CUSTOMER SATISFACTION OF LIGHT RAIL TRANSIT (LRT)

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Abstract: The concept of customer satisfaction is important in any business. Striving for customer satisfaction means understanding and anticipating what the customers want of the products or services given. Customer satisfaction can also be taken as an indicator either a customer will buy or use the product continuously. The aim of introducing the Light Rail Transit (LRT) system in Malaysia is to ease the traffic congestion in Malaysian roads by providing alternative mode of transport. If the service is not satisfactory and customers are not keen of using the service then the purpose of introducing the service in the first place is defeated. Due to that reason we wish to study the current level of customer satisfaction towards LRT service. From this study, the service attributes that need to be improved in order to increase the level of customer satisfaction will be identified. The service atributes are classified into two categories attributes at the train stations and attributes inside the train. A customer satisfaction survey were carried out and 300 questionnaires were successfully completed by the respondents. The data is analyze using the Penalty-Reward Contrast Analysis (PRCA) and Adequacy Importance Model (AIM). PRCA is used to classify the service attributes and AIM is used to measure the overall satisfaction of each service attributes by taking both the importance and satisfaction of each attributes into account. The resulting classifications of service attributes will be illustrated using Kano Model. The results show almost all service attributes are at a satisfactory level except four. These attributes were identified as cleanliness, efficiency, service of staff and safety. Further improvement need to be taken to improve the service and to increase the level of customer satisfaction.

Keywords: customer satisfaction; service, service attributes, PRCA , AIM, Kano model

1. Introduction

The concept of customer satisfaction is important in business field. Striving for customer satisfaction means understanding and anticipating what customers want of the products in the future but do not expect of them (Matzler et al. 1996). Customer satisfaction can be taken as an indicator that either customer will buy or use this product continuously. The product is indicated as quality if it success to achieve the customer expectation and needs. On the other hand, the failure to achieve customer satisfaction on this product will lose their ability in market competitor.

For service providers, customer satisfaction is crucial to know which service attributes add value and increase satisfaction, which of them merely fulfil minimum requirements and minimum dissatisfactions and which do both. Only then can they make better decisions about the research should be allocated to different service attributes in order to improve quality and satisfaction. Thus, the identification of customer satisfaction factors is crucial (Matzler & Sauerwein 2002).

In the transportation of Light Rail Transit (LRT), customer satisfaction concept is also crucial which service quality is indicated by customer evaluations (Sek 2002). In fact, rail system is a high technology transportation which is providing alternatives yet comfortable for customer. In Kuala Lumpur (KL), there are two LRT system implemented which are namely as Kelana Jaya Line (before that is PUTRA-LRT) and Ampang line (before that is STAR-LRT). The distance connection of LRT system between city central and other districts is around 20 km radius and it was a crossing with total 49 stations. The stations are styled in several types of architectural designs. Elevated stations, in most parts, were constructed in four major styles with distinctive roof designs for specific portions of the line. Underground stations, however, tend to feature unique concourse layout and vestibules, and feature floor-to-ceiling platform screen doors to prevent platform-to-track intrusions. Stations with island platforms allow easy interchange between north-bound and south-bound trains without requiring one to walk down/up to the concourse level.

General speaking, LRT system play a role in reducing the transport crowdedness on the road. Nevertheless, issues and customer complaints of LRT system problem are increasingly in several years. According to the *The Sun* (2001) report, one Argentina passenger fallen suddenly on the track at Station Bangsar. If not have the Platform Intrusion Emergency Stop (PIES) system to stop the PUTRA-LRT train, the passenger may threaten by this an accident. Besides that, a STAR-LRT train overshot at the ends of its track and daggling around 30m heights at Sentul Timur Station, Kuala Lumpur. Pondering whether did the LRT Company really service or maintain their train regularly to ensure public safety as this is not the first time accident (Ong 2006). Moreover, people crowdedness at station LRT, especially at Kuala Lumpur City Center (KLCC) station was caused of the lack of LRT train frequency during peak hour (Shek 2007). According to *Berita Harian* (2007), increasing of the Monthly Travel Card (MTC) for

the LRT fare also was complained by some people, which the LRT Company just to emphasize on increasing the LRT fare without give a notice early to passenger. Base on those problems above, LRT Company should to take seriously on improving of LRT service in order to increase customer satisfaction and service quality.

