Assessing the Service Quality of Public Transport Service: A Case of S-5 route in Kathmandu Valley

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Abstract

Public Transport is a shared passenger transport service available for use by anyone who pays set fares, operates on fixed routes and may include modes such as tempos, mini/micro buses, trolley buses, trams, trains. Besides reducing congestion and air pollution by providing transportation services to a large number of people, high capacity public transport system may also influence the urban form and quality of life in cities. The main objective of this research is to access the service quality of public transport services of S-5 route and recommend possible measures to improve public transport service quality. The findings of this paper can help in better understanding of the parameters influencing service quality. Questionnaire survey was conducted and 107 passengers were interviewed regarding their perception on public transport service. The indicators used to measure service quality of public transport service were Service reliability, comfort, security, safety, cleanliness, waiting time, walking time, peak hour frequency, off-peak hour frequency, route change, fare, staff behavior, Driver's recklessness, information and feedback. It was analyzed using likert's scale from 1-5 rating. The overall service quality of public transport service is found to be 3.14 which indicates good service quality. Data analysis showed peak hour service frequency and service reliability were of poor service quality while cleanliness, information, waiting time were of average service quality. So these aspects of public transport service should be reviewed and improved to improve the service quality of public transport in S-5 route in Kathmandu valley.

Keywords

Public Transport Service, Service Quality, People's Perception

1. Introduction

Public Transport is a shared passenger transport service available for use by anyone who pays set fares, operates on fixed routes and may include modes such as tempos, mini/micro buses, trolley buses, trams, trains. According to National Express Transit(2017), Public transportation systems bring many benefits to individuals, communities, and the local economy, but all too often, they don't get near the amount of attention that they should while it may benefits communities financially, reduce air pollution, increase fuel efficiency per passenger, reduce traffic congestion, saves travel cost, increase mobility and various other health and safety benefits [1]. Besides reducing congestion and air pollution by providing transportation services to a large number of people, high capacity public transport system may also influence the urban form and quality of life in cities. In Kathmandu, the use of public transport is declining and people are shifting towards other modes such as motorbikes and private cars. According to DoTM(2018), public transport constitutes only 2.75% of total passenger vehicles while almost 78.5% of the registered vehicles in the valley are two-wheelers. The population of other vehicle including private, government and diplomat vehicle accounts 97.25% of the total registered transport fleet.

According to survey conducted by Clean Air Network Nepal(2014) in Kathmandu valley, 57.7% of passengers were not happy with the travel time in public transport, 30.5% of people said that they have to wait for more than 10 minutes during morning peak hour to get a ride and 69.1% of surveyed passengers perceive that the public transport drivers practice reckless driving making travel uncomfortable [2].

More and more people are shifting from riding public transport to cars and motorbikes causing further congestion. The increased private vehicles cause the extended road width used up and causing never ending solution by extension of road width.

The key urban transport requirements in Kathmandu valley are management of travel demand modes of transport along with fair allocation of road space, in favor of pedestrians and public transport. This study gives some solution for public transportation for ensuring safety, comfort and easy services. Public transport system of Kathmandu are running through various operators without proper ticketing system, time schedule, interconnection, bus stations and fare as a result public do not consider public transport as proper means of transport. So to improve the quality of public transport service, first it should be evaluated, analyzed then look forward for improvements. The findings of this paper can help in better understanding of the parameters influencing service quality and the existing public transportation service quality of S-5 route. The finding can be further used by the government or private agencies with an aim to improve public transportation.

2. Research Objective

The objective of this research is to assess the service quality of public transportation services and recommend the possible measures to improve the service quality.

3. Literature Review

Quality of service is defined as the overall measured or perceived performance of transit from the passenger's point of view. Service quality measures reflect two important aspect of transit service one, the degree to which transit service is available to given locations and second, the comfort and convenience of the service provided to passenger. Quality of service measures differ from both traditional highway service quality measures, which are more vehicle-oriented than person-oriented, and form the numerous utilization and economic performance measures routinely collected by the transit industry, which tend to reflect the transit operator's variable of Level of service concept.

