IDENTIFYING INTERVENTION AREAS FOR THE IMPROVEMENT OF STATION FACILITY

PROJECT REPORT

Submitted by

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TKM20CETE18

to

the APJ Abdul Kalam Technological University

in partial fulfilment of the requirements for the award of the Degree of

Master of Technology

In

Transportation Engineering

DEPARTMENT OF CIVIL ENGINEERING

T K M College of Engineering, Kollam

July 2022

DECLARATION

I undersigned hereby declare that, this project report entitled “Identifying Intervention Areas for the Improvement of Station Facility”, submitted for the partial fulfillment of the requirements for the award of degree of Master of Technology of the APJ Abdul Kalam Technological University, Kerala is a bonafide work of mine carried out under the supervision of Dr. Munavar Fairooz C, Assistant Professor, Department of Civil Engineering, TKM College of Engineering, Kollam. I declare that, to the best of my knowledge, the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion to any other candidate. The content of this report is not being presented by any other student to this or any other University for the award of a degree.

Kollam VARSHA VIJAY

07/07/2022

DEPARTMENT OF CIVIL ENGINEERING

T K M COLLEGE OF ENGINEERING

CERTIFICATE

This is to certify that the Project Report entitled **'IDENTIFYING INTERVENTION ARAES FOR THE IMPROVEMENT OF STATION FACILITY'** is a bonafide record of the work done by **VARSHA VIJAY (TKM20CETE18)** during the academic year **2021-2022** in partial fulfilment of the requirements for the award of the Degree of Master of Technology in Transportation Engineering by the A P J Abdul Kalam Technological University, Kerala.

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ACKNOWLEDGEMENT

I take this opportunity to express my deep sense of gratitude and sincere thanks to all who helped me to complete the project successfully.

I am delightful in using this opportunity to express sincere thanks to **Dr.Sajeeb R**, Head of Department, Department of Civil Engineering, for providing me with adequate facilities and a proper environment for conducting the project work.

I hereby express my sincere gratitude to my guide, **Dr.Munavar Fairooz C** , Assistant Professor, Department of Civil Engineering, for the inspiration, valuable guidance, constant encouragement and creative suggestions rendered during the course of this project, and also in preparing this report without whom this project could not have been successfully accomplished.

I also express sincere thanks to my project coordinators, **Dr. Kavitha Madhu**, Associate Professor, Department of Civil Engineering, **Prof. Meenu Tomson,** Assistant Professor, Department of Civil Engineering and **Prof. Jijin A**, Assistant Professor, Department of Civil Engineering for their valuable guidance throughout the course of this work.

Finally, I thank my parents and friends who directly and indirectly contributed to the successful completion of my project.

VARSHA VIJAY

ABSTRACT

Traffic congestion had become a major problem due to dramatic growth of private vehicle users. One way to decrease traffic congestion is through public transit. It offers a more practical form of transportation and improves the economics of the nation. From various public transport mode, rail transport is considered one of the most important transport medium that can rectify this issue. The railway has shown to be a viable transportation option that satisfies requirements for more effective and ecologically friendly means of transportation. The quality of environment can be raised as environmental contamination is decreased. It is crucial to assess which characteristics are more appealing to the various types of transport customers, i.e., which aspects are more significant to determine service quality, in order to promote the use of the railway and to raise its future demand. Studies on service quality have emphasized the significance of taking into account users perceptions and working to enhance the areas in which they are most interested in order to generate demand for public transportation. A total of around 22 attributes were selected including the transfer facilities. The study was conducted mainly at Kollam railway station and two major neighbouring stations (Thiruvananthapuram Central railway station and Alappuzha railway station). The data obtained from the study is analysed using revised Importance Performance Analysis (IPA) from which the key intervention areas are identified. The passenger level of service for some station facilities were taken into consideration to identify the station capacity.

Keywords: Rail transport, service quality, IPA, level of service

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ABBREVIATIONS

AC	Accessibility to station
ST	Stair
ES	Escalator
LF	Lift
EF	Entertainment Facility
AS	Audio System
TS	Ticketing system
SF	Seating Facility
PF	Parking Facility
AM	Availability of medical facility
CK	Cloak room
VC	Visual Communication
AT	Access Time
SB	Staff Behaviour
SA	Safety
SE	Security
CL	Cleanliness
FR	Flooring and roofing
CR	Crowding
WR	Waiting room and washroom
FS	Availability of feeder services
FA	Food Availability
KLM	Kollam Railway Station
TVM	Thiruvananthapuram Railway Station
ALLP	Alappuzha Railway Station
PLOS	Passenger Level of Service
IPA	Importance Performance Analysis

1. INTRODUCTION

GENERAL

Modern life routinely involves the transportation of people and goods between locations. To meet their demands in terms of personal, professional, psychological, social, religious, recreational and other areas, people must move from one location to another. Public transportation is thought of as a long-term option for mobility in order to meet these needs. Making the time that passengers spend using the amenities at the station enjoyable will increase the number of passengers who are satisfied with their rail travel. The Indian Ministry of Railways has started making preparations to build platforms with good quality facility and first-rate services in order to create stations that meet international standards. In addition to the overall service, satisfaction surveys may ask respondents about how they perceive or value each service attribute. These customer satisfaction surveys enable consumers' opinions to be considered and prevent evaluating public transportation services solely from the perspective of management. A passenger's overall opinion of a train trip is positively impacted by the quality of the stations, and the availability of sufficient and high-quality services contributes to a pleasant stay.

1.1 Service Facility

Customer satisfaction is a mental state that controls how service expectations and performance perceptions function within a specific time frame. In the transportation industry, passenger satisfaction is generated by contrasting pre- and post-travel expectations and experiences. Given the amount of time passengers spend waiting on platforms, it's critical that the amenities there satisfy their needs and make their trip enjoyable. People won't choose rail service as their form of transportation if there are incompatible rail facilities present, such as a lack of cleanliness, inadequate amenities offered in idle stations, ineffective vending machines, and inadequate parking facilities. Passenger satisfaction is influenced by a variety of service quality factors. A commuter's opinion of diverse service quality is ascertained by the strong correlation between RAILQUAL and passenger satisfaction in the railway station. Some of the criteria used to determine the dimensions of service quality include the environment's cleanliness, vehicle access and circulation, pedestrian amenities, waiting space, ticketing system, and information centre in the railway stations. The different service facility dimensions are shown in Table 1.1.

Table 1.1 Different service facility dimensions (Source: -Thanaraju.et.al.2019)

Service facility dimensions (RAILQUAL)
Reliability
Assurance
Tangibles
Empathy
Responsiveness
Comfort
Convenience
Connection

1.2 Data Analysis Methods

In order to understand the importance of various transfer facility attributes from the commuters' point of view, data obtained from the survey is analysed using Importance Performance Analysis (IPA). In 1977, Martilla and James first suggested and implemented Importance Performance Analysis (IPA) as a means of assessing passenger happiness. A graphical tool called IPA is used to analyse customer satisfaction data and pinpoint the areas that need the greatest work. Researchers and managers in a variety of fields have found this technique to be a widely applicable tool that is reasonably simple to administer and analyse. IPA does not account for the non-linear relationship between the performance of the qualities and customer happiness, which might result in varied results depending on how an attribute's relevance is calculated.

The original IPA had two implicit assumptions: first, that attribute performance and attribute importance are independent variables; and second, that attribute performance and total performance have a linear and symmetrical relationship. These presumptions are incorrect since in reality there is an uneven relationship between attribute-level performance and overall customer happiness. Based on these assumptions IPA is revised comprising three factor theory and partial correlation. It consist of three categories: basic factors, performance factors, and excitement factors. Basic factors are the minimum requirements that when not met, cause consumer discontent but not satisfaction. When excitement factors are met, consumer satisfaction rises, but when they are not met, there is no negative impact. Performance factor lead to satisfaction when performance is high and dissatisfaction when performance is low.

1.3 Objective

The objective of the proposed study are as follows:

- To determine the significance of relationship between the service dimensions and passenger satisfaction towards railway facilities
- To identify the dimension of service quality that contributes to passenger satisfaction towards railway facilities
- To suggest improvement in transfer facility according to passenger satisfaction

1.4 Scope

- Study is going to be done at Kollam, Trivandrum and Alappuzha, Kerala
- The study is limited to station facilities.

1.5 Methodology

The methodology planned in order to achieve the above mentioned objective is described below:

1.Study of literature- Study was done on the commuter's perception towards various railway facilities.

2.Data Collection- A paper-based survey instrument was designed and responses in terms of Likert-type ordinal scale has been collected. It consists of part A, part B, part C and part D. In this part A consist of trip characteristics, part B and part C includes the important and satisfaction of various attributes respectively whereas part D consist of socio economic characteristics.

3.Analysis of data-The data obtained need to be analysed using an Important performance analysis (IPA) and the key intervention areas are identified. Then the level of service criteria for some selected attributes are identified.

2. LITERATURE REVIEW

For a variety of reasons, including its extensive network, accessibility, affordability, and convenience of travel, rail is a preferred means of transportation in India. Indian Railways has lost market share in both its freight and passenger segments despite being viewed as a barometer of the nation's economic success because of bad public perception and a lack of customer responsiveness. Concerns about rail, whether in the context of the quality of transit, rail coaches, or railway platforms, arise particularly when it comes to quality of service. Overcrowding, unlawful vending, a lack of facilities, waiting lounges, access control, and passenger guide systems can make passengers' stays uncomfortable and have a negative impact on how happy they are with their rail journeys. To meet the objectives of the present study the following literature review is carried out:

2.1 Service Facility Dimensions (Thanaraju.et.al.2019)

RAILQUAL instrument consist of reliability, assurance, tangibles, responsiveness, comfort, empathy, convenience and connection.

2.1.1 Reliability

In the context of railway facilities, greater service reliability is essential to boosting passenger satisfaction levels. The passengers' pleasure may rise as a result of the real-time information systems. This is due to the fact that the information offered at the train station, which functions as a service in a travel, might generate delays and dependability problems. The accuracy of the train schedule, train departures, and route map(s) that are displayed through the screen in the station, as well as the announcements in stations before and after disruptions, can all be used to assess the information system's dependability. Every passenger who uses a train as a form of transportation expects to be in a clean and healthy environment. As a result, the quality of the service provider may be impacted by the cleaning services provided in the waiting area on the platform. A lack of cleanliness can lead to issues including environmental contamination, a negative impression on foreign visitors, and the spread of infectious diseases. In order to maintain or raise the level of reliability from the user's perspective, it is the responsibility of the service provider to carry out services correctly.

2.1.2 Assurance

The assurance dimension combines competence, which refers to staff members having the necessary knowledge to provide the services, courtesy, which refers to the ability to perform the services in a courteous, respectful, and friendly manner, credibility, which can be assessed on the basis of the staff members' dependability, believability, and integrity, and security, which refers to the ability of the passenger to be free from risk, danger, and uncertainty. Personal safety at stations, providing enough notice of any changes to the itinerary, providing notice of train delays, staff availability, and question handling at the ticket counter/office have all been used as criteria to assess the level of assurance of the railway services.

One of the most crucial elements required for the traveller to feel at ease at the station while waiting for a train is public safety. If the surroundings does not make them feel safe, the passengers may decide not to take public transportation. Additionally, the most powerful factor influencing consumer happiness is "information." This is so that passengers may expect the train operator to provide pertinent information promptly. Therefore, for the purpose of ensuring a certain quality of railway service, the pertinent information needs to be displayed on the screen and announced using the information and announcement systems, respectively.

