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SERVICE QUALITY ATTRIBUTES AFFECTING THE SATISFACTION OF RAILWAY PASSENGERS OF SELECTIVE ROUTE IN SOUTHWESTERN PART OF BANGLADESH

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Abstract
With increased pace of urbanization and economic growth, attraction and dependency between different linking regions has also increased. Transportation have performed very crucial roles from very early accelerating the sharing of economic and development benefit of connecting spatial regions. Railway has been proved as a potential sector for drawing economic and development benefits for various countries. But less emphasis have been given in improvement of railway sector mainly in railway service in Bangladesh compare with road and which cause failed to draw proper economic benefit from the sector. This study has aimed to focus on the railway transportation sector and to develop a model defining the relationship between overall satisfaction and service quality attributes in a selective route from Khulna to Rajshahi in southwestern zone of Bangladesh so that it can reinforce further improvement process. Findings show that, overall service satisfaction depend on eight distinct service quality attributes. It implies the service with worst situation, overall satisfaction of service and need for priority improvement to support further orientation, addition and betterment of service to draw maximum economic and development benefit for those linking regions.
Keywords: Urbanization, Economic growth, Attraction, Linking region, Overall satisfaction.

1. Introduction

Railway is very popular sector of transportation practice in Bangladesh because of low costing and enjoyable journey. It made a great contribution to solve the communication demand as well as the employment problems which have a significant effect in the national economy of Bangladesh. A large group of peoples are engaged with this subsector from staff to executive level to operate the whole system. However as it serving great amount of passengers, the quality of service is the main concerning issue in that way. So ensuring desire quality of service for the passenger of all groups is the main

challenge for this sector. Targeting this challenge to identify satisfaction situation regarding the present service quality is the main aim of this study.

Railway is a dominating enterprise over others in Bangladesh. It captures a large amount of land resource of this country. This sector share around 20% passengers among all transport sectors in Bangladesh, it is just after roadway which covers around 65% and waterway have a contribution of about 16% of total passengers. For freight transportation it covers around 16% on the other hand roadway cover 48% and waterway cover about 35% (ADB, 2000). Regarding the Khulna station of selected route, a total of 310157 passengers were traveled from July 2007 to May 2008 and it is increasing (Bangladesh Railway, 2008).

This study explores a relation between railway service quality attributes and customer satisfaction based on passenger perception. A model is developed which describe the relationship between overall satisfaction of service and the service attributes in different circumstances of passenger perspectives. Primarily, the service quality attributes enlisted through literature review and interviewing the passenger and experts, after that using factor analysis the service attributes those express the overall service situation is determined and last of all a model developed. Using this satisfaction model the overall satisfaction of the railway service can be depicted which will help to know the service situation and provide a guidelines in further service assessment, betterment and improvement process.

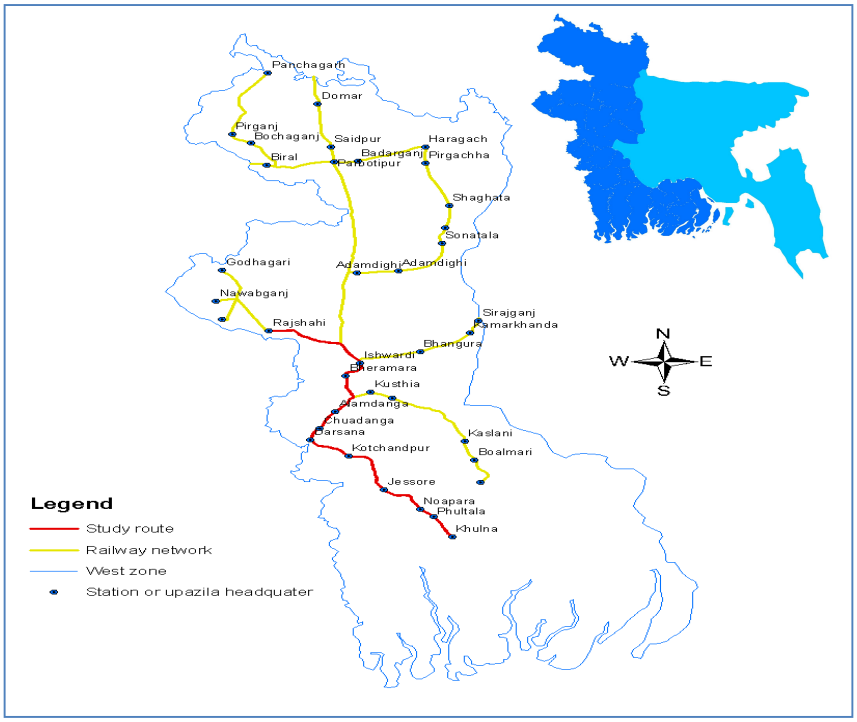

FIGURE 1: STUDY ROUTE (*KHULNA-JESSORE-ISHWARDI-RAJSHAHI)* (RHD, 2005)