The objective of this study is to investigate the level of customer satisfaction on the LRT service which is providing by LRT Company. Furtheremore, this study will also identify service dimension which is needed to improve in order to increase the level of customer satisfaction. The service dimensions are classified into at station and inside the train. Data analysis has been done through Penalty-Reward Contrast Analysis, PRCA and Adequacy Importance Model, IAM and following with illustrated all service dimensions in Kano Model.

2. Methodologi

The survey questionnaires in this study were developed based on service dimensions such as cleanliness, efficiency, facility, comfort, safety, information delivery, price and staff service. All passengers who always to use service LRT are become respondents for this study. Around 300 respondents was conducted and successfully to answer the whole questionnaires.

3. Kano Model

Kano analysis is indicated as a quality tool used to identify which customer needs is important. The requirement of all customers are may not same as important. Therefore, Kano analysis has a vital role to play in arranging the different customers requirements and identify which requirement is most important for all customers. Kano Model (Figure 1) distinguishes between three types of product requirement which influence customer satisfaction in different ways when met (Matzler et al. 1996). Three types of product requirement can be classified as basic factor, performance factor and excitement factor.
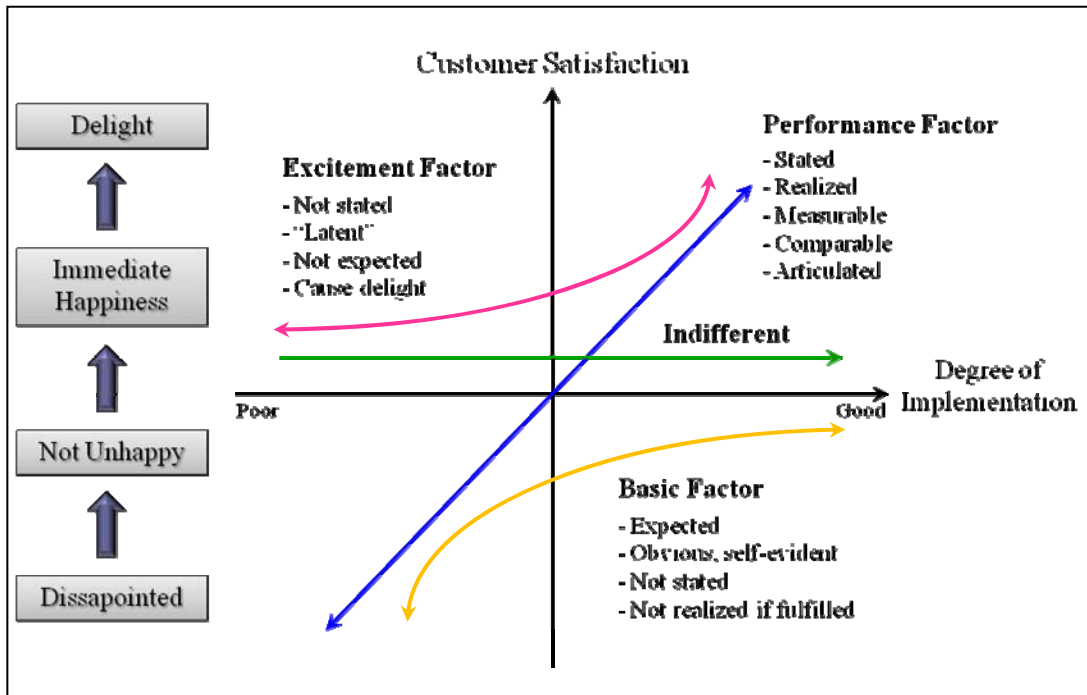
Figure 1: Illustration of Kano Model

Excitement factor can be described as surprise and delight attributes, and provide satisfaction when achieved fully but do not cause dissatisfaction when not fulfilled (Kano et al. 1984). Normally, those requirements are neither explicitly expressed nor expected by the customer (Matzler et al. 1996). Since this type of requirements often unexpectedly delights customers, they are often unspoken (Witell & Lofgren 2007).

Performance factor result in satisfaction when fulfilled and result in dissatisfaction when not fulfilled (Kano et al. 1984). With regard to these requirements, customer satisfaction is proportional to the level of fulfilment which the higher the level of fulfilment, the higher the customer's satisfaction and vice versa. Performance factor is usually explicitly demanded by the customer (Matzler et al. 1996).

Basic factor is taken for granted when fulfilled but result in dissatisfaction when not fulfilled (Kano et al. 1984). Explicitly, customer regards those requirements as prerequisites. If these requirements are not fulfilled, the customer will be extremely dissatisfied. On the other hand, as the customer takes these requirements for granted, their fulfilment will not increase his satisfaction. Fulfilling the basic requirements will only lead to a state of "not dissatisfied" (Matzler et al. 1996).

