisfaction is not only dependent on service quality but also on socio-economic conditions. Therefore, it is required to consider the relationship between level of satisfaction and socio-economic variables and the effect of satisfaction with service on mode choice.

**Data Collection :** The data collection process was done at May 2015. The targeted sample size was 400 numbers per four modes and each mode was defined 100 samples. The respondents rates for bus mode was 0.67%, for rail modes was 0.7%, for ferry boat was 0.77% and for taxi mode was 0.56%. The raw data were collected at stations, roadside and at home. The targeted respondents were randomly selected. Bus users' data were collected mostly at City Centre where various numbers of bus lines were overlapped. Taxi users were collected by means of road side interview and household survey. The other two public users were collected at stations.

To cover 377 bus lines, surveyors were carefully selected to avoid overlapping. But, according to this survey, there was unequal passenger flow over bus lines. For example, there was a high demand buses that across city centre. Data was collected at least one question sheet per one bus line.

The most difficult part of data collection played at Taxi users. Actually, household survey was not difficult and could easily ask to them. But, in roadside interview survey, respondents do not want to answer all questions.

In general, most of the Taxi users want to arrive their destinations quickly. They did not want to use too much time on questions. There were 5 to 7 minutes interval long to complete all questions. As a result,

incomplete questionnaires were come out. Among 13 numbers of rail routes, the most questions (around 60 numbers) were used on Yangon Circular Rail Route and Yangon-Toe Kyaung Kalay- Thilawa Route.

For Ferry Service, surveyors consumed mostly their questions at Pansodan-Data route from Pansodan side. There were no significant problems at train and ferry service during interviewing. All respondents were patient and helped in data collection process.

**Methodology:** Firstly, the current satisfaction condition of four public transport systems is reviewed by statistically using cross tab analysis. Satisfaction related with socio-economic conditions of gender, age, income, occupation, travel time and travel costs are calculated in comparison of four public transport modes. From theoretical point of view, efficiency is defined as speed, safety, regularity, integration, comfort, adequacy, frequency and cheapness. By considering these factors, the significant efficiency factors of four transport modes is evaluated using simple linear regression equation. At hypothesis test, all factors are positively related to satisfaction. After analysis, all factors are not significant on satisfaction.

After that, twenty four variables are divided into four groups using principal component method of factor analysis. Factors are extracted in eigenvalues greater than 1. The number of factors to extract is 4. The maximum iterations for convergence are 25. The suppress absolute values less than 0.10. Kaiser-Meyer-Olkin measure of sampling adequacy value for bus transport mode is 0.641, for ferry boat transport mode is 0.647, for circular train transport mode is 0.685, and for taxi transport mode is 0.744 respectively. Therefore, it can be accepted because KMO value is greater than 0.6. Moreover, these four groups are tested with reliability analysis. Reliability values of these groups are greater than 0.5. Therefore, it can be considered appropriate for being a group. [1]

Finally, customer satisfaction index on four transport modes is calculated by

$$CSI = \sum [S^n / W^n] \quad \text{Equation (1)}$$

where,

CSI = customer satisfaction index

$S^n$  = mean of n attribute

$W^n$  = weight of n attribute

Analysis and Results:

### (A) Socio Economic Characteristics

#### (i) Satisfaction related to Gender

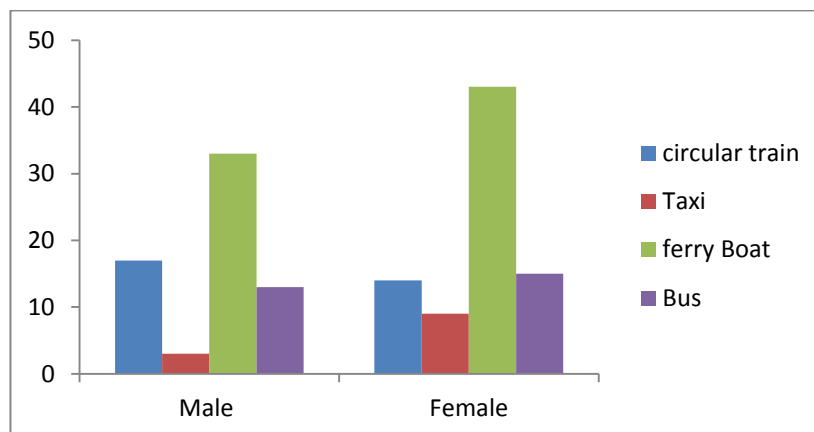


Figure. 1 Satisfaction related to Gender

The above figure 1 shows fully satisfaction level of various transport modes with related to gender. According to this figure, it is found that female group is more satisfied than male group. Among four transport modes, ferry boat users are higher than the other transport modes. While the circular train users stand the second highest group of satisfaction, the taxi users play the lowest satisfaction level in this graph.

#### (ii) Satisfaction related to Various Age Groups

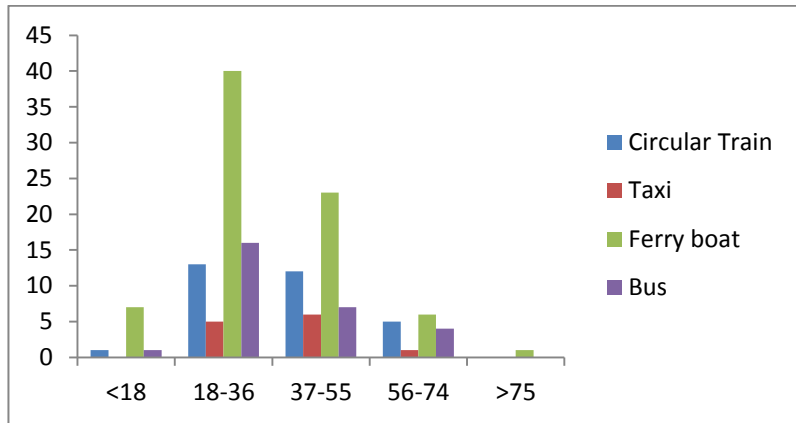


Figure. 2 Satisfaction related to Various Age Groups

According to above figure 2, age- group of between 18 to 36 is the highest satisfaction. The lowest group stands age greater than 75. Most of satisfaction groups are ferry boat users. From figure, age between 18-36 group is the highest portion of transport users. Age less than 18 and greater than 75 groups are lowest portion of transport users.

(iii) Satisfaction related to Various Income Group

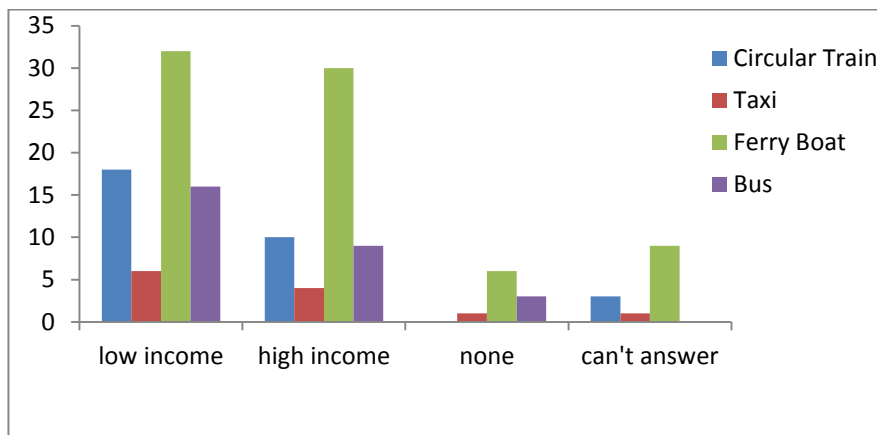


Figure. 3 Satisfaction related to Various Income Groups

The above figure 3 shows satisfaction level of transport users with different income groups. The highest satisfaction level of income group is low income group of ferry boat users. From the point of high income group, ferry boat users are also satisfied on using ferry boat service. It is found that low income group of transport users stands in highest percentage in public transport service.