2.1.3 Tangibles

Customer expectations defined tangibles as the actual facilities, tools, staff, and modes of communication related to the services. The physical characteristics and tangible dimensions of the environment are crucial elements that contributed to consumer satisfaction and a top priority for repeated purchases. As rail passengers could not predict the outcome of the services, they relies on the initial impression of the station's surroundings to rate the services available. The station's clean environment, the staff's general behavior and the clarity of the information delivered are crucial tangible components. It can be determined based on how the actual structures, tools, and personnel look.

The most significant SERVQUAL component, tangibles, may be assessed by looking at how the buildings, machinery, and employees look. The user experience can be improved by using clear and precise timetables, signage, maps, and notice boards that are simple to

read and understand. As a result, it is crucial that the service provider guarantee the timely delivery and proper maintenance of the tangible components of the train station.

2.1.4 Empathy

Empathy is described as the level of consideration and particular care given to the consumers, and it has a significant impact on how they are perceived. Customers' emotional perceptions can be influenced by service providers who demonstrate empathy by actively listening to, comprehending, and responding to their needs. It can be demonstrated by paying close attention to each user—whether it is the company or the staff—understanding their unique needs, and providing convenient business hours for all users. Positive and negative emotions can be categorised as emotions. Customer satisfaction can be increased by positive attitudes toward the quality of the station's services, while dissatisfaction can be caused by negative attitudes. The staff should receive adequate soft skill training to deliver services with greater empathy, especially when addressing passenger inquiries. The quality of the service can be improved by treating the consumer with compassion.

2.1.5 Responsiveness

According to SERVQUAL, responsiveness is the capacity to assist clients and provide quick service. The customer expects not to have to wait too long for the completion of a service and wants it done quickly. For instance, the management team should address complaints about malfunctioning facilities right away and offer the customer an acceptable solution. It is clear that happy customers are the result of good customer responsiveness. The handling of complaints should be emphasised in quality management. The retention of customers who have experienced service issues might be encouraged by effective complaint handling procedures. Throughout the entire rail transportation route, assistance and fast service should be available at all times. From the perspective of railway services, the vending machine should always have enough cash for change. In addition, pedestrian amenities like escalators and elevators should be regularly upgraded and maintained to prevent breakdown.

2.1.6 Comfort

One of the key elements in determining service excellence is customer comfort. Customers' perceptions of the station's temperature, brightness, and cleanliness are all

included in the comfort value. The amount of seating, temperature, and illumination can all affect how comfortable a waiting area is. The style of the waiting room furniture also affects how comfortable customers are. The proper level-changing pedestrian amenities, such as a ramp, elevator, escalator, and staircase, should be offered. The lighting in a train station should be bright enough, the air inside should be clean, and noise should be kept to a minimum. It has been observed that smart level shifting facility design can result in a comfortable train ride. The design of pedestrian facilities should be user-friendly and comfortable for use by normal adults, those with disabilities, and the elderly. Therefore, comfort should be a priority in the level altering facilities' design.

2.1.7 Convenience

The degree of passenger-friendliness of the amenities and services present in a railroad station is related to convenience. Customer satisfaction will be impacted by the passenger's perception of convenience. This is so because the convenience dimension has been evaluated as the service quality dimension with the highest perceived value addition. The criteria utilized to assess the level of convenience of the railway services include the accessibility of travel information, the simplicity of purchasing tickets, and the convenience of ticket office hours. There are two ways for a passenger to receive travel information, including audio and visual information systems as shown in Fig 2.1 and 2.2 respectively.

Fig 2.1 Audio Information

(Source:photonado.com)

Fig 2.2 Video Information

(Source:photonado.com)

The visual information needs to be provided within a 2 metre range to ensure easy access to travel information. Passengers will feel considerably more at ease as a result because the information is close at hand. Additionally, a clear announcement made by an audio information system when the train arrives can draw the passengers' attention. Increasing

the range of ticket services available at the railway station can have an impact on how convenient the ticketing system is for passengers. From the standpoint of the passenger, the availability of parking spots, the availability of park-and-ride options, as well as bike stands and storage facilities for lock-ups, can boost the level of convenience.

2.1.8 Connection

The effectiveness of the railway station's connections to various modes of transportation is referred to as connection. From the perspective of the passenger, connectivity has become an important component affecting how the service is seen as being of a high standard. The sufficiency of parking facilities and the accessibility of the train station serve as the foundation for the evaluation of service quality under the examination of connection dimension. One of the characteristics to measure the connectedness of the railroad station is the availability of buses at the railway interchange. The integration of passengers between public transportation modes can be improved by the railway interchange with bus service**.**

2.2 Design of Survey Instrument

Thanaraju.et.al. (2019) conducted a study in which he identifies the dimension of service quality that contributes to passenger satisfaction towards railway facilities and also determines the significance of relationship between the dimensions and passenger satisfaction towards railway facilities in the central region of Malaysia. In Malaysia rail transport is one of the most important transport medium. Rail transportation usage is encouraged by government as it can reduce environmental pollution and improve the quality of environment. As a result, the government of Malaysia has set up a number of rail transit systems, including the Light Rapid Transit (LRT), Monorail, Mass Rapid Transit (MRT), Keretapi Tanah Melayu (KTM), and Airport Rail Link. However, individuals have shied away from using this form of transportation because to mismatched public transportation infrastructure. The six criteria that were used to conduct this study were waiting space, ticketing system, pedestrian facilities, car access and circulation, and information centres in the train stations. Data from a survey are used to analyse the degree of passenger satisfaction. Using multiple regression analysis, the association between RAILQUAL and passenger happiness is discovered from the acquired data.

This study used a quantitative research strategy that involved distributing 600 sets of questionnaires to the intended respondents, who are rail passengers. It is divided into section A for collecting demographic information and section B for asking questions about the dependent and independent RAILQUAL dimensions variables. Software called SPSS was used to analyse and describe the data. Results obtained through coefficient correlation and multiple regression analysis.[16]

Sadhukhan.et.al.(2015) conducted a study to understand the importance of various transfer facility attributes from the commuters' point of view which includes prioritization of transfer facility attributes on the basis of the perceived importance by metro commuters. The data were collected from metro commuters in Kolkata and were analysed using three established methods, namely, TOPSIS, RIDIT, and GRA, in order to understand the variation, if any, in the derived rankings of attributes obtained from these methods.

There were two sections to the questionnaire. The socioeconomic and trip characteristics of the respondents were collected in the first section, and their opinions regarding the importance of various transfer facility attributes were collected in the second section using a five-point Likert-type ordinal scale (Likert, 1932), where 1 signifies the very low importance level and 5 signifies the very high importance level of an attribute. Based on the comments of commuters, the list was altered during the pilot survey by adding and removing some qualities. Access time, transfer walking time, level changing facilities, pedestrian facilities, direct cost, or metro charge are the transfer facility qualities taken into account for the final study.[13]

2.3 Importance Performance Analysis (IPA)

The Importance Performance Analysis (IPA), is a popular analytical method and produces recommendations for the management of customer satisfaction. IPA is a two-dimensional grid based on the relevance of quality attributes as perceived by customers and the performance of those attributes. It is possible to establish strategies for satisfaction management based on how these two factors interact**.** It consist of importance on the x-axis and performance (satisfaction) on the y-axis is typically constructed using data from satisfaction surveys. Customers are prompted to rate each attribute according to its effectiveness. Measures of self-stated importance (such as rating scales, constant sums scales, etc.) or deduced importance are used to determine the relevance of attributes

(multiple regression weights). The relationship between customer attribute performance and overall satisfaction is asymmetrical, and the connection between attribute importance and attribute performance is causative, as various theoretical and empirical research have demonstrated. These results call into question the efficiency of conventional IPA.

A revised IPA that incorporates the three-factor theory concept, partial correlation analysis, and natural logarithmic transformation was presented by Weng (2006) and Maztler et al. (2003). They stated that satisfaction is created by cognitively comparing actual performance to pre-purchase expectations. When perceived performance exceeds expectations, this is known as positive confirmation (satisfaction), but when it falls short of expectations, this is known as negative disconfirmation (dissatisfaction). This concept divides quality features into three categories—basic factors, performance factors, and thrill elements each of which has a different effect on customer satisfaction.

2.4 Level of Service

Azadpeyma et al. (2018) used VISSIM software to simulate a study to determine the number of people in the Shohada Square metro station. Six scenarios were investigated in this research and various conditions were assessed based on the simulation findings and the TCRP manual. There were two main approaches that were thought of to enhance station performance.

The levels of services and satisfaction that passengers felt in regard to the amenities on platforms in the State of Kerala were examined by Parthiban et al.(2021). It focuses on pedestrian characteristics based on age, gender, ability to carry luggage, and flow, density, and speed criteria. With the help of PTV Vissim and Viswalk, a simulation model of the pedestrian network at the railway station was created, and stairways and entrance passages, respectively, were analysed.

Bhatnagar and Ram (2021) conducted study based on the quality of the passenger access and dispersion facilities. Based on passenger behaviour at a terminal building and Equivalent Passenger Units (EPUs) from anthropometric and passenger behaviour research, it analyses the ideal degree of service for passengers. The degree of services for the passenger's movement inside the terminal building is also evaluated using EPUs. Influence zones are constructed for the case study station once access and dispersal facilities have been examined.

3. METHOD OF ANALYSIS

Importance Performance Analysis (IPA) was first proposed and introduced by Martilla and James in 1977 as a means to measure client satisfaction with a product or service. IPA is a graphical tool used for better understanding customer satisfaction and identifying the most critical attributes/items for improvement. This technique has shown to be a widely applicable tool that is relatively simple to administer and interpret, resulting in widespread use among researchers and managers in various fields. It is also a way to support the creation of effective marketing programmes because it makes it easier to interpret data and makes it more useful when making strategic decisions. The non-linear relationship between the performance of the attributes and customer satisfaction is not taken into account by IPA, which may lead to inaccurate improvement decisions and prevent the introduction of innovations. IPA results in different conclusions depending on how an attribute's importance is calculated.

Wong, Hideki and George (2011) state, "IPA evaluation tool is used to prescribe the prioritization of attributes for improvement and it can also provide guidance for strategic development." IPA, as an evaluation tool, is used to understand customer satisfaction and prioritize areas for improvement. IPA is composed of a two-dimensional graph where the vertical axis represents Customers' Satisfaction or Performance and the horizontal axis represents the Importance of service, which is broken into four quadrants as shown in Fig 3.1.

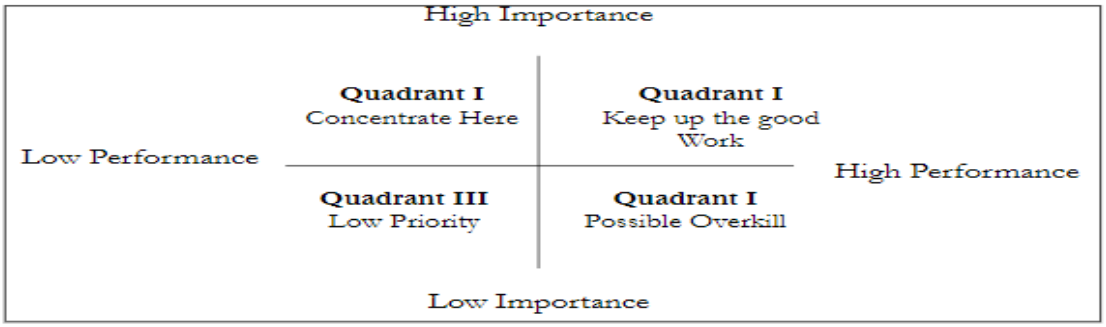


Fig 3.1 IPA framework (source: Kinsella and Caulfield.2011)

- "Concentrate here" refers to the area where performance standards are low and items are of utmost importance. The best outcome would be obtained if the items in this category were improved right away.