However, some requirements of products cannot be classified according to the Kano Model. These requirements are neither good nor bad, and consequently they do not result in either customer satisfaction or customer dissatisfaction. As conclusion, a competitive product meets the requirement of basic factor, maximises performances factor, and includes as many "excitement" factor as possible at a cost the market can bear.

4. Penalty-Reward Contract Analysis (PRCA)

In this study, Penalty-Reward Contrast Analysis (PRCA) was applied which suggested by Brandt (1987). This method has two advantages. First, the attribute importance given the level of attribute satisfaction can be measured. Second,

the results allow classifying service attributes into basic, performance and excitement factors. Hence, the convergent validity can be assessed (Matzler & Sauerwein 2002).

Brandt (1987) proposes a type of regression analysis that uses dummy-variables to identify minimum requirements (basic factors) and value-enhancing requirements (excitement factors). In essence, one set of dummy variables is created and used to quantify excitement factors and another set is created to quantify basic factors. Basic factors and excitement factors are expressed as contributor to overall satisfaction (dependent variable) (Matzler & Sauerwein 2002). Generally, the code of dummy-variable can be explicated in Table 1.

Table 1: Attribute satisfaction rating change to dummy-variable

Customer satisfaction	D_1	D_2
Very satisfied	1	0
Moderate	0	0
Very unsatisfied	0	1

D_1 = "Reward" are expressed as incremental increase associated with high satisfaction
D_2 = "Penalty" are expressed as incremental decrease associated with low satisfaction

In order to conduct the analysis in this study, attribute satisfaction ratings were recorded. "Very satisfied" ratings were used to form the dummy variables to quantify excitement factors (value of "0"), while "very unsatisfied" ratings were used to form the dummy variables to quantify basic factors (value of "1"). "Neither satisfied nor unsatisfied" were defined as expressing indifferent (expectations were met). Indifferent customers comprise a reference group (Matzler & Sauerwein 2002).

Base on this recording, a regression analysis is conducted by using seven-point overall satisfaction ratings as dependent variable

and dummy-variable for rewards and penalty as independent variables. If the reward outweighs the penalty, the attribute is considered as an excitement factor. If the penalty exceeds the reward, the attribute in question is a basic factor. If reward and penalty are equal, the attribute lend to satisfaction when performance is high as well as to dissatisfaction when performance is low. Hence, it is a performance factor "hybrid" (Matzler & Sauerwein 2002). Table 2 as below indicated the condition of categorization attribute into basic factor, performance factor and excitement factor base on PRCA method.

Table 2: Condition of categorization attribute

Reward	Penalty	Factor
Significant	Insignificant	Excitement
Significant	Significant	Performance
Insignificant	Significant	Basic
Insignificant	Insignificant	Indifferent

The value of model significant is indicated by comparison of model value-p with fixed value-α. If value-p is lower than value-α, this attribute is indicated as significant. On the contrary, the attribute is indicated as insignificant if value-p is higher than value-α. Next, the attribute can be classified whether as basic factor, performance factor, excitement factor or indifferent by comparison the significant of both reward and penalty coefficient.

5. Adequacy Importance Model (AIM)

Adequacy Importance Model is suggested by Dobbelstein (2003) which is used to measures the satisfaction in a compensatory way. As an example, a low product value for one requirement (Customer A, aspect of frequency of LRT train) can be compensated by a high product value for another requirement (Customer A, aspect of accuracy time arrival of LRT train). This indicates that customer satisfaction on LRT service in efficiency dimension will not be totally lost if it performs poorly in one requirement as

long as there are other good ones. The overall-satisfaction scores for efficiency dimension can be obtained by the average of all customers' satisfaction on this dimension. Below equation has shown the calculation on the overall-satisfaction for each aspect of product

$$S_{ij} = \sum_{k=1}^{n} I_{ijk} * P_{ijk}$$

S_{ij} = Overall saisfaction of customer i with dimension j

I_{ijk} = Importance of product attribute k for customer i

P_{ijk} = Perceived quality of product attribute k of dimension j by customer i

n = Number of relevent product attributes.

