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Assessment of Service Quality Related to Accessibility and Infrastructural Amenities at Kharagpur Railway Station

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ABSTRACT: Accessibility and connectivity at regional, national, and international level plays an important role in making an urban area respire. An efficient transportation network promotes sustainable and efficient urban environmental management. In India, the focus on enhancement of transportation sector is evident, but railway sector is comparatively less explored. Railway stations are the nodes in railway networks in an urban environment, and hence it is very crucial for a station to be well-equipped with all the latest demands for passengers' easy commute. Though, the experiences and facilities at Indian railway stations are quite varied. The Railway Budget 2016-17 highlights the improvement of station services like barrier-free accessibility, Wi-Fi provision, maintaining cleanliness, improving customer interface, etc. This paper aims to prioritize the components of two major attributes of service quality at railway stations, namely 'access related characteristics' and 'infrastructure related amenities'. It attempts to identify the components requiring special attention to ensure future comfort and satisfaction of the users. Importance-Satisfaction Modelhas been used taking into account the experts' opinion, who are users of the station, on importance and satisfaction levels of the service quality attributes and their components. The study was conducted at Kharagpur railway station, one of the oldest and busiest station in West Bengal.

Keywords: Railway station, Service quality, Importance-Satisfaction Analysis, Urban infrastructure management, Kharagpur

I. INTRODUCTION

India is the second most populated country in the world with an area of 3.287 million km^2 and over 1.25 billion people living in a diverse culture (Ministry of Home Affairs, Govt. Of India, 2016). In this huge chunk of land, with a burgeoning population, connectivity plays a vital role. To fulfill the needs of enhancing connectivity an efficient multi-modal transportation system is required. Railway infrastructure is significant for India as it provides the most convenient and cheapest mode of transport to over 23 million passengers (Ministry of Railways, 2015) every day and operated by the government on subsidies. The country has developed a wide network of railways since its independence in 1947. The growth in expansion of the network remained the first priority of the administrators and hence the service quality became the back drop. Thus, it becomes essential to assess the service quality and the related satisfaction level of passengers and further, to understand the gap between the passengers' satisfaction with the service quality and the opinion of the service providers and planners (experts).

Service quality is measured by considering user's point of view by various researchers. However, this paper attempts to assess the quality of services from the experts' point of view, to understand their perception about two major attributes of railway station's service quality, namely 'accessibility related characteristics' and 'infrastructural related amenities'.

Table 1: Review of definitions of Service Quality.

Definitions	Inferences
"Services are often viewed as a whole, whereas in reality, it is a cascade of unique yet, interrelated performance of the service components." (Bitner, 1993)	- performance of interrelated service components
"Quality of service for local public transport industry as a concept that involves those components of the service which affect its fitness for purpose, and indeed fitness for purpose, require detailed definition in relation to local objectives and circumstances." (Cavana, Corbett, & Lo, 2007)	- local objectives - circumstances
"service quality for public transport industry as the measures of accessibility, reliability, comfort, convenience and safety" (Silcock, 1981)	- Accessibility - convenience

These experts are also the users; hence their perception as both expert and user makes this research unique. Findings are based on the responses recorded from a designed questionnaire and on importance and satisfaction levels of the selected components by the Importance-Satisfaction Analysis. The method helps in prioritization of the components and thus can in turn help in defining focus area and efficient resource allocation.

The paper excludes the soft and intangible aspects of service quality related to human behavior. The study is conducted for Kharagpur Railway Station in West Bengal, India.

II. LITERATURE REVIEW

It has been observed that service quality at railway station is least researched in Indian scenario. There are two forces that dominate the service quality -improving and changing technological advancements and shift in regulatory environment. This has made the users more and more aware of their requirements and demand of higher standards services (Sachdev & Verma, 2004). They know the importance of the services and do not get satisfied easily, making service providers hard to measure and satisfy the needs. Hence it is essential to know that how sensitive users are to various service components. Thus, the need to evaluate service quality and improving it becomes prime important for users satisfaction. Service quality evaluation methods are used for quality monitoring, which involves the means and results for achieving the objective.

A. Defining Service Quality

Literature offers a variety of definitions to explain 'Service Quality' and **Error! Reference source not found.** represents few of the selected relevant ones.

B. Measuring Service Quality

An earlier study by Fisk(1981) divided the service evaluation process into three sequential stages: pre-consumption, consumption, and post-consumption. Walker(1995) incorporated the sequential idea in his model of service satisfaction that considered the evaluation process over time. In his study, the outcome of the evaluation is satisfaction, dissatisfaction, and also a neutral option which was not considered in Fisk's evaluation model. Considering other conceptual and empirical studies in the area, it appears that service quality incorporates users' experiences in multiple directions of which importance and satisfaction are the two most significant.