- "Keep up the Good Work" refers to areas with high performance standards and issues that are of utmost importance. The business owners ought to continue their recent activities.
- “Low Priority" designates the section with low priority items and low performance standards. There is no need to make this region better.
- "Possible Overkill" denotes a situation where performance levels are high but the components are not deemed crucial. These items' improvement can be minimised in this quadrant.

IPA has been widely used in a variety of industries, including tourism and recreation, restaurant service quality, public administration, employment satisfaction in restaurants, and public transit. IPA can be used in public transportation to analyse consumer satisfaction on several service aspects. It is possible to determine which traits customers believe should have the highest and lowest priorities for improvement by looking at the points in each quadrant. As a result, this IPA offers a straightforward graphic representation of visitors' attitudes toward the service. The service provider can then take into account the numerous enhancements and develop an improvement plan.

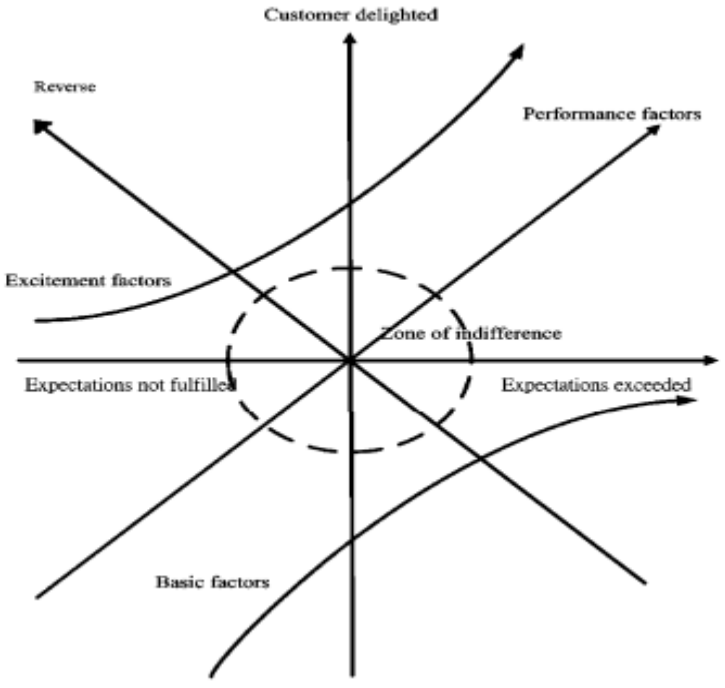


Fig 3.2 Three factor theory,adopted from Kano,1984(source:Deng.2006)

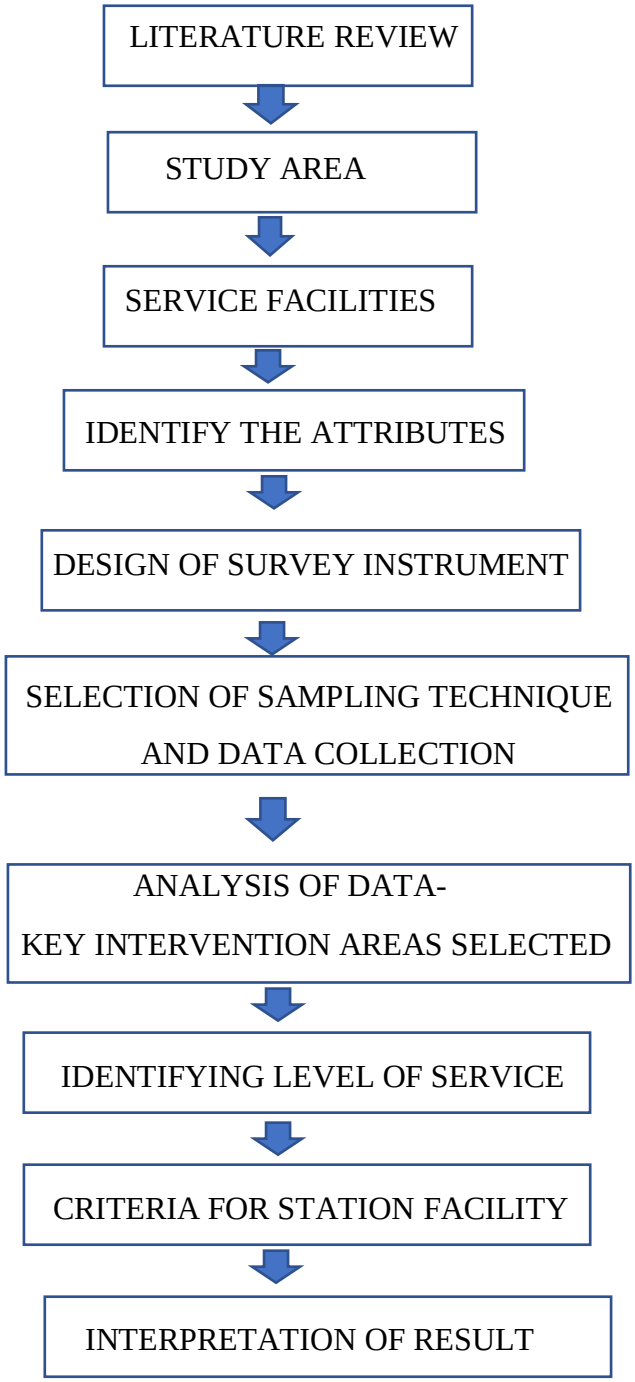
Weng (2006) and Maztler.et.al.(2003) conducted studies to propose a revised IPA approach. Two implicit assumptions underlie the IPA: (1) Attribute performance and attribute importance are two independent variables. (2) The relationship between quality

attribute performance and overall performance is linear and symmetric. These limitations led to the development of revised IPA that integrated three factor theory. A model that distinguishes across various quality attribute categories was created by Kano et al. in 1984. According to Kano's model, there are five basic types of product or service quality features (attractive, one-dimensional, must-be, indifferent, and reverse), each of which has a different impact on consumer satisfaction. However, according to some customer satisfaction research, three categories—basic factors, performance factors, and excitement factors—can be used to categorise quality features.

- Basic factors (dissatisfiers) are minimum standards that, if not met, induce dissatisfaction but, if met or exceeded, do not result in customer satisfaction; poor performance on these traits has a bigger influence on total satisfaction than good performance. Basic needs must be met, but this is not a sufficient prerequisite for satisfaction. Basic elements are completely anticipated. They are taken for granted by the customer who views them as necessities.
- Excitement factors (satisfiers) are the factors that raise customer happiness if supplied but do not induce discontent if they are not delivered. In other words, positive performance on these criteria has a bigger impact on total satisfaction than negative performance. The buyer is surprised by the excitement factors and feels "delighted."
- Performance factors result in satisfaction when performance is high and unhappiness when performance is poor. In this instance, the relationship between attribute performance and overall satisfaction is linear and symmetric.

4. METHODOLOGY

The conceptual framework of methodology mainly includes the identification of different attributes that influence the importance of various facilities and customer satisfaction. The methodology is fabricated as shown below.



4.1 Study Area

Kollam is selected as the study area as shown in Fig 4.1. It is one of the state's oldest railroad stations. It is operated by the Thiruvananthapuram railway division and is a part of the Southern Railway zone of the Indian Railways. It has 6 station platforms and 17 tracks for long-distance, passenger, MEMU, and freight trains.

Fig 4.1 Kollam Railway Station

The neighbouring station considered for study is Thiruvananthapuram railway station and Alappuzha railway station. Trivandrum Central, presently known as Thiruvananthapuram Central, was earlier known as (also known as Thampanoor railway station)is shown in Fig 4.2. It is a significant railroad station that serves Trivandrum. It is a major rail hub for Southern Railway and one of Kerala's busiest train stations. One of Thiruvananthapuram's most recognizable sights is the railway station structure. The station is well positioned for passengers, across from Thiruvananthapuram Central Bus Station, in the center of the city. The nearby railroad stations toward the north and south, respectively, are Pettah and Nemom.

Fig 4.2 Thiruvananthapuram Central Railway Station

The next station considered was Alappuzha Railway Station. Alleppey railway station (ALLP), also known as Alappuzha railway station, is shown in Fig 4.3. The station is a

significant stop on the coastal line between Ernakulam and Kayamkulam. This station is run by the Thiruvananthapuram railway division and is part of the Southern Railway zone of Indian Railways. In Kerala, it is a popular tourist site. As a result, visitors can access the tourist destinations in and surrounding Alappuzha from the Alappuzha train station.

Fig 4.3 Alappuzha Railway Station

4.2 Identification of Attributes

Based on the service facility available at Kollam railway station various attributes has been identified as shown in Table 4.1 and Table 4.2 to determine the customer satisfaction.

Table 4.1 Description of selected attributes

Attributes	**Description**
Accessibility to station(AC)	Entrance and exit of the station
Stair(ST)	Transfer of passenger from one platform to other through a series of steps
Escalator(ES)	Transfer of passenger from one platform to other through a moving staircase
Lift(LF)	Transfer of passenger through a car that moves in vertical shaft
Entertainment Facility(EF)	Television and other facilities provided at station
Audio System(AS)	Systems used for announcement of train arrival and departure

Table 4.2 Description of selected attributes

Attributes	**Description**
Ticketing system(TS)	Tickets bought at the railway station
Seating Facility(SF)	Seats available for passenger to be seated
Parking Facility(PF)	Space available for vehicles to park at the station premise itself
Availability of medical facility(AM)	Medical related facilities available at station
Cloak room(CK)	Space to store or keep heavy luggage's
Visual Communication(VC)	The type of guidance available to the commuters for movements between railway platform and entry/exit gates or feeder stops
Access Time(AT)	The time taken by a railway commuter to reach to the feeder stops from railway station (or vice versa)
Staff Behaviour(SB)	The way in which staffs at the station provide guidance
Safety(SA)	Passenger should have a fearless environment
Security(SE)	Police and other securities available at the station
Cleanliness(CL)	The neatness of the station and its surroundings
Flooring and roofing(FR)	The floor at the station is convenient for passenger to walk and carry luggage's whereas the roof should provide shelter to passenger
Crowding(CR)	Space consumed by the passenger at platforms
Waiting room and washroom(WR)	The restroom and waiting area facility at station
Availability of feeder services(FS)	Adequacy of feeder services to the station (or vice versa)
Food Availability(FA)	The food stalls available at the with good quality products

The images of various attributes like Audio system, Visual communication, Stair, Escalator, Food Stall, Parking facility, Ticketing system, Medical Facility and Cleanliness of Kollam railway station is as shown in Fig 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11 and 4.12 respectively.