According to Eboli and Mazzulla (2008), service quality can be on the basis of transit user judgments

[3]. These judgments, which can be considered a subjective measure of service quality, generally derive from the well-known Customer Satisfaction Surveys (CSS), which help transit operators to identify which service quality factors are considered the most important by their customers. Customer judgments can be expressed in terms of expectations, which represent what customers expect of the service, and perceptions, which represent what customers receive from the service. Service quality measurement based on customer opinions allows the perceived performances of a given transit service to be analyzed. The main disadvantages of this type of measure are the strong subjectivity of transit users' judgments and the failure to take non-users' perceptions into account.

For the evaluation of service quality, it is necessary to know the indicators for the evaluation based on perception of users. There are many literatures available for the study of indicators of service quality and Eboli and Mazzulla(2008) considers following indicators to be relevant to measure the service quality [3],

1. **Service Availability**
   The attributes belonging to this category of service aspects are represented by characteristics of the route of the bus line in terms of path and coverage, number of bus stops, distance between bus stops, location of the bus stops, and characteristics of the service, like service frequency, span of service, travel time, need for transfers.

2. **Service Reliability**
   Service reliability is one of the most investigated transit service aspects and it is considered as a very important aspect for the transit users. Public transit agencies have developed multiple indicators to measure service reliability, but the three most common measures are on-time performance, headway regularity and running time adherence.

3. **Comfort**
   Comfort during the journey is important for transit users, both the physical comfort regarding vehicles and comfort regarding ambient conditions on board or at stops. Comfort on board means having soft and clean seats, comfortable temperature, not many people on board, smoothness of the bus ride, low levels of noise and vibrations, not nasty odours.

4. **Cleanliness**
   The indicators regarding cleanliness refer to the physical condition of vehicles and facilities, and

specifically the cleanliness of the bus interior and exterior, having buses and shelters clean of graffiti, cleanliness of seating and windows, and so on. Every transit agency performs the cleaning of bus interiors on a daily basis, even if only to remove coarse refuse such as bottles and newspapers. As a consequence, transit agencies could perform periodic detailed cleaning of the entire bus, which includes the interior. Depending on the agency, detailed cleaning is performed monthly, quarterly, or annually; the level of detailed cleaning depends on how much is daily done as part of the service line function.

5. **Safety and security**
   The aspect linked to safety indicates the degree of safety from crime or accidents and the feeling of security resulting from psychological factors; therefore, this aspect refers not only to safety from crimes while riding or at bus stops and from accidents, but also to safety related to the behaviour of other persons and to the bus operation. Generally, the term "safety" is used to indicate the possibility of being involved in a road accident, while the term "security" refers to the possibility of becoming the victim of a crime.

6. **Fare**
   The service aspect regarding fare includes characteristics of the monetary cost of the journey by bus, like the cost of a one-way ride, the cost of a transfer, the availability of discounted fares (e.g. for students), the availability of volume discounts (e.g. for monthly passes), the cost of parking at bus stops.

7. **Information**
   Another service aspect affecting transit service quality is linked to the availability of information pertinent to the planning and execution of a journey. Passengers need to know how to use transit service, where the access is located, where to get off in the proximity of their destination, whether any transfers are required, and when transit services are scheduled to depart and arrive. Without this information, potential passengers will not be able to use transit service.

8. **Customer care**
   Customer care includes those elements needed to make easier and more pleasant the journey, like courtesy and knowledge of drivers, courtesy and helpfulness of ticket agents, personnel appearance, together with elements linked to the easiness of

purchasing tickets or paying fare, presence and condition of the ticket issuing and validation machines, and effectiveness of the ticket selling network.

9. **Environmental Impacts**
   The service aspect regarding the impacts of the bus systems on the environment includes effects in terms of emissions, noise, visual pollution, vibration, dust and dirt, odour, waste, but also effect of vibrations on road and natural resources consumption in terms of energy or space. In the scientific literature, there is a considerable amount of models and procedures which allow the effects of the transport systems to be quantified, especially in terms of pollution and noise. In order to obtain some indicators one can refers to the well-known literature of the specific sector.