(iv) Satisfaction related to Types of Occupation

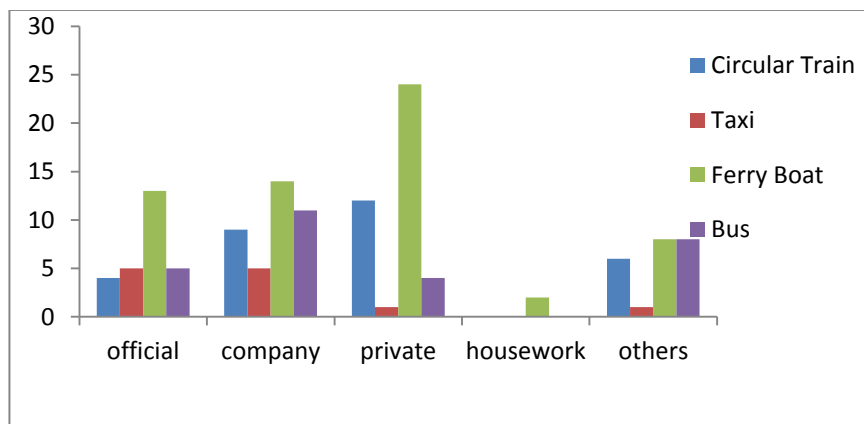


Figure. 4 Satisfaction related to Types of Occupation

The above figure 4 shows satisfaction level of four transport users according to types of occupations. In this figure, occupations are classified into official work, company, private, housework and others. In comparing five

occupations, private workers are more satisfied than the other workers. According to four transport modes, ferry boat users who are private workers stand the highest satisfaction level over other transport modes. It can also be said that the highest share of public transport users are private workers.

(v) Satisfaction related to Total Travel Cost

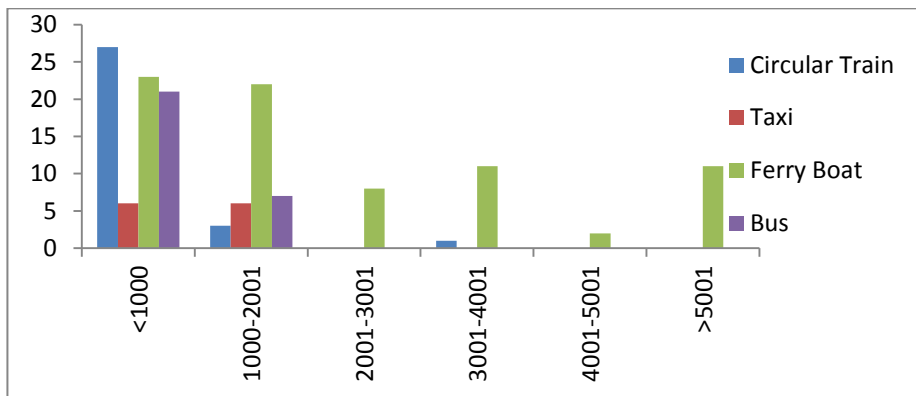


Figure. 5 Satisfaction related to Total Travel Cost

This figure 5 plays satisfaction condition of four transport modes associated with total travel cost. In this figure, it is divided into six groups: namely; <1000 kyats, 1000-2001 kyats, 2001-3001kyats, 3001-4001 kyats, 4001-5001 kyats and >5001 kyats. Among these groups, most of transport users consume less than 1000 kyats and these users also fully satisfied on related service. Circular train users which cost less than 1000 kyats stand the highest satisfaction level.