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2. CONCEPT AND BACKGROUND

A study on railway passenger service quality valuation carried out from December 1999 to June 2000 by the organization named Steer Davies Gleave of London prepared for Shadow Strategic Rail Authority to study the importance of rail passengers into improvement of the range and quality of facilities and service on stations and in trains (Gleave, S. D., 2000). This study gives emphasis on monetary valuation of the improvement of service for a number of passenger groups. Key aim of this study to provides some robust parameters which can use in different circumstances of assessment of railway service. In subsequent steps of current study those parameters provide essential help to short out the service quality attributes which affect the passenger satisfaction of service regarding the particular study area. About 22 attributes were used to conduct the railway passenger quality valuation process which helps to identify the responsible attributes regarding the particular study.

Another study named service quality attributes affecting customer satisfaction for bus transit for measuring the relationship between global customer satisfaction and service attributes of public transport especially of bus transit for University of Calabria student to reach the campus from the urban area of Cossenza of southern Italy. A model proposed in this study which may useful to analyze the correlation between service quality attributes and identify the more convenient attributes for improving the supplies service (Fu, L. and Xin, Y. 2007). This study provides the methodological assistance to conduct current study to determine the relationship between rail passenger satisfaction and service attributes. Specifically multivariate technique, factor analysis, regression analysis and analysis of variance were used to estimate the interrelated dependency of attributes. In current study basically factor analysis and regression analysis used to draw the relationship between the satisfaction of service and service quality attributes of rail passengers.

Factor analysis introduced as very useful technique to summarize a large amount of data in manageable way. Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables (Lind, D. A. and Meson, R. D., 1994). Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. It may used to define a relationship among sets of many interrelated variables are examined and represented in terms of a few underlying factors (Malhotra, 2008). This technique is applicable to identify the underlying dimension or factors that explain the correlations among a set of variables (Eboli and Mazzulla, 2007). Factor analysis can

be employed to determine the brand attributes that influence consumer choice (Malhotra, 2008). In the current study this technique used to determine the factor those influence the quality of railway service.

The overall railway service is interdependent on the service attributes. The quality of those service attributes dominate the satisfaction of overall service of rail passengers and this relationship can be depict through a linear model stating overall satisfaction as dependent and others service attributes as independent variable. The regression model is found as most familiar option to draw the relationship between overall satisfaction and service attributes of railway.

3. DATA PROCESSING AND ANALYSIS

The sample survey was addressed to the rail passenger considering the Khulna-Jessor-Ishwardhi-Rajshahi route of southwestern part of Bangladesh. This selected route is very important corridor for west zone of Bangladesh. This survey conducted at October 2008 to a sample of 120 rail passengers. They were asked about their socioeconomic characteristics considering their origin, destination and purpose of trips and about the overall satisfaction on present service condition. To evaluate the rail service quality, the passenger was asked about 20 service attributes selected primarily through literature review, interview to the passenger and railway executives. On a scale from 1 to 5 denote the satisfaction level form very poor to very good, passenger asked to give satisfaction level regarding their perception of existing service condition. The specific cause underlying their choice also requested to describe. The primarily selected service quality attributes are listed as below:

TABLE 1: RAIL SERVICE QUALITY ATTRIBUTES:

Attributes		Attributes	
v1	waiting arrangement	v11	journey time
v2	seat condition	v12	Train announcement
v3	spacing among seats	v13	waiting arrangement
v4	spacing for moving on train	v14	ticketing time
v5	luggage storage facilities	v15	information availability
v6	window condition	v16	toilet facilities in the station
v7	environment inside the train	v17	security in the station
v8	condition of toilet inside the train	v18	safety caution
v9	fooding inside the train	v19	announcement in the station
v10	security inside the train	v20	behaviors of the staffs in the station

Collected data from field survey processed to conduct the factor analysis. Through factor analysis the service quality attributes which determine the satisfaction of rail service extracted in following way.