C. Understanding Importance-Satisfaction Model

The application of Importance-Satisfaction Model was based on the Importance-Performance Analysis developed by Martilla and James (1977). The performance has been replaced by satisfaction, since it considers that satisfaction has become the main measure of service quality. Tonge and Moore(2007)define performance as a measure of production that results in satisfaction. According to these authors, satisfaction provides information to analyze the performance on a results-based practice. When comparing the importance to the satisfaction of certain attributes, it identifies the areas in which to intervene and focus on service performance/satisfaction. Importance–Satisfaction Analysis (ISA) is a low-cost, easily understood way to organize information about the components of a service and provide intuitively appealing strategies for a service to set priorities for potential change. In this paper, the ISA technique refers to the process of determining a set of components that characterizes service quality of railway station, evaluating the importance of these components, evaluating the satisfaction levels of the condition of these components, and representing the scaled importance and satisfaction of each component on two axes of a grid for comparison. The labeling of the quadrants of the grid indicates strategic actions to be taken with respect to each component (Tyrrell & Okrant, 2004).

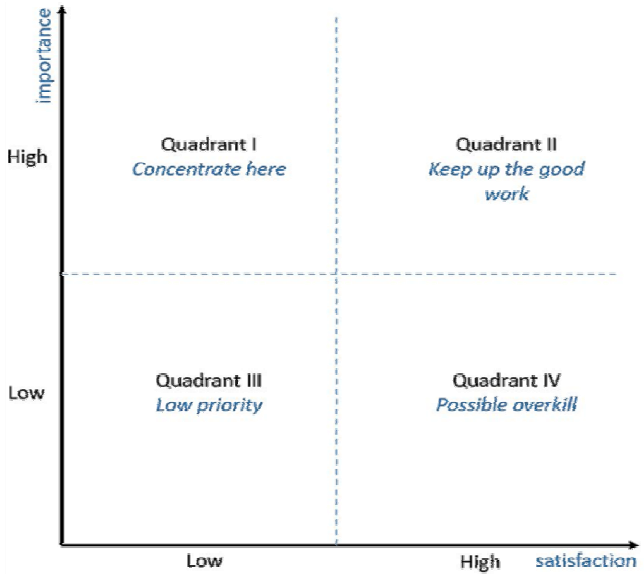

Fig. 1. I-S Model (Chen & Huang, 2011).

According to Boley, McGehee, & Hammett(2017) placing the cross-hair within the Importance-Satisfaction matrix is the most controversial limitation and suggests using the median values of the data for the placement of the cross-hairs. This technique of placing the cross-hair simply at the middle of the Likert scale is commonly referred as "scale-centered" ISA. "This is the most transparent way to place cross-hair "acknowledges (Oh, 2001). Hence in this analysis the crosshair on the graph will be at the median of the recorded data value.

D. Implication of the Quadrants of I-S Model

Quadrant I (concentrate here) is perceived to be high in importance to users having low performance. This quadrant suggests focused improvements. Quadrant II is (keep up the good work) perceived to be high in importance as well as in performance requiring less focus. Quadrant III (low priority) is perceived to have low performance and importance, limitation on resources is made in this section. Quadrant IV (possible overkill) has components of low importance but high on performance, a surplus resource allocation can be properly distributed on areas requiring more attention (Tzeng & Chang, 2011).

III. DATA COLLECTION

A questionnaire was designed for obtaining the perception of the experts regarding the two major attributes of the service quality at Kharagpur Railway Station, namely 'accessibility related characteristics' and 'infrastructure related amenities'. These two attributes were further divided into 14 components each. A five point Likert scale was adopted for obtaining the responses. The experts rated each component ranging from one to five in terms importance and satisfaction levels. For importance the rating ranged from 'very important' to 'very unimportant' and for satisfaction 'very satisfied' to 'very dissatisfied', scaling 5 to 1 respectively as shown in Table 2.

For the ease of answering, both importance and satisfaction levels were put one after another in questionnaire. In many researches these two levels are asked in two different sections which takes more time to answer the questions. The data are collected by expert sampling method and analyzed using MS-Excel and SPSS statistical software.

Table 2: Importance and Satisfaction Level rating on a five-point scale.