(vi) Satisfaction related to One Way Travel Time

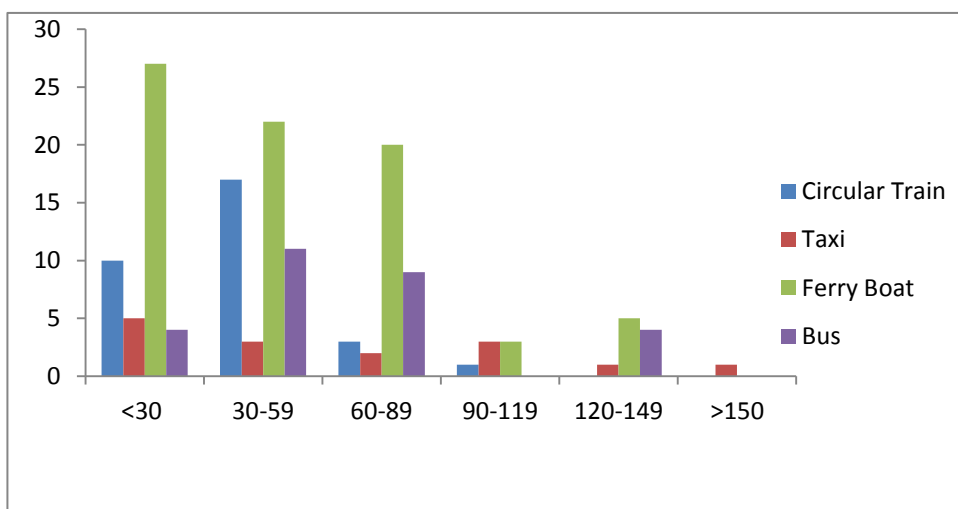


Figure. 6 Satisfaction related to One Way Travel Time

The above figure 6 shows satisfaction condition of four transport modes with one way travel time. From this figure, taxi service consumes longest travel time. Today, most of users consume their one way travel time in less than 30 minutes. The most satisfied group is ferry boat users who spend their time in less than 30 minutes. Ferry boats service operates regular service and frequent schedule and this fact become customer satisfaction.

**(B) Comparison of User Satisfaction on Different Public Transport Modes**

At ferry boat user, two third per cent of users are fully satisfied. The medium users are small amount on ferry boat satisfaction. The highest attractive point on ferry boat users are travel cost, wide space on boat, comfortable and safe waiting at station, and easily use. They also satisfy on regular and frequent schedule.

Half percentage of circular train users is partly dissatisfied while only 1% is fully satisfied. Therefore, large numbers of passengers are dissatisfied on this transport system. The main considerations for choosing this system is low travel cost, quickly arrive other than bus, right and frequent schedule and adequate space at station. The reduction factors on this system are uncomfortable and rare nodes.