TABLE 2: COMMUNALITIES (A)

Attributes	Initial	Extraction	Attributes	Initial	Extraction
waiting time	.655	.716	journey time	.415	.474
seat condition	.526	.601	train announcement	.423	.345
spacing among seats	.439	.332	waiting arrangement	.608	.999
spacing for moving on train	.587	.893	ticketing time	.531	.526
luggage storage facilities	.387	.356	information availability	.466	.560
window condition	.465	.317	toilet facilities in the station	.505	.391
environment inside the train	.536	.851	security in the station	.503	.560
condition of toilet inside the train	.349	.463	safety caution	.560	.635
fooding inside the train	.464	.517	announcement in the station	.333	.283
security inside the train	.599	.890	behaviors of the staffs in the station	.444	.601

Extraction Method: Maximum Likelihood.
One or more communality estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

The above table shows the results obtain through factor analysis. Each value under column extraction shows the percentage of similar response by the passengers against each attributes. The value for waiting arrangement attributes shows that 99% passenger found with similar response about this attributes. It is 89% for spacing for moving train and for security inside the station and so for others.

TABLE 3: TOTAL VARIANCE EXPLAINED

Factor	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.580	17.900	17.900	1.987	9.937	9.937	1.747	8.737	8.737
2	2.513	12.567	30.467	2.166	10.828	20.766	1.687	8.434	17.171
3	2.017	10.083	40.549	2.086	10.429	31.195	1.449	7.243	24.414
4	1.603	8.015	48.565	1.005	5.024	36.218	1.433	7.164	31.578
5	1.299	6.496	55.061	1.673	8.365	44.583	1.401	7.003	38.582
6	1.288	6.441	61.502	.909	4.546	49.130	1.342	6.708	45.290
7	1.161	5.806	67.308	.769	3.844	52.973	1.239	6.197	51.487
8	1.006	5.031	72.339	.714	3.569	56.542	1.011	5.055	56.542

Extraction Method: Maximum Likelihood.

The table above shows the concept of determination of the number of factor those have to extract for subsequence analysis. From the above it can explain that the number of factor that needs to extract is 8 which have eigen values greater than 1. It also seen that those 8 factor cover around 56.5 % of total variance of rail service.

TABLE 4: ROTATED FACTOR MATRIX (A)

	Factor							
	1	2	3	4	5	6	7	8
waiting time	.126	.499	-.156	.001	.648	.170	.042	-.041
seat condition	.073	.201	.056	.016	.326	.314	.233	-.540
spacing among seats	.120	.524	-.079	.088	.000	.163	.042	.024
spacing for moving on train	-.093	.880	-.136	.021	.105	-.037	-.272	.065
luggage storage facilities	.221	.222	-.288	.140	.257	-.245	.156	.071
window condition	.410	-.215	.013	.189	.113	.181	.139	.035
environment inside the train	.143	.107	-.140	-.142	.095	.857	.126	-.139
condition of toilet inside the train	-.082	.091	.027	-.582	.051	.215	-.062	.236
fooding inside the train	.098	-.064	.267	-.008	.621	.059	.015	.134
security inside the train	.120	-.156	.887	-.002	.152	-.122	.083	-.140
journey time	.523	.155	-.025	-.026	.012	.027	-.085	-.011
train announcement	.528	.028	.022	.225	.099	.047	-.048	-.022
waiting arrangement	.663	.143	-.157	-.136	.417	-.024	-.696	.057
ticketing time	.181	.235	-.418	.430	-.029	.228	.008	.158
station information	.089	.027	-.022	.614	.245	.260	-.146	.158
toilet facilities in the station	-.060	-.153	.015	-.553	.085	.110	.129	-.148
security in the station	.070	-.081	.029	-.218	.145	.084	.686	-.045
safety caution	.575	-.032	.463	-.051	.026	.168	.184	.152
announcement in the station	.238	.210	.039	.093	.091	.348	-.001	.205
behaviors of the staffs in the station	.079	.168	-.131	.113	.287	.052	.030	.671

Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 16 iterations.

Above table shows the results obtain from the factor analysis after rotation of factor matrix. The method used for rotation of factors is varimax an orthogonal rotation. From this it can identify the attributes those have to extract by analysis. In this way 8 factors identified considering the high correlation with the factors. So, extracted 8 factors from the analysis are waiting time, spacing for moving on train, environment inside the train, security inside the train, waiting arrangement, station information, security in the station and behavior of staffs. In the way of calibrating satisfaction model those service attributes used as independent variables and overall satisfaction is dependent. The model result describes in table 5 and table 6.

TABLE 5: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.644(a)	.415	.301	.60071

a Predictors: (Constant), behaviors of the staffs in the station, environment inside the train, waiting arrangement, security inside the train, station information, spacing for moving on train, security in the station, waiting time for train.