The use of the Adequacy Importance Model is explained with the help of an example in Figure 2. It gives an example of the scales that may be used and of a concrete measurement and calculation of the overall satisfaction of three customers LRT. In the example customer A is most satisfied with the performance of efficiency dimension.
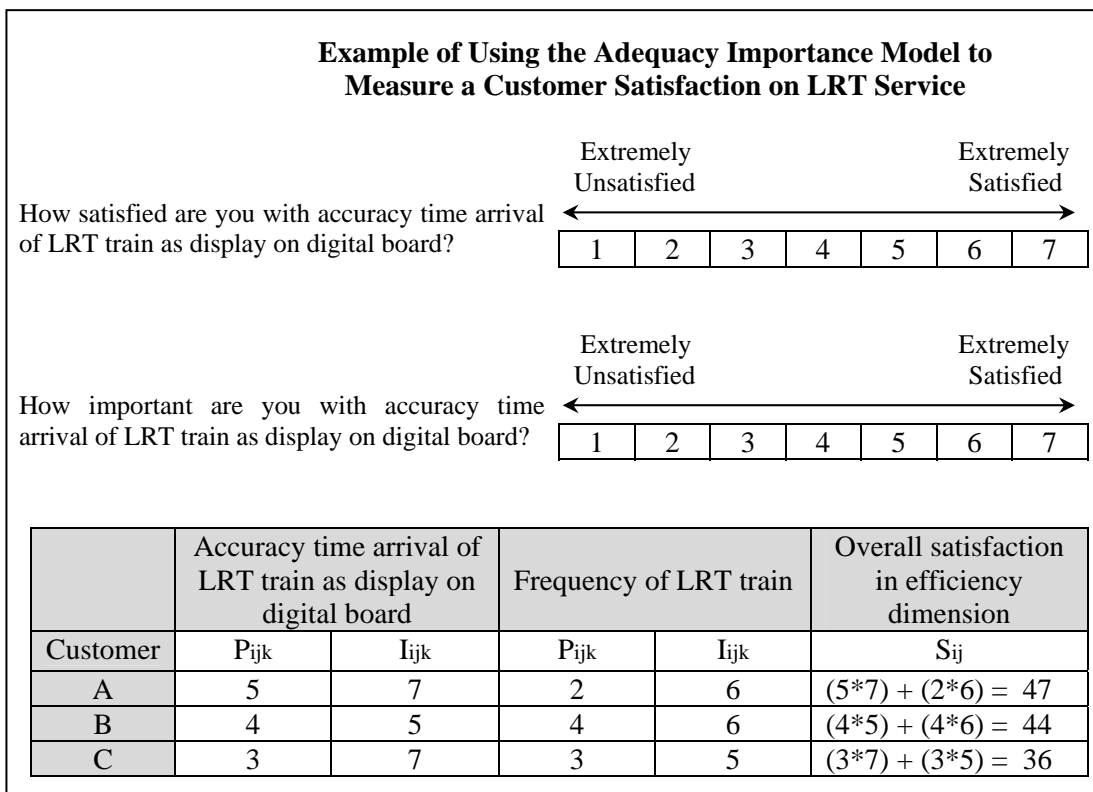

Example of Using the Adequacy Importance Model to Measure a Customer Satisfaction on LRT Service

How satisfied are you with accuracy time arrival of LRT train as display on digital board?

Extremely Unsatisfied ← → Extremely Satisfied

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

How important are you with accuracy time arrival of LRT train as display on digital board?

Extremely Unsatisfied ← → Extremely Satisfied

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Customer	Accuracy time arrival of LRT train as display on digital board		Frequency of LRT train		Overall satisfaction in efficiency dimension
	P_{ijk}	I_{ijk}	P_{ijk}	I_{ijk}	S_{ij}
A	5	7	2	6	(5*7) + (2*6) = 47
B	4	5	4	6	(4*5) + (4*6) = 44
C	3	7	3	5	(3*7) + (3*5) = 36

Figure 2: Example of Adequacy Importance Model

6. Disscussion of Result and Finding

The overall satisfaction of each service dimensions from the result of IAM are scheduled in Table 3 and 4, which the service dimensions are classified into two sections. First section (Table 3) is about satisfaction mean and standard deviation of service dimensions at station while second section (Table 4) is about satisfaction mean and standard deviation of service dimensions inside the train.