Fig 4.4 Audio System

Fig 4.5 Visual Communication

Fig 4.6 Stairs

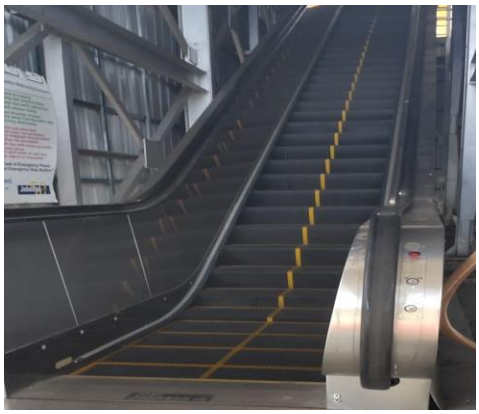


Fig 4.7 Escalator

Fig 4.8 Food Stall

Fig 4.9 Parking facility

Fig 4.10 Ticket Counter

Fig 4.11 Medical Facility

Fig 4.12 Cleanliness

The images of various attributes of Thiruvananthapuram Railway Station like visual communication, parking facility, sign boards, escalator, seating facility are shown in Fig 4.13, 4.14, 4.15, 4.16 and 4.17 respectively.

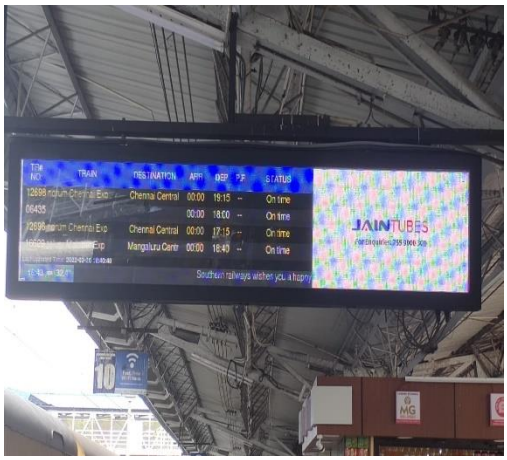


Fig 4.13 Visual Communication

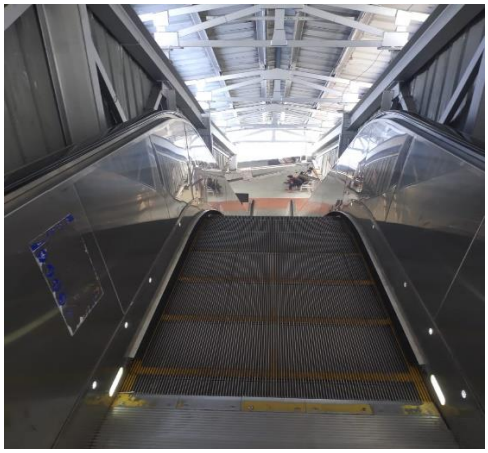


Fig 4.14 Escalator

Fig 4.15 Parking Facility

Fig 4.16 Sign Board

Fig 4.17 Seating facility

The images of various attributes of Alappuzha Railway Station such as ticketing system, information center, food stall, waiting room and roofing are shown in Fig 4.18, 4.19, 4.20, 4.21 and 4.22 respectively.

Fig 4.18 Ticket Counters

Fig 4.19 Information center

Fig 4.20 Waiting Room

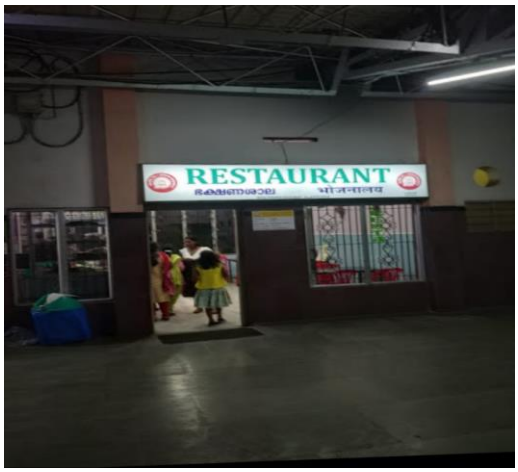


Fig 4.21 Food counter

Fig 4.22 Roofing

5. DATA COLLECTION AND ANALYSIS OF DATA

5.1 Design of Survey Instrument

It is crucial to assess which characteristics are more appealing to the various types of transport customers, i.e., which aspects are more significant to determine service quality, in order to promote the use of the railway and to raise its future demand. A paper based face to face survey instrument was designed to collect responses from rail commuters in Kollam. The questionnaire included four parts as shown in Fig 5.1. The first part was to collect respondent's trip characteristics information , the second part and third part was to collect their responses in terms of importance and satisfaction of various transfer facility attributes in a five-point Likert-type ordinal scale respectively. The fourth part was to collect the socio economic characteristics of the respondents.

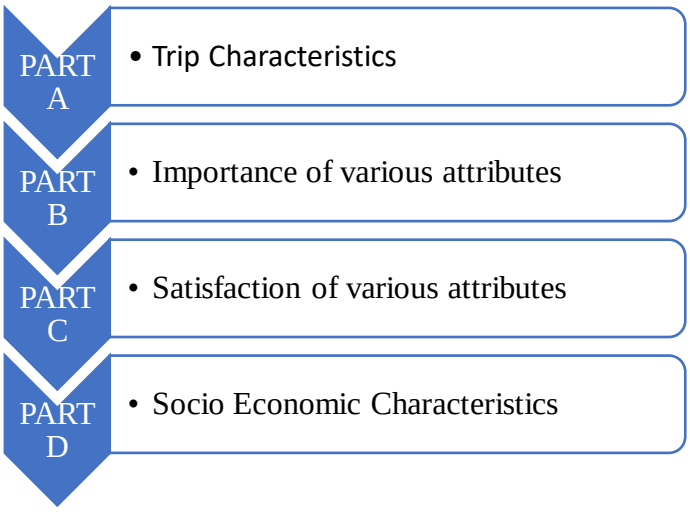


Fig 5.1 Different part of survey instrument

The response were given in terms of 5 point Likert type scale where in terms of importance of attributes 1 stands for least important, 2 stands for somewhat important, 3 stands for important, 4 stands for very important and 5 stands for most important. In terms of satisfaction of attributes 1 stands for highly dissatisfied, 2 stands for dissatisfied; 3 for neutral, 4 for satisfied and 5 stands for highly satisfied.

In general, the majority of the respondents rated all of the transfer facility attributes, while a few evaluated only some of the attributes. Moreover, in some responses, the socioeconomic and trips characteristics information were incomplete. Therefore, during

initial data processing and refinement, some of the observations were eliminated, leading to retaining 827, 478 and 403 fully filled refined responses in the final database. The sample of questionnaire is attached in Appendix A.

5.2 Analysis of Data

From the data collected process around 827 responses were obtained from Kollam railway station and 478,407 responses from Thiruvananthapuram and Alappuzha stations respectively. 61 % responses were from males while 39% responses were obtained from females. The data obtained is then analysed to determine the percentage importance and percentage satisfaction of various attributes as shown in Fig 5.2 and 5.5 respectively.

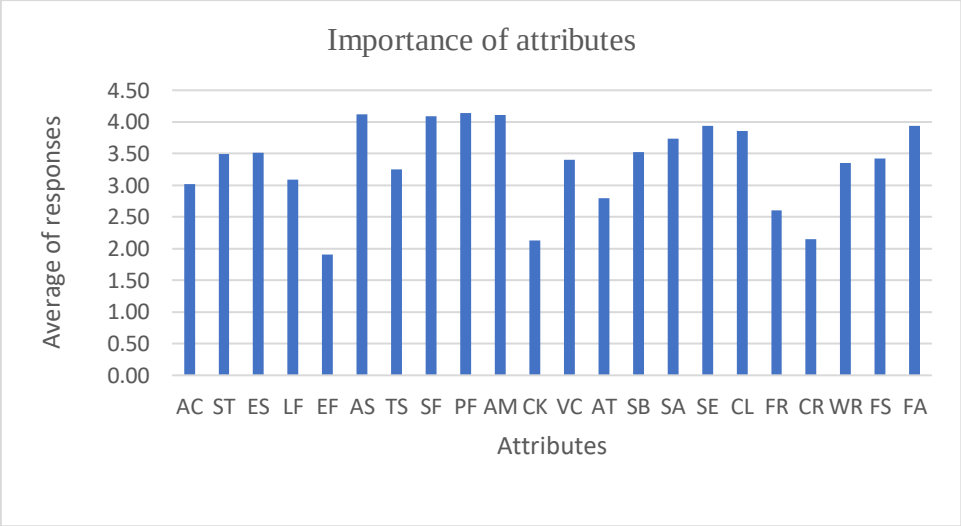


Fig 5.2 Percentage of importance of various attributes

On an average scale from Fig 5.2 we can see that the highest percentage of importance is obtained for parking facility whereas the lowest percentage of importance is given to entertainment facility. This is basically due to the increase in private vehicles. Passengers choose to reach the railway station with private vehicles than wasting time for public transport or feeder services. Nowadays electric gadgets like mobile phones, tablets, laptops etc. has taken the world. With the use of these gadgets passenger can spend their stop over time at station so the necessity of entertainment facility at railway station is decreasing. The percentage importance of stair, escalator and lift is shown Fig 5.3 Passengers give more importance to lift and escalator than the stair but the satisfaction of passenger at Kollam railway station is more for stairs than escalator and lift as shown in Fig 5.4 because of the placement of lift and escalator far away from the entrance. While considering the Thiruvananthapuram railway station more importance is given to

escalators than stair because the volume of passenger is more compared to the other stations.

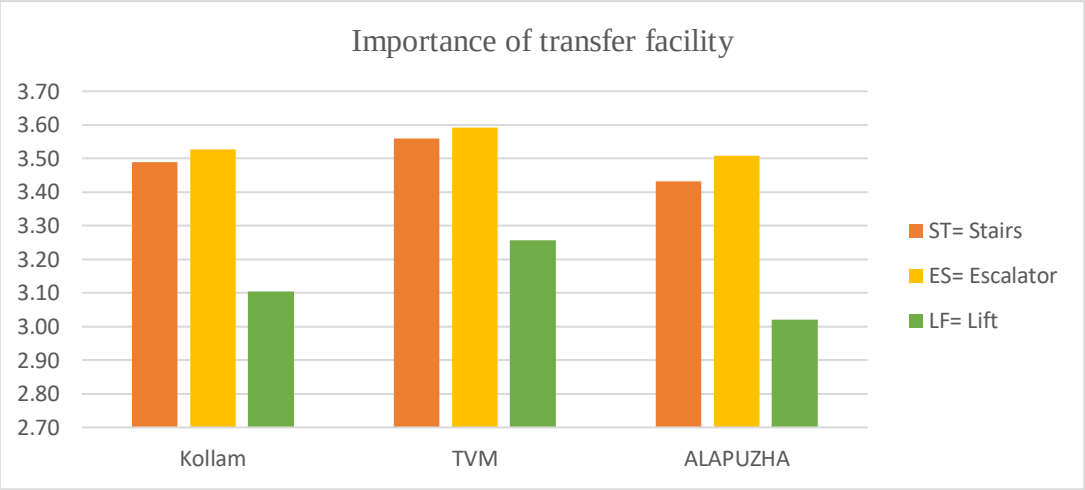


Fig 5.3 Percentage importance of transfer facility

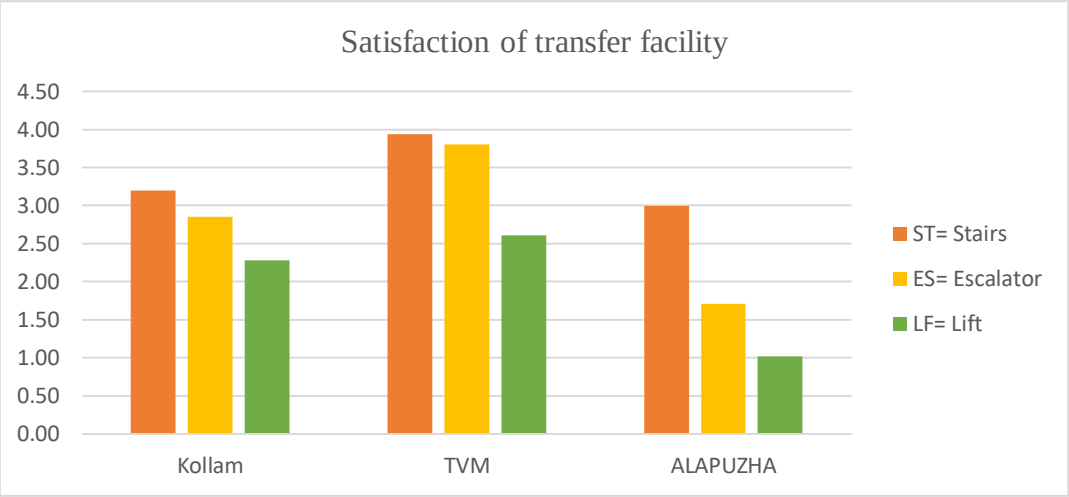


Fig 5.4 Percentage satisfaction of transfer facility

Fig 5.5 shows the average of satisfaction level of different attributes at the three stations. The satisfaction level of Thiruvananthapuram station is comparatively more when considering the Kollam and Alappuzha stations. The attributes like cleanliness, security, access time and seating facility are more satisfied by the passenger at the Kollam railway.