4. Methodology

The research follows Post-Positivist Paradigm, Case-Study research strategy and Inductive approach. It includes both primary and secondary data collection. The population for questionnaire survey is considered to be infinite. The sample size was calculated using standard sample size calculation formula with confidence 95% and confidence interval of 10%. From the calculation the sample size for the passengers are determined as 96. The questionnaire survey was done by interviewing people inside bus as it was difficult to recognize the people on the stops and there was more chance of interruption in interview due to bus arrivals. As far as possible the latest on-board passengers were interviewed so as to include samples from each stops.

A short questionnaire survey designed to be easily administered while actually taking public transport was developed based on the information from the initial field observation. It was simplified and questionnaire was prepared to measure the service quality of public transport. The survey was administered between 9 am to 7 pm for 3 working days and included 107 respondents. The study tries to understand the perception of people on different indicators of transport service quality and experience of problems with public transport. The indicators used to measure perception on service quality of public transport are Reliability, comfort, security, cleanliness, waiting time, walking time, peak hour frequency, off-peak hour frequency, reorganization, fare, staff

behavior, Driver's recklessness, information and feedback on customer service. The questionnaire was divided in two section, first section includes the profile of passengers and second section includes the perception of passengers on different indicators of service quality of public transportation service.

The data surveyed and collected were arranged in format. Thus obtained data were analyzed using MS Excel and SPSS. Likert's scale rating method was used to scale the perception of passengers on public transportation services. The questionnaire survey was analyzed in two section, passengers profile and passengers perception. Passengers profile are analyzed using frequency table and pie chart while passenger's perception was scaled using likert's scale with 1-5 rating scale. Every perception based questionnaire was rated 1 for first opinion and rated 5 for 5th opinion where 1 being the worst and 5 being the best. The Average score was calculated as mean and categorized using Table 1. Average score of all indicators was calculated and overall average score was calculate to measure overall service quality of public transport for user's perspective.

Table 1: Level of Service based on Likert's scale

LOS	Mean Score	Service Quality
A	=1	Worse
B	>1 and <=2	Poor
C	>2 and <=3	Average
D	>3 and <=4	Good
E	>4 and <=5	Excellent

5. Study Area

The study area is selected to be S-5 route of Kathmandu valley which is the pilot route of KSUT project which runs from Sinamangal to New Buspark through CBD. It provides an alternative alignment to Primary Route P-5 for passengers between Sinamangal and New Bus Park. The route Map is shown in figure 1.

The route is 10.1 Km long from sinamangal to New Buspark and 9.2 Km long from New Buspark to Sinamangal. This route is previously served by micro and tempo which has been replaced by 9m long buses with capacity of 55(25 seats and 30 standing). As this route is pilot route of KSUT project [4] to improve the quality of service provided to public so the route is selected to assess the service quality and recommend the possible measures to further improve the quality
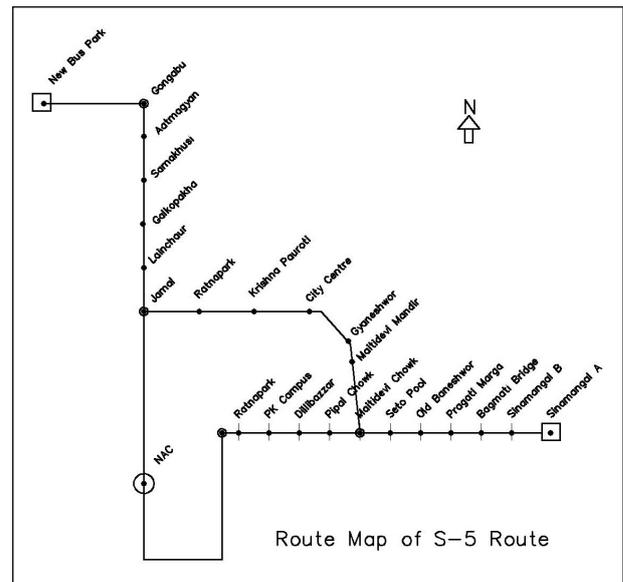
of public transport services.