Rating	5	4	3	2	1
Importance	Very important	Important	Somewhat important	Unimportant	Very unimportant
Satisfaction	Very satisfied	Satisfied	Neither	Dissatisfied	Very dissatisfied

IV. DATA ANALYSIS

A. Experts' Profile

The survey was conducted at Divisional Railway Manager's (DRM) office Kharagpur, Kharagpur railway station and IIT Kharagpur and as many as 30 experts were identified ranging from railway's senior administrative staff like Senior Divisional Engineer Coordination, Senior Electrical Divisional Engineer Coordination, etc. to related faculty members and research scholars from IIT Kharagpur. Out of 30, 22 experts were males and 8 were females. Also, 15 of them were in the age group of 20-30 years, while 8 were from 30-40 years, 3 from 40-50 years and 4 from 50-60 years age group.

B. Descriptive Data Statistics

The means, standard deviation, and ranking as per the means of the importance and satisfaction level of the 14 components for the two attributes is calculated and depicted in Table 3**: Importance and satisfaction levels of access related characteristics.**

Mean value of 'Importance' in access related characteristics varies from 4.77 (Transition Area) to 3.76 (Porter) with the maximum standard deviation of 0.872 (Porter) while the 'Satisfaction' varies from 3.77 (Shading) to 2.63 (Barrier-free) with the maximum standard deviation of 1.189 (Escalator/Elevator).

Table 3: Importance and satisfaction levels of access related characteristics.

S. No.	Component	Importance Level			Satisfaction Level		
		Mean	S D	Rank	Mean	S D	Rank
A1	Parking Facility	4.67	0.479	4	3.23	0.935	5
A2	Transition Area	4.77	0.430	1	2.87	0.937	12
A3	Proximity	4.13	0.819	13	3.60	0.968	2
A4	Road Condition	4.43	0.626	9	3.57	1.073	3
A5	Floor Condition	4.37	0.718	11	3.27	0.944	4
A6	Conflict-free Approachability	4.53	0.681	7	2.87	0.860	12
A7	Circulation	4.67	0.479	4	2.97	0.999	10
A8	Porter	3.76	0.872	14	2.97	0.809	10
A9	Level Change	4.70	0.651	2	3.00	1.114	9
A10	Stairs	4.43	0.568	9	3.13	0.937	7
A11	FOB/ Underpass	4.70	0.466	2	3.20	1.126	6
A12	Elevator/ Escalator	4.50	0.682	8	3.03	1.189	8
A13	Shading	4.33	0.606	12	3.77	0.898	1
A14	Barrier-free	4.63	0.490	6	2.63	1.033	14

Table 4: Importance and satisfaction levels of infrastructure related amenities.

S. No.	Component	Importance Level			Satisfaction Level		
		Mean	S D	Rank	Mean	S D	Rank
B1	Security	4.83	0.461	3	2.63	1.159	9
B2	ATM	4.40	0.675	10	3.43	1.135	2
B3	Medicine	4.33	0.661	11	2.00	0.788	14
B4	Utility Shopping	3.83	0.747	13	2.53	0.730	12
B5	Ventilation	4.27	0.691	12	3.00	0.983	6
B6	Lighting	4.77	0.430	6	3.73	0.868	1
B7	Drinking Water	4.93	0.254	1	2.87	1.042	7
B8	Toilet	4.87	0.346	2	2.03	1.033	13
B9	Dustbin	4.80	0.484	5	2.57	1.073	10
B10	Internet	3.83	0.834	13	3.27	1.258	4
B11	Seating	4.70	0.466	7	3.03	1.033	5
B12	Announcement System	4.70	0.466	7	3.30	0.877	3

B13	Waiting Room	4.43	0.626	9	2.57	1.006	10
B14	Information Display	4.83	0.379	3	2.77	1.006	8

Mean value of 'Importance' in infrastructure related amenities varies from 4.93 (Drinking Water) to 3.83 (Utility Shopping & Internet) with the maximum standard deviation of 0.834 (Internet) while the 'Satisfaction' varies from 3.73 (Lighting) to 2.00 (Medicine) with the maximum standard deviation of 1.258 (Internet).

C. Data Reliability

Cronbach's Alpha has been used to measure the reliability and consistency of the data. Table 6**: Summary of ISM.** shows the values of Cronbach's alpha and its statistical interpretation. The value is more than 0.7 for all the cases, and thus, the opinion data collected during the survey is found to be statistically significantly consistent. Cronbach's Alpha expression- $\boldsymbol{\alpha = (N.\bar{c}) / v\square + (N-1).c\square}$Where N = the number of items, c□ = avg. covariance between item-pairs, and v□ = avg. variance.