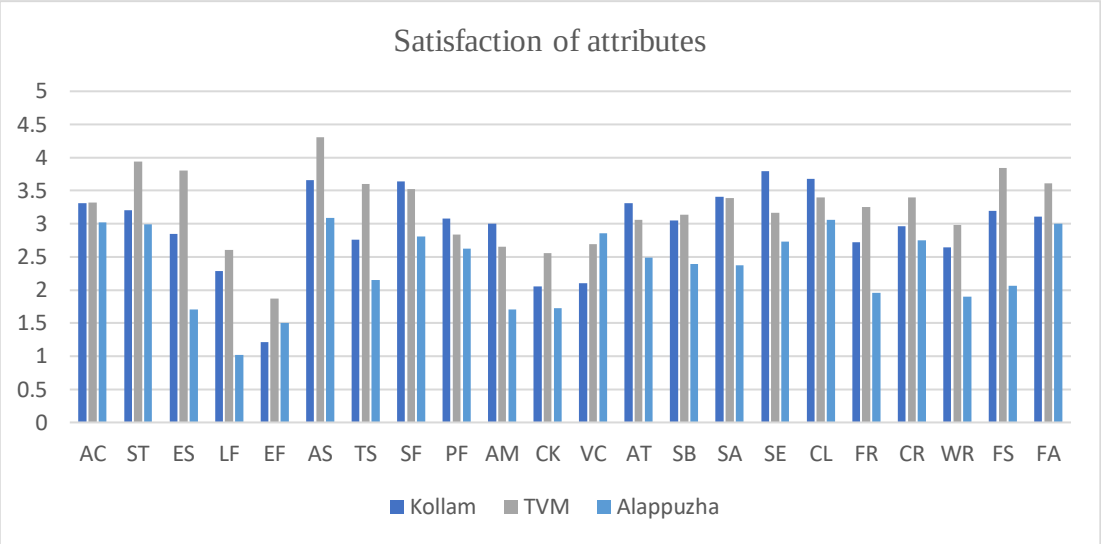


Fig 5.5 Percentage of satisfaction in various attributes

When considering the attributes such as cloak room, crowding and waiting and washroom, it has a constant graph. Based on crowding the usage of waiting room and cloak room is increasing gradually as shown in Fig 5.6.

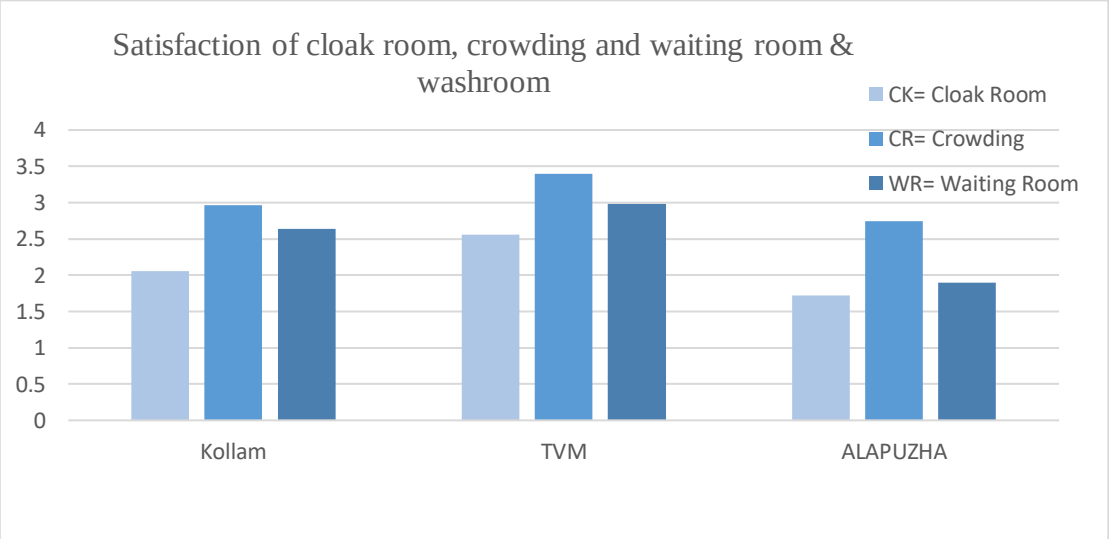


Fig 5.6 Satisfaction of Cloak Room, Crowding and Waiting Room

Visual Communication (VC) and audio system (AS) are two important attributes in station facility. These are helpful in conveying messages to the passenger about the train schedules. When comparing the three stations VC is more efficient at Thiruvananthapuram railway station than the Kollam and Alappuzha station as shown in Fig 5.7.

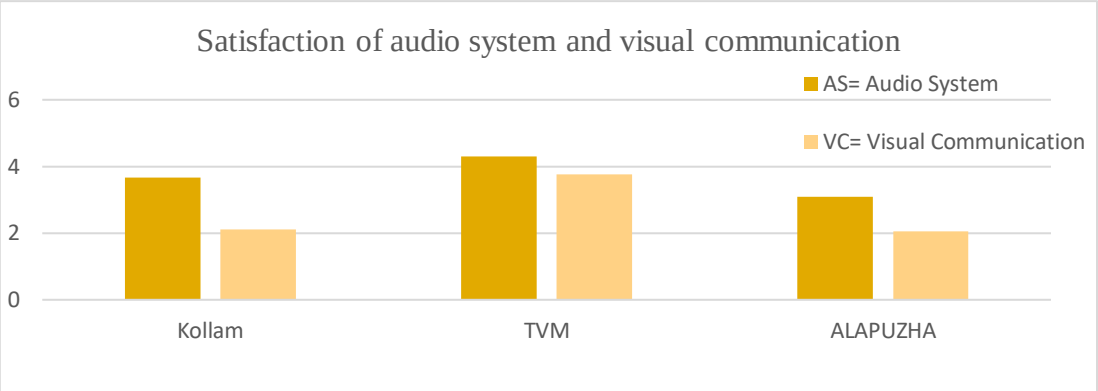


Fig 5.7 Satisfaction of audio system and visual communication

While considering the importance of ticketing system, the importance of ticketing facility at station has decreased gradually as shown in Fig 5.8 due to the online ticket booking platforms available which makes it easier for the passengers. During the initial data collection phase the amount of passengers were comparatively less compared to the current situation of covid. So passengers were less bothered about the ticketing facility. But the scenario has changed all the working and student as passengers who uses the rail as their transport mode daily find it difficult to get tickets online. Thus, a drastic change has occurred in the importance of offline and online ticket booking as shown in Fig 5.9. Based on this the stop over time at station depends as shown in Fig 5.10. Online ticket booking decrease in stop over time at station which saves the time for each and every passengers.

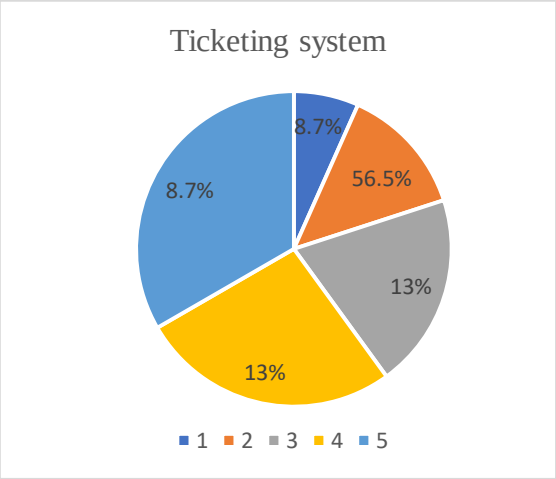


Fig 5.8 Percentage importance of ticketing system (initial phase)

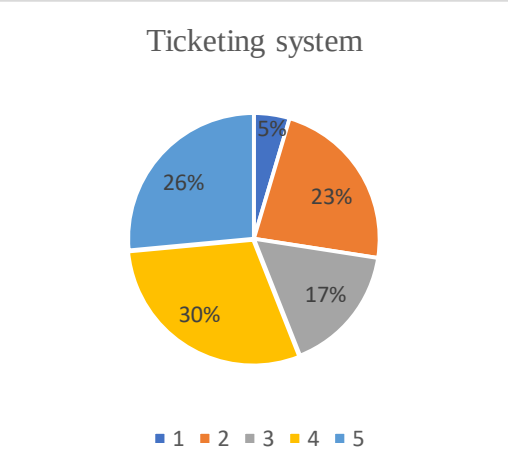


Fig 5.9 Percentage importance of ticketing system(final phase)

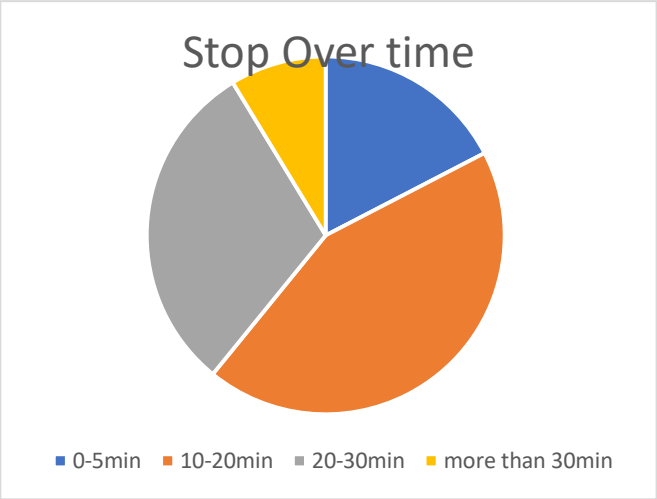


Fig 5.10 Percentage stop over time of passenger

5.3 Importance Performance Analysis (IPA)

Importance Performance Analysis (IPA) is a method for ranking attributes according to their importance and performance, and it has been widely used in the study of tourism and service quality. In the transportation industry, operators frequently gauge consumer satisfaction based on their opinions of public transportation's features; nevertheless, their significance is less frequently assessed.