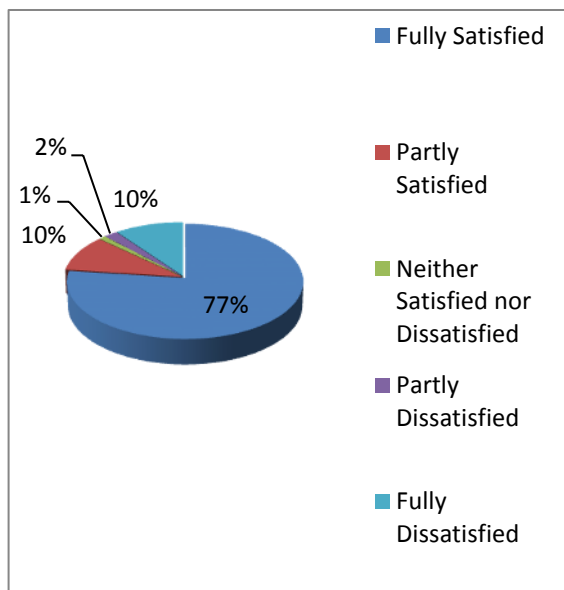


Figure.7 Ferry Boat User Satisfaction

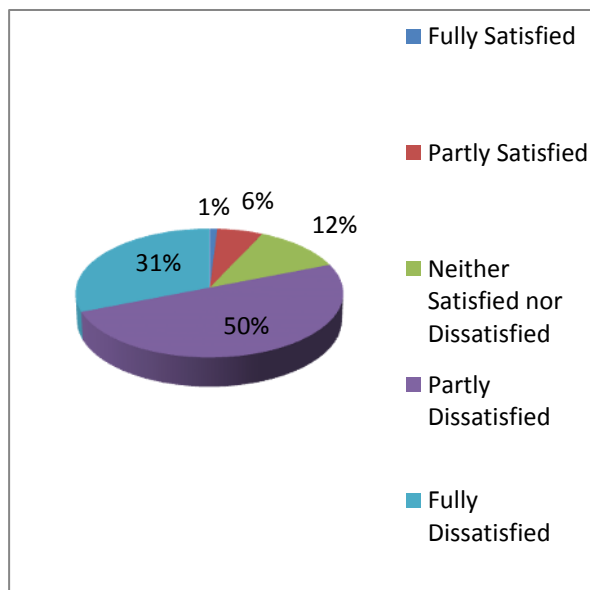


Figure.8 Circular Train User Satisfaction

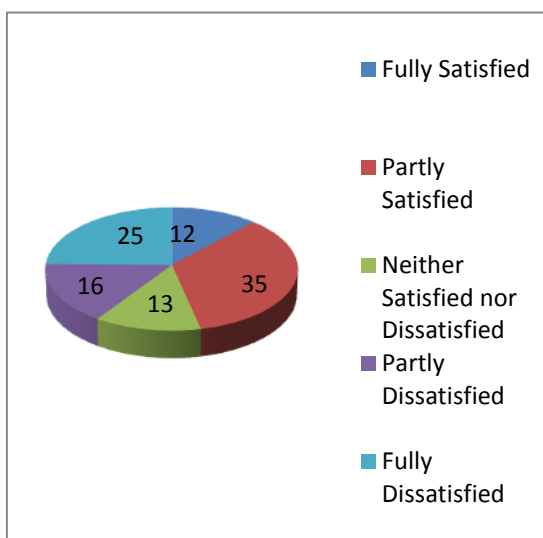


Figure. 9 Taxi User Satisfaction

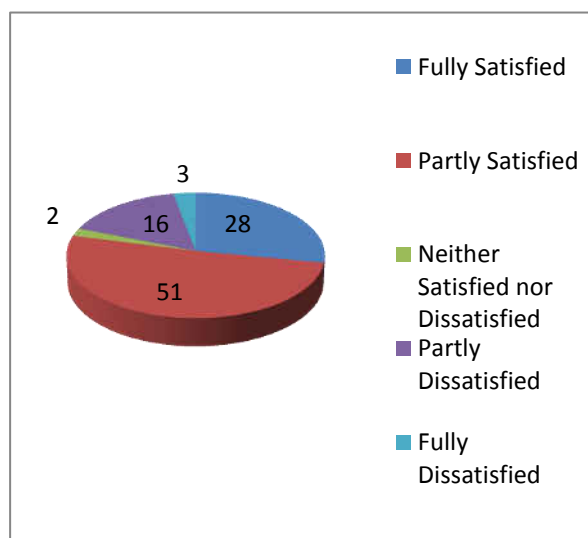


Figure.10 Bus User Satisfaction

At Taxi users’ satisfaction level, one fourth of users are fully dissatisfied. The highest percentage stands at partly satisfied on Taxi service. There is neither attractive nor poor points to users. Most of users choose Taxi when they want to arrive quickly their destinations.

The bus users are partly satisfied about 51%. They are satisfied on essential of this system, travel cost and next stop information during operation. They are also disliked on this system due to small space for usage on bus, rare case to be seated at peak hour and workers.

In comparing four satisfaction levels, ferry boat stands at highest one and Taxi service was lowest one. The main considerations are travel cost, right schedule and service information.