Figure 1: Route Map of S-5 Route

6. Data Sets and Analysis

6.1 Passenger's Profile

From the survey of 107 respondents, 75% of respondents were male and 25% were female, 62% were from age group 15-30 years while 33% were from age group 31-50 years and 5% were from age group 51-65 years. Further it was found that 36% were students, 21% were service holders, 10% of passengers were unemployed and rest of passenger's occupation is shown in table 2.

Table 2: Occupation of passengers

Occupation	Frequency	Percent
Student	39	36.4
Retired	7	6.5
Informal Worker	2	1.9
Housewife	6	5.6
Business	10	9.3
Proffessional	7	6.5
Service	22	20.6
Unemployed	11	10.3
Others	3	2.8
Total	107	100

Majority of the passengers, 52% were travelling for work purpose while 18% were travelling for education purpose and rest were travelling for recreation, business and treatment purposes. Among the respondents 52% were from income group less than 15000 while 34% were from income group 15000-30000 and 11% were from income group 30000-45000. Almost 68% of the passengers travel

daily using public transport, 27% travels number of times during week and 5% travels number of times during month. Around 9% of the respondents owns driving license and among them 70% owns a vehicle like scooter, motorbike and cars.

6.2 Passenger's Perception

From the survey of 107 respondents, perception on different indicators of service quality were measured using likert's scale on rating between 1-5.The frequency of score for all the indicators of service quality is shown in table 3 below and their average score are calculated. The mean of average score of all the indicators is calculated to measure overall service quality of public transport.

Table 3: Overall Rating of Service Quality

SN	Description	Score					Average score
		1	2	3	4	5	
1	Comfort	0	3	7	96	1	3.89
2	Cleanliness	0	26	64	17	0	2.92
3	Security	0	3	15	89	0	3.8
4	Walking time	0	4	28	43	32	3.96
5	Waiting time	4	12	75	14	2	2.94
6	Staff behaviour	0	4	59	44	0	3.37
7	Driving Reclessness	1	5	73	28	0	3.19
8	Route Change	0	3	57	47	0	3.41
9	Information	1	7	90	9	0	2.99
10	Fare	0	3	17	87	0	3.79
11	Peak Frequency	3	99	5	0	0	1.99
12	Off-peak Frequency	0	0	80	27	0	3.25
13	Reliability	85	17	4	1	0	1.26
14	Feedback	0	3	79	25	0	3.24
	Average Score						3.14

7. Findings and Discussion

From the analysis of people's perception on different measures of service quality, it was found that almost 90% of the passengers felt comfortable, 6.5% of passengers felt average and 3% of passengers felt uncomfortable. The mean score for comfort was calculated as 3.89 which indicats good service quality in terms of comfort. Further it was found that 60% of passengers felt neither clean nor unclean, 24% of the passengers felt it unclean and 16% of passengers found the public transport clean. The mean score for cleanliness was calculated as 2.92 which indicate average service quality in terms of cleanliness. For high quality service walking time should be less than 5 min for walking about 400m distance. It was found that 40% of passengers have to walk for around 5-10 minutes, 30% of passengers have to walk for less than

5 minutes, 26% of passengers have to walk 10-15 minutes and only 4% have to walk more than 15 minutes. The mean score for walking time was calculated as 3.96 which indicate good service quality in terms of walking time. People often prefer not to choose public transport due to excessive waiting time at stops. It was found that 70% of the people say they have to wait 6-9 minutes, 13% of people have to wait 3-6 minutes, 11% of people have to wait 9-12 minutes, 4% of people have to wait more than 12 minutes and 2% of people have to wait for less than 3 minutes. The mean score for waiting time was calculated as 2.94 which indicate average service quality in terms of waiting time.