IPA is a simple instrument for comprehending customer satisfaction and setting priorities for enhancing service quality. In management scheme, the importance-performance space was divided into four quadrants based on the mean customer judgments of importance and performance across a number of variables. It is easy to determine which traits customers believe should be given the highest priorities for improvement (i.e., the "concentrate here" quadrant) and the lowest priorities for improvement (i.e., the "possible overkill" quadrant). In factor structure also the cluster of various attributes are divided into two dimensional matrix. The degree to which an attribute fits into each of the four clusters—basic, important performance, excitement and unimportant performance is known as the membership degree of the attribute. As a result, each characteristic had four membership degrees, and the attributes were assigned to a specific cluster based on the membership degree with the highest value. By analysing the data using revised IPA the management scheme and factor structure of Kollam railway station (KLM) is obtained. After analysing and clustering the attributes the key intervention areas are identified.

The clustering of attributes is shown in Fig 5.11 and 5.12. The result obtained is shown Table 5.1 and 5.2.

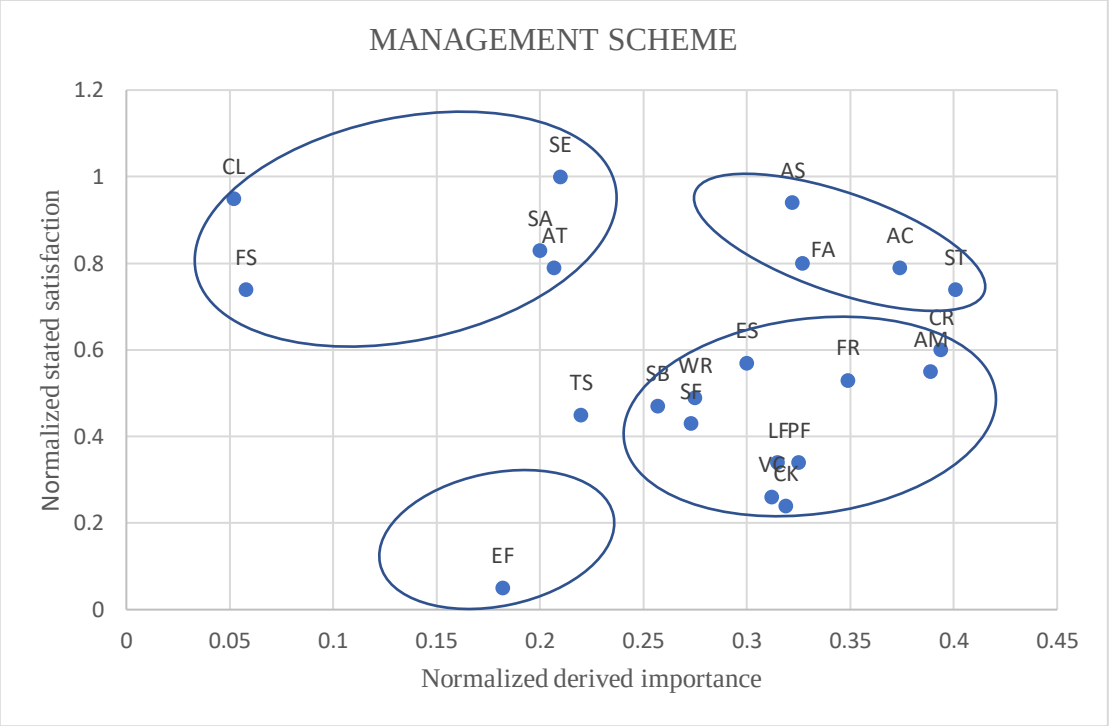


Fig 5.11 Management schemes (KLM)

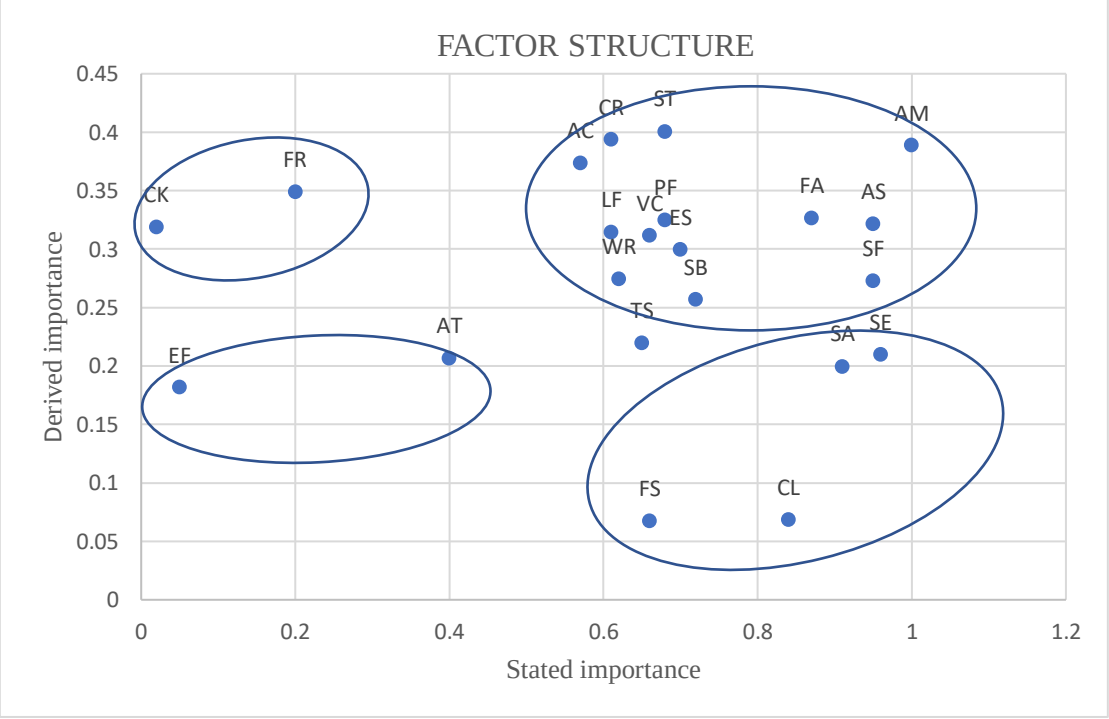


Fig 5.12 Factor Structure (KLM)

Table 5.1 Management scheme of attributes

Possible overkill	• Cleanliness(CL) • Safety(SF) • Security(SE) • Access Time(AT) • Availability of feeder service(FS)
Keep up good work	• Audio system(AS) • Stair(ST) • Availability of food(FA) • Accessibility to station(AC)
Concentrate here	• Availability of medical facility(AM) • Lift(LF) • Escalator(ES) • Visual Communication(VC) • Waiting room and washroom(WR) • Staff Behaviour(SB) • Seating facility(SF) • Parking facility(PF) • Cloak Room(CK) • Flooring and roofing(FR) • Crowding(CR) • Ticketing system(TS)
Least priority	• Entertainment Facility(EF)

Table 5.2 Factor Structure clustering of attributes

Excitement factors	• Cloak Room(CK) • Flooring and roofing(FR)
Performance factor(importance)	• Accessibility to station(AC) • Stair(ST) • Lift(LF) • Waiting room and washroom(WR) • Parking facility(PF) • Visual Communication(VC) • Escalator(ES) • Staff Behaviour(SB) • Availability of food(FA) • Seating facility(SF) • Availability of medical facility(AM) • Crowding(CR)
Performance factor (unimportant)	• Entertainment Facility(EF) • Access Time(AT)
Basic factors	• Ticketing system(TS) • Availability of feeder service(FS) • Cleanliness(CL) • Safety(SF) • Security(SE)

From the analysis it can be seen that the transfer facility attributes like lift and escalator, medical facility and visual communication facilities at station needs to be improved. This can be done by giving sign boards of escalator and lift at the entrance and other important placed in such a way that it is visible to the passengers easily. The visual communication system need to be repaired by the authorities so that it helps in guidance of passenger.

The neighbouring station considered for study is Thiruvananthapuram Central railway station (TVM) and Alappuzha railway station (ALLP). In case of TVM around 478 data were obtained for analysis. The management scheme and factor structure of Thiruvananthapuram railway station is shown in Fig 5.13 and 5.14 respectively.

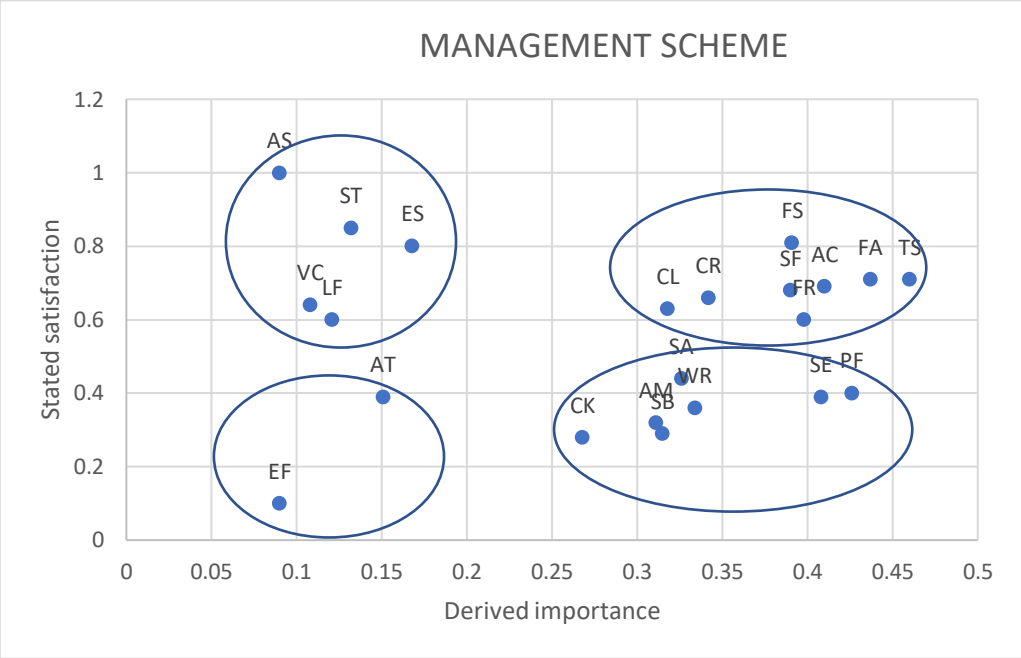


Fig 5.13 Management Scheme (TVM)

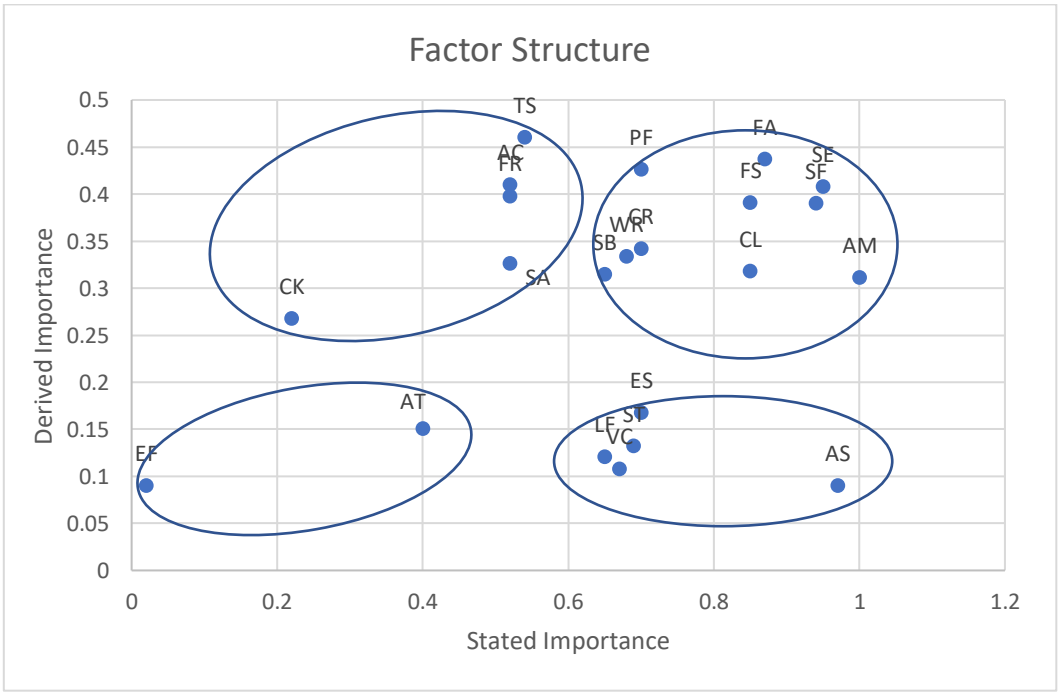


Fig 5.14 Factor Structure (TVM)

A total of 407 data were obtained for analysis of Alappuzha railway station. The management scheme and factor structure of Alappuzha railway station is shown in Fig 5.15 and 5.16 respectively. The clustered result is shown in Table 5.3.