**(C) Simple Linear Regression**

(i) Circular Train Service,

$$\text{Satisfaction} = 1.067 + 0.105 \text{ comfort} + 0.223 \text{ safety} + 0.222 \text{ adequacy} + 0.156 \text{ frequency} + 0.132 \text{ regularity} \quad \text{Equation (2)}$$

It is considered at 95 % confidence interval. The significant values are 0.039 for comfortable, 0.005 for safety, 0.002 for adequacy, 0.037 for frequency and 0.055 for regularity. There are five variables are significant on circular train service regression equation. The train users’ satisfaction is depended on comfort, safety, adequacy, frequency and regularity. The other variables such as speed, integration and cheapness are not significant satisfaction. Therefore, these variables are not considered on train users’ satisfaction. If these significant variables are made on improvement, it will be sure the higher the satisfaction.

(ii) Taxi Service

$$\text{Satisfaction} = 2.307 + 0.192 \text{ safety} \quad \text{Equation (3)}$$

This equation is carried out at 95% confident interval. According to this equation, taxi users’ satisfaction is depended only on safety. The significant value on safety is 0.05. The more provision of safety management on Taxi service, the higher the satisfaction will be.

(iii) Ferry Boat Service

$$\text{Satisfaction} = 3.146 + 0.284 \text{ adequacy} \quad \text{Equation (4)}$$

It is calculated at 95 % confident interval. Satisfaction is relied upon adequacy of ferry boat service. The significant value is 0.046. The better the adequacy, the higher the satisfaction on this service.

(iv) Bus Service

$$\text{Satisfaction} = 1.476 + 0.357 \text{ adequacy} + 0.169 \text{ cheapness} + 0.166 \text{ comfortable} \quad \text{Equation (5)}$$

This equation is determined at 95% confident interval. Three variables are significant on bus users’ satisfaction. The significant value are 0.00 for adequacy, 0.041 for cheapness and 0.050 for comfortable respectively. The more improvement makes on adequacy, cheapness and comfortable, the bus users will be more satisfied.

**(D) Factor Analysis and Reliability Test**

There are twenty four variables are factorized into four groups for each service. KMO value for Taxi service is 0.744, KMO value for Circular Train service is 0.685, KMO value for Ferry Boat service is 0.647 and KMO value for Bus service is 0.641, respectively. The following tables show factorized variables and related reliability (R) values.

Table. 1 Group of Variables using Factor Analysis (Taxi Service)

Service Operation (R=0.831)	Worker involvement (R = 0.825)	Problems (R=0.624)	Inconvenience (R=0.531)
-Quickly arrived -Safely waiting -Safe during operation - Easily integrate -Cost available	-Kind and Helpful workers -Skillful workers -Easily use	-Lack of integration -Unavailable cost -Dirty -Old and unattractive -Essential for Daily movement	-Uncomfortable -Rare nodes

According to this table, first group is called service operation, second group for worker relation, third group for users’ problems and fourth group for users’ inconvenience.

Table. 2 Group of Variables using Factor Analysis (Circular Train Service)

Service Operation (R=0.807)		Problems (R = 0.516)	Easiness (R=0.598)	Inconvenience (R=0.580)
-Quickly arrived -Always seated -Enough usage -Right Schedule -Operated in time -Easily integrate -Cost available	-Get information at station -Get information during operation -Essential for daily movement -Kind and helpful workers -Skillful workers	-Adequate space -Uncomfortable -Comfortable at station -Rare nodes	-Safely waiting - Safe during operation - Unbelief on schedule - Lack of integration - Easily use	-Unavailable cost - Dirty - Old and unattractive

From table 2, it is named as service operation, users’ problems, easiness and inconvenience.

Table. 3 Group of Variables using Factor Analysis (Ferry Boat Service)

Service Operation (R=0.830)	Easiness (R = 0.659)	Availability (R=0.599)	Inconvenience (R=0.504)
-Right schedule -Lack of integration - Get information at station - Get information during operation - Essential for daily Movement - Kind and helpful workers	-Quickly arrived - Safely waiting -Safe during operation - Adequate space - Unavailable cost - Easily use	-Always seated - Operated in time - Comfortable at station - Cost available - Skillful workers	-Unbelief on schedule - Uncomfortable - Dirty - Old and unattractive -Rare Nodes

According to table 3, these variables are grouped into service operation, easiness, availability and inconvenience.