Table 3: Satisfaction mean and standard deviation of service dimensions at station

Service Dimension	Mean	Standard Deviation
Cleanliness	22.89	11.556
Efficiency	24.75	10.834
Facility	26.01	8.703
Comfort	26.72	11.794
Information delivery	28.68	8.327
Price	28.27	12.505
Staff service	25.18	9.353

Table 4: Satisfaction mean and standard deviation of service dimensions inside the tren

Service Dimension	Mean	Standard Deviation
Cleanliness	33.12	12.040
Efficiency	29.42	13.210
Facility	27.28	11.255
Safety	21.18	6.645
Comfort	28.86	10.778
Information delivery	29.46	9.999

The value of 25 is indicated as neutral (The highest value is 49 while the value of 1 as the lowest). Thus, if the service dimensions have the overall satisfaction which are lower than value of 25, it means those service dimensions are classified into dissatisfied group. While if the overall satisfaction of service dimensions are higher than value of 25, it means the service dimensions are classified into satisfied group. Dissatisfied groups are needed to take an action to improve their service while satifed groups are indicated as maintain or to upgrade their service which can to attain a higher level of satisfation.

Based on the Table 3, service dimensions at station are classified as dissatisfied group including cleanliness and efficiency. Staff service is indicated as medium satisfied bacause it's satisfaction mean is nearly to neutral value and it should to get an improvement as possible. On the other hand, only safety is needed to get an improvement among others service dimensions inside the train (Table 4).

6.1. The combination result of PRCA and IAM

The result of combination between PRCA and IAM has shown in Table 5. As a result, the majoriti of service dimensions are classified into satified group excluded cleanliness, efficiency and staff service dimension at station as well as safety dimension inside the train. Safety and clenliness are needed to take a seriously for improving the service quality because both service dimensions are classified as basic factor with a lower satisfied. Both service dimensions are regarded as prerequisites by LRT customers and customers will be extremely disappointed and dissatisfied if this factor cannot be fulfilled. Besides cleanliness and safety dimension, efficiency and staff service are classified as performance factor with lower satisfied also need to be focused. Both service dimensions will lend to dissatisfaction when the service quality cannot be fulfilled as well as satisfaction when a higher fulfilment of both service quality dimensions.

Table 5: The combination result of PRCA and IAM

Dimension	Classification by PRCA	Overall satisfaction of IAM	Decision
At Station			
Cleanliness	Basic	Low	Improvement
Efficiency	Performance	Low	Improvement
Facility	Performance	High	Persisting
Comfort	Excitement	High	Persisting
Information delivery	Performance	High	Persisting
Price	Excitement	High	Persisting
Staff service	Performance	Medium	Improvement if possible
Inside the Train			
Cleanliness	Performance	High	Persisting
Efficiency	Basic	High	Persisting
Facility	Performance	High	Persisting
Safety	Basic	Low	Improvement
Comfort	Performance	High	Persisting
Information delivery	Performance	High	Persisting

7. Conclusion

As a result of the present analysis on service dimensions LRT, it can be concluded by saying that customer satisfaction on LRT service just remain to medium satisfied level. The service dimensions are needed to focus included cleanliness, efficiency, staff service at station as well as safety inside the train. Figure 3 is the illustration of service dimensions at LRT station while Figure 4 is the illustration of service dimensions inside the LRT train. Based on the result of decision, LRT Company should be taken actions for improving the service quality in those dimensions which are classified in dissatisfied group in order to increase the service quality and customer satified.