One of the most important measures of service quality of public transport is security. It was found that 80% of passengers felt secured, 14% felt neither secured nor unsecured and 3% felt unsecured. The mean score for security was calculated as 3.80 which indicate good service quality in terms of security. Service frequency should vary according to hour of the day. During peak hours there are more demand so frequency needs to be high in peak hours. So, two measures of service frequency and off-peak hour frequency were taken. In case of peak hour frequency, 93% of passengers felt that service is infrequent, 5% felt that service is neither infrequent nor frequent and 2% felt that service is very infrequent. The mean score for peak hour frequency was calculated as 1.99 which indicates poor service quality in terms of peak hour frequency. In case of off-peak hour frequency, 75% of people felt the service is neither frequent nor infrequent and 25% of people believe the service is frequent. The mean score for off-peak hour frequency was calculated as 3.25 which indicate good service quality in terms of service frequency in off-peak hours. Further it was found that, 81% of people felt the fare is reasonable, 16% of people felt that fare is neither reasonable nor unreasonable and 3% felt fare is unreasonable. The mean score for fare was calculated as 3.79 which indicate good service quality in terms of fare. The information provided also has an influence on service quality of public transport as it is easy to travel along the route with adequate information about the route. It was found that 84% of people neither agreed nor disagreed, 8% of people agreed, 7% of people disagreed and 1% of people strongly disagreed on adequate information provided. The mean score for information provided was calculated as 2.99 which indicate average service quality of public transport in terms of information

provided.

Service reliability was measured in terms on-schedule service of public transport. It was found that 79% strongly disagreed, 16% disagreed, 4% neither agreed nor disagreed and 1% agreed on on-schedule service of public transport. The mean score for service reliability was calculated as 1.26 which indicates poor service quality in terms of service reliability. In case of staff behavior it was found that, 55% of people felt average, 41% of people felt good and 4% of people felt bad behavior of staff. The mean score for staff was calculated as 3.37 which indicate good service quality in terms of staff behavior. In case of driver's recklessness it was found that, 68% neither agreed nor disagreed, 26% disagreed, 5% agreed and 1% strongly agreed on driving recklessness. The mean score for driving recklessness was calculated as 3.19 which indicate good service quality in terms of Driving Recklessness. Inquiring about easiness for route change/reorganization it was found that, 53% felt neither easy nor difficult, 44% felt easy and 3% felt difficult to change route/reorganize. The mean score for route change was calculated as 3.41 which indicate good service quality in terms of route change. In case of feedback on customer service it was found that, 74% of passengers felt neither bad nor good, 23% of people felt good and 3% of people felt bad on the customer service provided. The mean score for feedback on customer service provided was calculated as 3.21 which indicate good service quality in terms of customer service provided. Further it was observed that ticketing system was initially used but during the survey period it was not available due to some problem in ticketing system technology.

Considering all the indicators of service quality used mean of all average score was calculated to be 3.14 which indicates good overall service quality of public transport. Even though overall service quality was found to be good but some of the services regarding service reliability is poor, cleanliness was average, information provided is average and service frequency in peak hour is found to be poor. So these aspects of public transport service should be reviewed and improved to improve the service quality of public transport in S-5 route in Kathmandu valley.

8. Conclusion and Recommendation

Although the overall service quality of public transport service of S-5 route in Kathmandu valley

was found to be of Good service quality but some indicators like service reliability and peak hour frequency are of poor LOS and cleanliness and information provided are on average LOS. To Improve the service quality of public transport service in this route, the proper schedule of buses should be maintained so that people can easily plan their journey based on the schedule, the frequency during peak hour seems to be low which is not offering services to all the people wanting the service at that time so it should be increased so that all the passengers in the route can gain the services of public transport, cleanliness was found to be average and to improve it buses need to cleaned daily and if possible during every cycle it must be minor cleaned, Information provided was on average so it can be improved by providing information about the route and the destinations arrivals and nearness and information about the buses on stops. It was observed that due to lack of ticketing system, extra time was being consumed for collecting fares from passengers and causing delay in travel time. Proper Ticketing system should be implemented and if possible provision of membership holder for customers should be implemented. So these measures should be worked out to improve the service quality of public transport service in S-5 route.

This study was conducted under following limitaions:

- The mechanical condition of vehicles are not considered.
- The environmental impacts of public transportation service are not considered.
- The service quality of public transportation service is evaluated on the basis of passenger's perception only.

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