Table 5: **Reliability Test - Cronbach's alpha values.**

Level	Attribute	α value	Statistical Interpretation
Importance	Access related characteristics	0.712	Acceptable *(0.8 >α> 0.7)*
Importance	Infrastructure related amenities	0.732	Acceptable *(0.8 >α> 0.7)*
Satisfaction	Access related characteristics	0.826	Good *(0.9 >α> 0.8)*
Satisfaction	Infrastructure related amenities	0.879	Good *(0.9 >α> 0.8)*

Table 6: Summary of ISM.

Quadrant	Access related characteristics	Infrastructure related amenities
Concentrate Here	• Barrier-free • Transition Area • Level Change • Circulation • Conflict-free Approachability	• Toilet • Dustbin • Security • Information Display • Drinking Water
Keep up the good work	• FOB/ Underpass • Parking Facility	• Lighting • Announcement System • Seating
Lower Priority	• Stairs • Elevator/ Escalator • Porter	• Waiting Room • Utility Shopping • Medicine
Possible Overkill	• Shading • Proximity • Road Condition • Floor Condition	• ATM • Internet • Ventilation

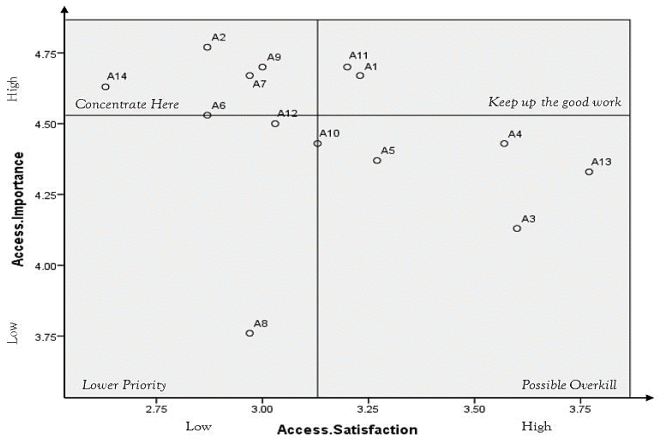

Fig. 2. ISM of Access related characteristics.

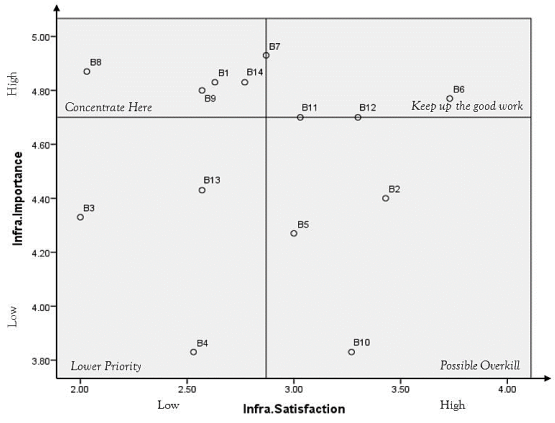

Fig. 3. ISM of Infrastructure related amenities.

D. Importance – Satisfaction Model Grid

The relative values of the components were plotted according to the Importance – Satisfaction Model. Crosshair was plotted on the median of the means of the importance and satisfaction levels of each component for the two attributes. Median values are used here to define the central tendency because a true interval scale may not always exist and thus mean values may not be truly representative. Fig. 2,

Fig. **3**, and **Error! Reference source not found.** represents the Importance – Satisfaction Model of 'access related characteristics' and 'infrastructure related components'.

V. CONCLUSION AND DISCUSSION

This study proposed Importance – Satisfaction Model for assessment of service quality at Kharagpur railway station for two major attributes – 'access related characteristics' and 'infrastructure related amenities'. The uniqueness of the study is that the analysis is based on the opinion from the experts, those experts who are also the users of the Kharagpur Railway station. The data collected was found to be statistically significant and also represented the service quality scenario at the station substantially proficient. It is noteworthy that components like ATM, internet, shading, etc., which are sufficiently available in the study area, are in the 'Possible Overkill' quadrant. In the access related characteristics the components with the major focus are barrier-free accessibility, transition area, level change, circulation, and conflict-free approachability. In the infrastructure related amenities, focus is need for toilets, dustbin, security, information display, and drinking water. Further, similar survey can be performed for the users and a comparison between the opinions of users and experts may help in better comprehending the assessment and augmentation of service quality components.

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