Total Quality Service (TQS) is an important concept which is used to improve the service quality. According to Stamatis 1996, TQS is indicated as a sincerely commitment to concept operation which focus on customer, increasing service performance, measuring performance company by using reference measurement, respect and provide a reward to staff, and to attain customer demand on anytime. TQS was suggested to implement on LRT Company because it is a good strategy system which can to integrate management system to involve all leader and company staff by using combination method of qualitative and quantitative for continually improvement process in order to meet customer needs.
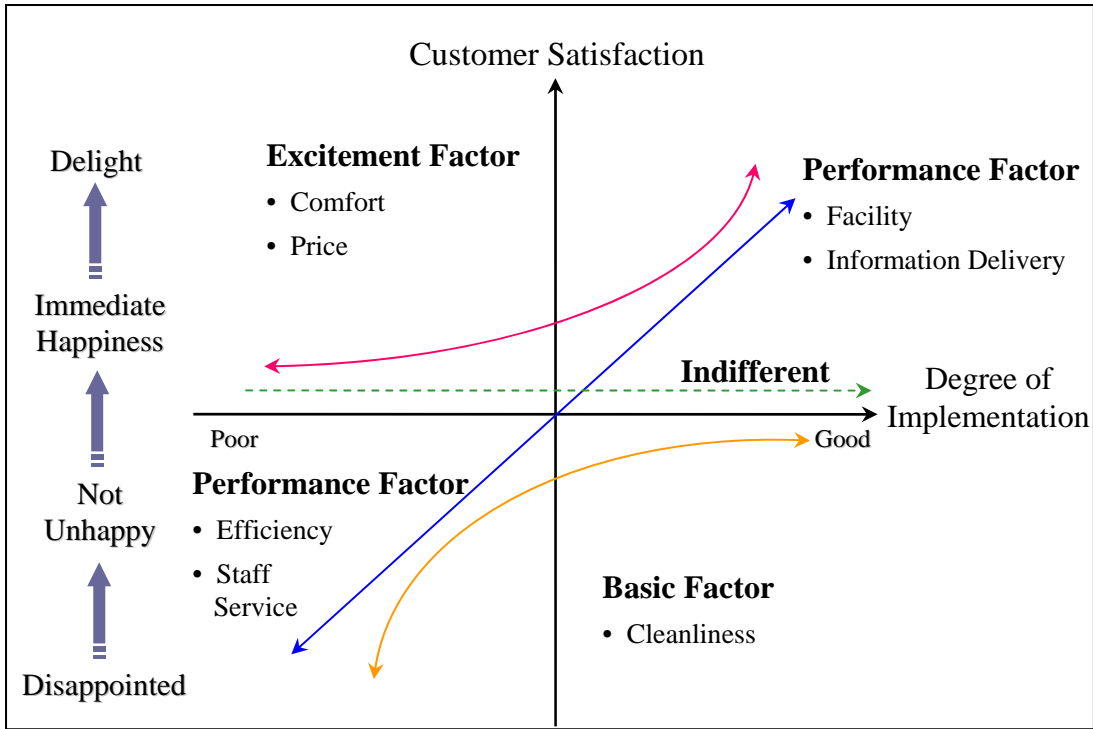
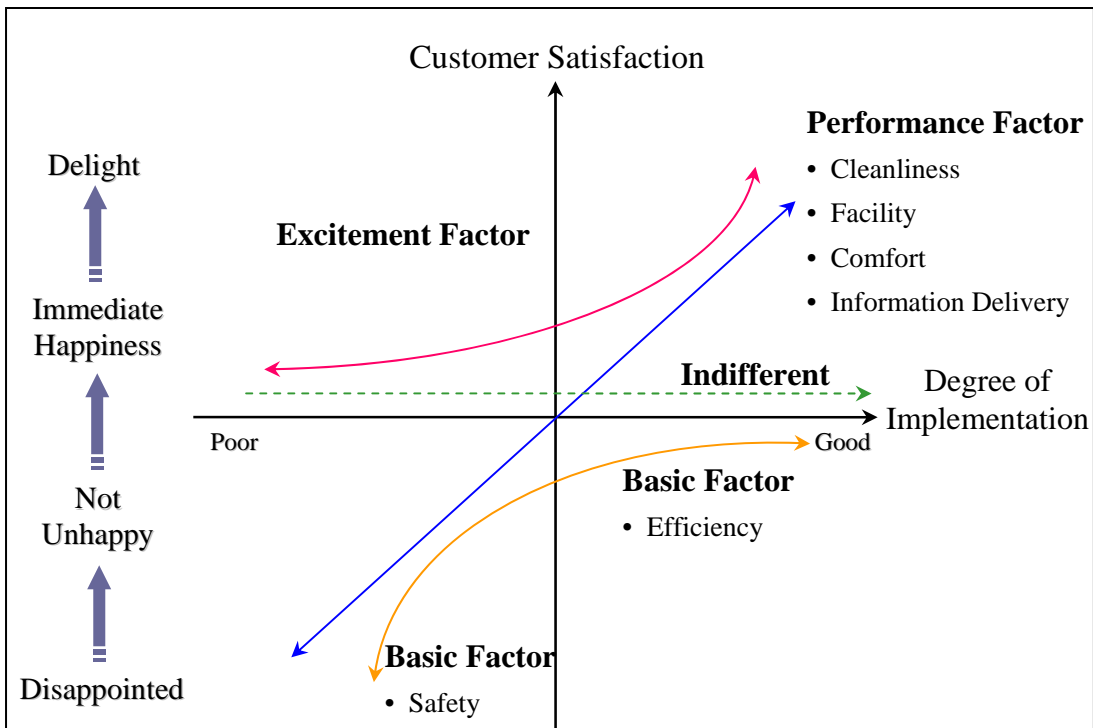Table 3: The illustration of service dimensions at LRT station

Table 4: The illustration of service dimensions inside the LRT train

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