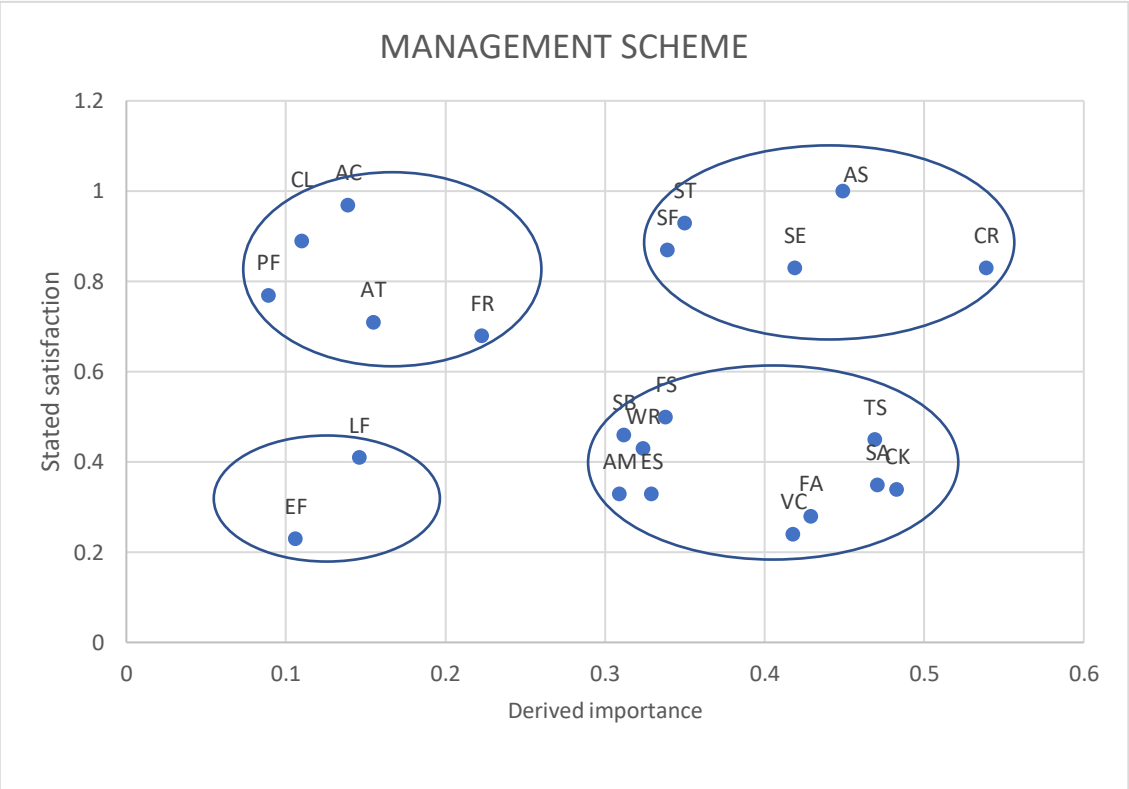


Fig 5.15 Management Scheme (ALLP)

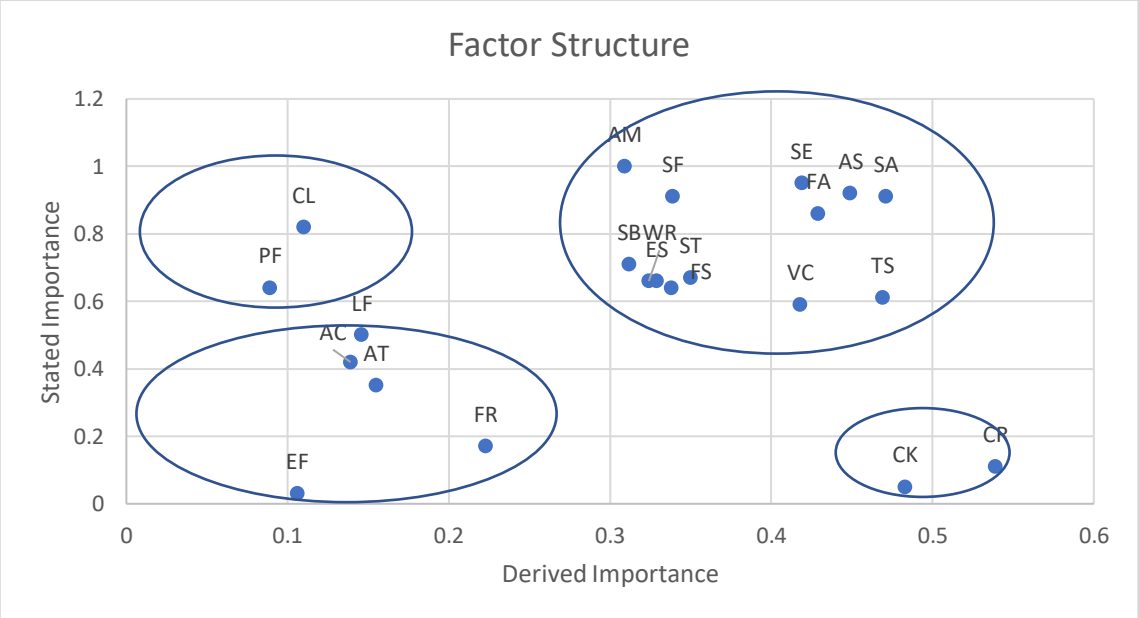


Fig 5.16 Factor Structure (ALLP)

Table 5.3 Management scheme clustering of Thiruvananthapuram and Alappuzha railway station

	Thiruvananthapuram	Alappuzha
Possible Overkill	• Audio system(AS) • Visual Communication(VC) • Lift(LF) • Escalator(ES) • Stair(ST)	• Cleanliness(CL) • Accessibility to station(AC) • Parking facility(PF) • Flooring and roofing(FR) • Lift(LF)
Least Priority	• Entertainment Facility(EF)	• Entertainment Facility(EF) • Access Time(AT)
Concentrate here	• Cloak Room(CK) • Availability of medical facility(AM) • Safety(SA) • Waiting room and washroom(WR) • Security(SE) • Staff Behaviour(SB) • Parking facility(PF)	• Staff Behaviour(SB) • Waiting room and washroom(WR) • Availability of feeder service(FS) • Availability of medical facility(AM) • Escalator(ES) • Visual Communication(VC) • Availability of food(FA) • Ticketing system(TS) • Safety(SA) • Cloak Room(CK)

Table 5.3 Management scheme clustering of Thiruvananthapuram and Alappuzha railway station

	Thiruvananthapuram	Alappuzha
Keep up good work	• Access Time(AT) • Availability of feeder service(FS) • Cleanliness(CL) • Seating facility(SF) • Flooring and roofing(FR) • Availability of food(FA) • Ticketing system(TS) • Crowding(CR) • Accessibility to station(AC)	• Seating facility(SF) • Stair(ST) • Security(SE) • Audio system(AS) • Crowding(CR)

Attributes such as cloak room, staff behaviour, waiting room and washroom, safety and availability of medical facility needs to be given more concentration at both TVM and ALLP stations. Passengers are satisfied with the audio system and visual communication available at TVM station than the ALLP station. Transfer facility like lift, escalator and stair needs to be more convenient at Alappuzha station. When comparing the three stations people are more satisfied with the TVM station than Kollam and Alappuzha.

5.4 Identification of Priority Areas

For Kollam Railway Station, the factor structure was compared with management plans for various attributes in order to determine the areas of intervention. According to the criterion that underperforming basic factors (concentrate here and least priority) should obtain the greatest priority, followed by underperforming performance and excitement factors, factors that needed improvement were prioritized. Consequently, a reasonable hierarchy of attributes is obtained from the following ways:

- Basic factors under concentrate here
- Basic factor under least priority
- Performance factor under concentrate here
- Excitement factors under concentrate here

The normalized derived importance obtained after doing the partial correlation using SPSS, normalized stated importance and normalized stated performance were shown in Table 5.4 and 5.5.

Table 5.4 Identification of priority areas of Kollam Railway station

	Attributes
Basic factor under concentrate here	• Ticketing system
Performance factor under concentrate here	• Availability of medical facility(AM) • Lift(LF) • Escalator(ES) • Visual Communication(VC) • Waiting room and washroom(WR) • Staff Behaviour(SB) • Seating facility(SF) • Parking facility(PF) • Crowding(CR)
Excitement factors under concentrate here	• Cloak Room(CK) • Flooring and roofing(FR)

Table 5.5 Values of analysis

Attributes	Abbreviations	Normalized Stated Importance	Normalized Derived Importance	Normalized Stated Satisfaction
Accessibility to station	AC	0.57	0.374	0.79
Stair	ST	0.68	0.401	0.74
Escalator	ES	0.7	0.31	0.57
Lift	LF	0.61	0.315	0.34
Entertainment facility	EF	0.05	0.182	0.05
Audio system	AS	0.95	0.322	0.94
Ticketing system	TS	0.65	0.22	0.45
Seating Facility	SF	0.95	0.273	0.43
Parking Facility	PF	0.68	0.325	0.34
Availability of medical facility	AM	1	0.389	0.55
Cloak room	CK	0.02	0.319	0.24
Visual Communication	VC	0.66	0.312	0.26
Access Time	AT	0.4	0.207	0.79
Staff Behaviour	SB	0.72	0.257	0.47
Safety	SA	0.91	0.201	0.83
Security	SE	0.96	0.21	1
Cleanliness	CL	0.84	0.052	0.95
Flooring and roofing	FR	0.2	0.349	0.53
Crowding	CR	0.61	0.394	0.6
Waiting room and washroom	WR	0.62	0.275	0.49
Feeder services	FS	0.66	0.058	0.74
Food Availability	FA	0.87	0.327	0.8

For various attributes at Kollam railway station the key intervention areas were identified, no basic factors comes under concentrate here. Ticketing system was basic factor that comes under least priority. Most of the attributes in performance factor fell under concentrate here as shown in Table 5.5. Excitement factors like cloak room and flooring and roofing comes under concentrate here.