TABLE 6: COEFFICIENTS (A)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.296	1.180		-1.945	.059
	waiting time for train	.090	.199	.076	.453	.653
	spacing for moving on train	.121	.137	.137	.886	.381
	environment inside the train	.276	.131	.282	2.103	.042
	security inside the train	.265	.121	.285	2.194	.034
	waiting arrangement	.296	.158	.275	1.872	.068
	station information	.263	.133	.265	1.984	.054
	security in the station	.115	.132	.135	.873	.388
	behaviors of the staffs in the station	.087	.126	.091	.694	.491

Dependent Variable: overall satisfaction on existing service.

From table 5 it seen that the coefficient of correlation (R) value 0.64 which describe strong relationship between variables and the coefficient of determinant (R^2) value describe that overall satisfaction will varied around 30% for variation in each of those six independent variables. Table 6 shows the value of constant and coefficient value of each attributes for satisfaction model. So the satisfaction model describe as below

Overall satisfaction = -2.89 + 0.08*(waiting time) + 0.14*(spacing for moving on train) + 0.29*(security inside the train) + 0.28*(waiting arrangement) + 0.27*(station information) + 0.14*(station security) + 0.09*(behavior of staff in the station)+ 0.28(train environment)

4. RESULT AND DISCUSSION

The relation between overall satisfaction and service quality attributes stated earlier through a satisfaction model. From this model it have observed that the satisfaction of railway service is depend on eight distinct service quality attributes and security inside the train is the worst among those because the coefficient of the security inside the train get high value which implies the service satisfaction is mostly dominated by the quality of this service attribute for the selected route. Also waiting arrangement and train environment found very near condition as like as train security, because both services get almost similar coefficient value like train security. Spacing for moving on train and station security found with the worst situation after these three service attributes. Behavior of the staffs and waiting time found with low coefficient value than others which implies that these two have less domination in overall service satisfaction. The passenger give more importance in security inside the train because it is most common of hijacking and lost of luggage or baggage when train stopped in different station and there is very low security patrol found inside the train, also in case of long journey majority of passenger sleeping on train. Station information that is availability of information about train schedule, arrival and departure time, other information are not well managed. It have seen that there is no assigned stuff or help point to provide information and staffs on ticketing room are not talking much except selling tickets. However in few stations it have found display board also display screen in some ticketing center but that can provide limited information only about fare and train schedule. Station waiting arrangement that is waiting room or shelter, it have observed in field that the seat capacity is very low and are not well arranged, also room environment are very unclean and clumsy. However it also seen that in some case waiting room area not open at all. Station security that is status of security patrol that can give protection form unwanted occurrences by hijackers, pickpockets etc. it have seen that at evening some drug addicted persons are moving on the station without any restriction. However there have some places in station which are not noticeable from the platform and also no restriction, checking for entry or moving on the station. Waiting time is found as important service to define the overall satisfaction of service because most of the passenger want to get their destination in lest time. Although it found as crucial service issue to determine the overall service satisfaction it is not much problematic one because the waiting time not varied much with out any worst case. Another important service issue that dominates the overall satisfaction level of passenger is environment inside the train. At field level survey it have observed that many waste like packets of dry food found on train floor also the floor were found very unclean. However, it have found by asking that cleaning of train are not maintain timely by the staffs. There also found other service with bad condition like fooding inside the train provided by very unhealthy kitchen which is not notice by passenger because of awareness and it also seen that in the

dining space there is no seat with any table. In few stations it have observe that the height of train floor from station platform is much higher than normal range which create problems during uploading, unloading and riding on the train and there is enough possibility to happening an accident at the time of emergency riding like riding on slow running train. Few scenarios of railway service regarding the selective route present through following pictures:

FIGURE 1: WAITING ARRANGEMENT –VERY LOW SEAT CAPACITY

FIGURE 2: WAITING ARRANGEMENT- CLOSED

FIGURE 3: VERY UNHYGIENIC KITCHEN

FIGURE 4: NO SEAT IN DINING SPACE

FIGURE 5: HEIGHT BETWEEN PLATFORM AND TRAIN FLOOR IS MUCH

5. CONCLUDING REMARK

With increase of transportation demand in this route, excessive pressure on railway service has emerged. But with increasing demand of service no betterment initiative have been performed simultaneously. However in most case the existing service quality has not observed at satisfactory provision. Although large amount of passengers of different income have dependency on this sector, so it need further improvement of this service so that more passenger may attract to used this service. The satisfaction model will be helpful to determine the overall satisfaction that is overall situation of existing rail service in different circumstances which provide the guidelines in further assessment, betterment and improvement process. It will provide a mean of measuring the passenger perception in terms of rail service quality which help to assess the efficiency of supply side of service.

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