Table. 4 Group of Variables using Factor Analysis (Bus Service)

Availability (R=0.806)	Weakness (R = 0.727)	Service operation (R=0.544)	Inconvenience (R=0.539)
-Quickly arrived - Safely waiting - Safe during operation - Always seated - Adequate space - Enough usage - Cost available - Kind and helpful workers - Easily use	-Lack of integration - Uncomfortable - Dirty - Old and unattractive - Get information at station - Get information during operation - Essential for daily movement	-Right schedule - Operated in time - Unavailable cost	-Unbelief on schedule - Easily integrate - Comfortable at station - Skillful workers - Rare nodes

From above table 4, twenty four variables are divided into four groups such as availability, weakness, service operation and inconvenience.

(E) Customer Satisfaction Index

(i) Taxi User Satisfaction Index

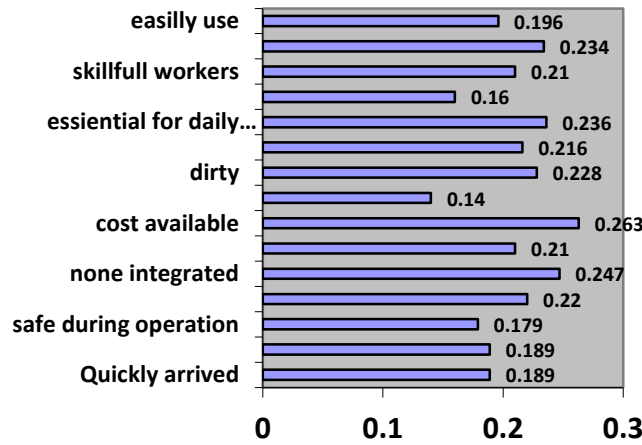


Figure. 11 CSI Index on Taxi User Satisfaction

The total CSI index for Taxi users stands at 31% of all Taxi users. This index shows the customer satisfaction rate. This means that user satisfies on taxi service about one third percentage and can be defined as neither satisfied nor dissatisfied. From Figure, Taxi users can afford travel cost and they agreed cost definition. Only 1.6% fully satisfies on Taxi service.

(ii) Circular Train User Satisfaction Index

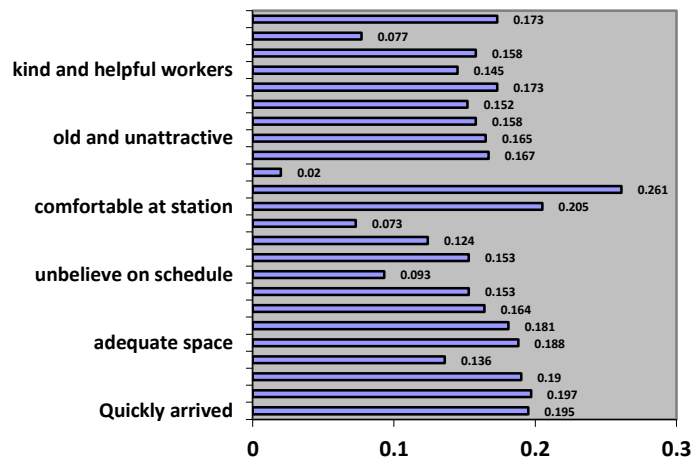


Figure. 12 CSI Index on Circular Train User Satisfaction

Total CSI Index of circular train user standard as 35% and users are partly satisfied on this service. They also satisfy on limited travel costs and they are fully dissatisfied on comfortable.