5.5 Level of Service

Stations are a key component of the rail transportation infrastructure. A station offers a place where travellers can buy tickets and board trains. The performance of the entire network will be enhanced by analysing and enhancing the station capacity. The capacity of a station refers to the ability to provide security and comfort for the anticipated number of passengers. The maximum number of passengers that can pass through all of the station's amenities is considered the station's capacity station. In this study the level of service of passengers for various attributes are analyzed. The attributes like ticketing system, waiting room, seating facility, parking facility and steps are considered to identify the passenger's level of service (PLOS) at these station facilities based on the satisfaction obtained from the passenger in a 5 point Likert type scale. From each satisfaction level the 85^{th} percentile is taken as the PLOS. Only a few station facilities are taken into consideration based on (i)from the entry of passengers to the station (parking facility and ticketing system), (ii)passengers waiting for the arrival of train (waiting room and seating facility) and (iii)finally the transfer facility usage before departure (steps).The LOS of passenger satisfaction level 5, 4, 3, 2 and 1 are represented as LOS A, LOS B, LOS C, LOS D and LOS E. The higher satisfaction level is considered as LOS A and the lowest one as LOS E.

5.5.1 Ticketing system

Kollam railway station have 6 counters named W1, W2, W3, W4, W5 and W6 but currently only 2-3 counters are working properly. An electric vending machine is also available at station but the PLOS only taken for normal ticket counters. The analysis is done by calculating the number of passengers in a queue and the passenger at the end of the queue is noted. The time he/she is standing at the end of queue to the time he/she gets the ticket is noted in minutes. Then satisfaction from that particular passenger is taken. Passenger per minute is number of persons in the queue divided by the time taken

(min).The based on the satisfaction obtained the 85th percentile values are taken into consideration. The PLOS for satisfaction level 1,2,3,4 and 5 is shown in Table 5.6. The figure of ticket counter is shown in Fig 4.10. Passengers are giving higher satisfaction rate when the number of passenger per min is more. At LOS A, a range of about more than 5 passenger per min can be served with ticket from the ticket counter.

Table 5.6 PLOS of ticketing system

Satisfaction level	PLOS(passenger per min)
LOS A	>5
LOS B	4-5
LOS C	3-4
LOS D	2-3
LOS E	1-2

5.5.2 Parking facility

The parking available at Kollam railway station is towards the main entrance and also at the back gate area. The parking area is divided into five different section based on the area and the number of vehicle parked is noted. From each section the parking of vehicle/10m^2 is calculated. The parking passenger's satisfaction level is taken to analyse the PLOS by taking the 85th percentile value as shown in Table 5.7. The parking available has now became somewhat more convenient to the passenger with the coming of parking area at the back entrance. The parking area outside the stations are not taken into consideration but most of the daily passengers vehicles are parked outside due to the daily parking fee starting from Rs.10 for two wheelers for two hours. Extra charges will be paid if exceeds two hours. As the number of vehicle increases space for parking is minimal so when the vehicle/10m^2 increases passenger's satisfaction level is less.

Table 5.7 PLOS Parking Facility

Satisfaction level	PLOS(Vehicle/10m^2)
LOS A	<5
LOS B	5-7
LOS C	7-9
LOS D	9-12
LOS E	12-15

5.5.3 Waiting room

The waiting room available at Kollam railway station have ladies waiting room and second class waiting room. The ladies waiting room have a total of 32 seats while the second class waiting room have 28 seats. The total number of seats occupied at a 30min interval is noted and the satisfaction is taken from the passengers at the waiting area. Passenger per seat is analysed to find the PLOS of waiting area. PLOS of waiting room is shown in Table 5.8. As the number of passengers at waiting area increases the satisfaction level is decreasing due to less seating capacity.

Table 5.8 PLOS of waiting room

Satisfaction levels	PLOS of ladies waiting room (Passenger per seat)	PLOS of second class waiting room (Passenger per seat)
LOS A	<0.35	<0.42
LOS B	0.35-0.56	0.42-0.56
LOS C	0.56-0.75	0.56-0.76
LOS D	0.75-0.86	0.76-0..89
LOS E	0.86-0.97	0.89-0.98

5.5.4 Seating facility

A total of 345 seats are available at platform 1 and 374 seats at platform 2 and 3. Some of the seats available are not safe for seating and the placement of seats are not under the shelter roof towards the general compartment area. To find the PLOS as shown in Table 5.9, number of seats in a row with the occupancy of seat is noted to calculate the passenger per seat. From the 85th percentile satisfaction levels the PLOS is obtained.

Table 5.9 PLOS of seating facility

Satisfaction level	PLOS (Passenger per seat)
LOS A	<0.23
LOS B	0.23-0.41
LOS C	0.41-0.59
LOS D	0.59-0.75
LOS E	0.75-0.95

5.5.5 Transfer facility

The steps are one of the most commonly used transfer facility at Kollam railway station shown in Fig 4.6. The PLOS of passengers from platform no.1 to platform no.2 or 3 is taken into consideration and vice versa. A range of 75-80steps are there from the entry of passenger from one platform to arrival at other platform. An average length of stretch taken for the study is considered as 30m. Each person's time of entry and exit is noted so the time taken in seconds can be obtained. The satisfaction from passengers is taken at the arriving platform. Table 5.10. shows the result obtained from analysis. Based on the length and width of the transfer facility and crowding the speed of passengers varies, as the speed increases passengers satisfaction rate also is high.

Table 5.10 PLOS on transfer facility

Satisfaction levels	PLOS (m/s)
LOS A	>0.86
LOS B	0.86-0.65
LOS C	0.65-0.47
LOS D	0.47-0.27
LOS E	0.27-0.11

6. CONCLUSIONS AND SCOPE FOR FUTURE RESEARCH

GENERAL

The ideal railway operator should be able to provide the necessary facilities in the railway station and should have a clear understanding of the particular needs of the passengers. As a result, a railway station with better and sufficient amenities can make more money because doing so will promote and increase the number of people who use rail transit. In order to meet passenger expectations and promote the use of rail transportation while decreasing the problem of traffic congestion, the railroad operator and relevant government body should offer suitable railroad facilities. The country's economy will benefit from better facility management and enough train facilities in the railway station, in addition to passengers and commuters.

6.1 Conclusions

The various attributes that contributes to passenger satisfaction towards railway facilities is determined as follows.

- The transfer facilities available at Thiruvananthapuram station has higher satisfaction level than the Kollam and Alappuzha station. From the three transfer facilities considered escalator is of higher importance than stair and lift.
- The flooring and roofing are not appropriate at Kollam railway station towards the general compartment arriving area. This also leads to less safety of the passenger.
- The accessibility towards the station is less for Alappuzha railway station. While the Thiruvananthapuram station being at the central and opposite of Thampanoor bus station provides more access for the passengers.
- Due to the online ticket bookings the daily travelling passengers are facing severe issues regarding the availability of tickets. Based on online booking the stop over time of people are also decreases.
- For long distance travelers the importance of cloak room and waiting area are more rather than short distance traveler.

The relationship between performance and importance of service facility based on passenger satisfaction is analyzed. The revised IPA method is used to cluster the attributes. Priority areas of intervention were identified from the perception of commuters

at station.These areas needed to be given prior importance. Commuter's perception towards attributes like staff behaviour, flooring and roofing, cleanliness and security are more than transfer facilities. The passenger level of service for some attributes are identified. The satisfaction from the commuters depends on their individual opinion about the particular attribute. When considering the case of parking some are concerned about the less availability of space for parking while other considers the parking fare. Likewise in steps factors like age of passengers, luggage etc. need to be considered. People with heavy luggage finds step with low satisfaction level. They would like to prefer escalators or lift. These facilities should also be available at the nearby area of entrance and exit. Sign boards should be placed at important places of station so that it may help in guidance of people. Concerned authorities should provide adequate maintenance and repair of railway facilities in order to meet the expectation of the passengers.

6.2 Scope for Future Research

The present study deals with the identification of priority areas of interventions for Kollam railway station and the two neighbouring major stations (Thiruvananthapuram and Alappuzha railway station). Also the level of service criteria for Kollam railway station.

- For future research the study can be extended to all the major stations further interesting results could be obtained.
- Only 22 attributes are considered in this study, so attributes like ATM availability, drinking water, electrical devices like fan and light etc. can be taken.
- Factors such as age of passenger, whether they have luggage or not, children, short trip or long trip, separate parking facility for two wheelers and four wheeler etc. can be taken into consideration for finding the level of service of station facilities.

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APPENDIX A

COMMUTER'S PERCEPTION TOWARDS RAILWAY STATION FACILITIES

Dear respondent**,**

I am an MTech Student from TKM College of Engineering, Kollam. Being part of my project, it is important to know your perceptions towards various aspects/attributesassociated with service facility at Kollam railway station. We shall be thankful to you for spending a little part of your precious time in filling this questionnaire.

Part-A: Trip Characteristics (Please **Tick (√)** against appropriate one)

1. How frequent do you use train for making your trip?

(a)Never (b) Rarely (c) Sometimes (d) Often (e) Always

2. Which class travel do you prefer?

(a)Seating (b) Sleeper (c) AC 2 TIER (d)AC 3 TIER

3. Trip Purpose for the most recent trip by train:

(a)Work/office (b) Business (c) Education (d) Recreation or Social (e) Other

4. How much time stop over at the station?

(a) 0-5min (b)10-20min (c)20-30min (d)more than 30min

Part-B: Importance of attributes

Rate the IMPORTANCE of various attributes in the context of the selection of mode, on a scale of 1 to 5, with

1→least important,

2→somewhat important,

3→important,

4→very important and

5→most important.

Attributes	**Importance(1-5)**	**Attributes**	**Importance(1-5)**
Accessibility to station		Visual Communication	
Stair		Access Time	
Escalator		Staff Behavior	
Lift		Safety	
Entertainment facility		Security	
Audio system		Cleanliness	
Ticketing system		Flooring and roofing	
Seating facility		Crowding	
Parking facility		Waiting room and washroom	
Availability of medicalfacility		Feeder services	
Cloak room		Food availability	

Part C: Satisfaction with different service facility

Rate the LEVEL OF SATISFACTION about each mode on a scale of 1 to 5, with

1 → Highly dissatisfied;

2 → Dissatisfied;

3 → Neutral,

4 → Satisfied and

5 → Highly satisfied

Service facility	**Satisfaction (1-5)**		**Service facility**	**Satisfaction (1-5)**	
	Origin	**Destination**		**Origin**	**Destination**
Accessibility to station			Visual Communication		
Stair			Access Time		
Escalator			Staff Behavior		
Lift			Safety		
Entertainment facility			Security		
Audio system			Cleanliness		
Ticketing system			Flooring and roofing		
Seating facility			Crowding		
Parking facility			Waiting room and washroom		
Availability of Medical facility			Feeder services		
Cloak room			Food availability		

Part D: Socio-Economic Characteristics

1. Gender: (a) Male (b) Female

2. Age : (a) < 20 years (b) 20 to 35 years (c) 35 to 55 years (d) > 55 years

3. Education: (a) up to 10^{th} Standard (b) 12^{th} Standard (c) Graduate (d) Masters/Above

4. Occupation: (a) Service/Job (b) Business (c)Self-employment (d) Student (e) Other

5. Monthly Family Income (in Rs./-) :

(a) Up to 10, 000/- (b) 10, 000/- to 20, 000/- (c) 20, 000/- to 30,000/-
(d) 30000/- to 40000/ (e) 40000/- to 60000/- (f) 60000/- to 80000/-
(g) More than 80000/-

THANK YOU