(iii) Bus User Satisfaction Index

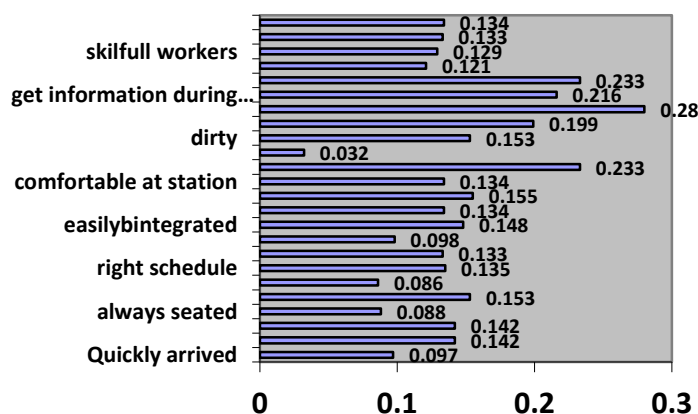


Figure. 13 CSI Index on Bus User Satisfaction



These users are neither satisfied nor dissatisfied on bus transport service. The total CSI index is 34% and users believe that this system plays a main transport mode and very important for daily movement. Because of unfixed and infrequent travel costs at peak hour, this make to users' dissatisfaction.

(iv) Ferry Boat User Satisfaction Index

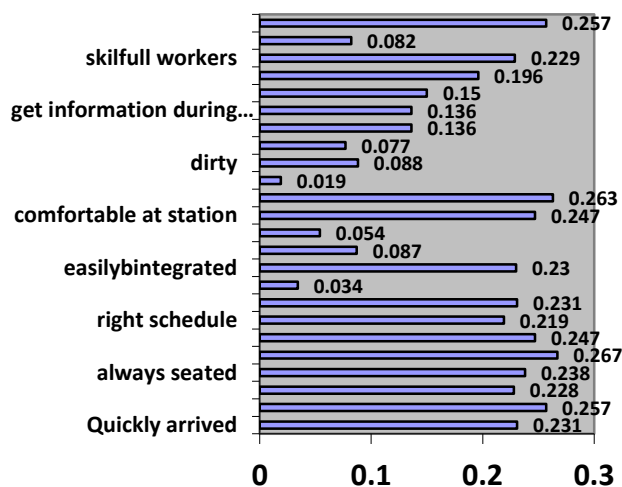


Figure. 14 CSI Index on Ferry Boat User Satisfaction

The ferry boat users feel more satisfy than other three transport mode. The CSI index of this transport mode was 42% and all users are partly satisfied. In this mode, all users can afford travel costs and they used right schedule.

Over four modes of transport, ferry boats users more satisfy and Taxi users feel less satisfy. They usually satisfy on travel cost and less satisfies on comfortable and information.

Recommendation: In this paper, only user point of view was calculated. Responsibilities and employment generation were not considered in this study. Therefore, these factors should be studied for next research. Actually, satisfaction relied on both private and public partnership. Therefore, satisfaction should be considered from service provider and regulatory body. Moreover, qualitative approach with large sample size in describing perceptions and expectations should be made. Safety management of urban public transport system should also be studied. Moreover, comparison of efficiency study on private and public transport system should also be considered.

## CONCLUSION:

From this study, efficiency factors are effectively applied to measure satisfaction level of particular transportation mode. Speed, safety, adequacy, frequency, regularity, integration, comfort and cheapness are considered as efficiency factors. 50000-200000 income groups are occupied on public transportation. Any transportation mode consumed travel time of less than 60 minutes. It is confirmed that the main considerations of mode choice were travel cost, right schedule and service information. By using regression equation, comfort, safety, adequacy, frequency and regularity are positively related to circular train users' satisfaction. Only safety is significant on Taxi users' satisfaction. Ferry boat users' satisfaction is depended on adequacy. Bus users' satisfaction is relied upon adequacy, cheapness and comfortable. After twenty four variables had been factorized, four groups are evaluated for each travel mode such as service operation, problems, inconvenience, availability, weakness, and easiness and worker involvement. Finally, four transport mode users are satisfied on defined travel costs. Moreover, bus users agreed that this transport mode is essential for daily movement.

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