



# A CASE STUDY ON PUBLIC TRANSPORT SERVICE IN URBAN AREAS

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## ABSTRACT

Present study on detailed examination of a quality of service indicator utilised by the APSRTC to assess the opinions of passengers towards bus transport. The quality of service indicator takes the form of a 20 item opinion scale which covers an array of service aspects. Regression analysis is used to identify hidden constructs which are present within this scale. It is identified some of the factors covering convenience, environment and ease of use issues towards perceived quality of bus service. The study will be useful in explaining variations of bus transport satisfaction. Results of the analysis may suggest regarding quality of bus service vary significantly across passenger groups, with females having a tendency to exhibit relatively negative opinions regarding the quality of the APSRTC environment with a similar finding will be observed in the case of passengers who are looking after the home and family. In addition, peoples suggestions towards improvements to service frequency, availability, reliability and stability will likely increase perceived satisfaction amongst existing passengers. At a more general level, the study demonstrates the level of additional knowledge which can be attained through more detailed analysis of existing transport policy data.

**Keywords:** comfort, passengers, perception, regression, quality.

## 1. INTRODUCTION

Andhra Pradesh State Road Transport Corporation (or APSRTC) is the state-owned road transport corporation in the Indian state of Andhra Pradesh. Its headquarters are located at NTR Administrative Block of RTC House in Pandit Nehru bus station of Vijayawada. Many other Indian metro towns in Telangana, Tamil Nadu, Karnataka, Odisha, Yanam and Chattisgarh are also linked with the service.

APSRTC was formed on 11 January 1958 as per Road Transport Corporations Act 1950. Earlier, it was a part of Nizam State Rail and Road Transport Department. Consequent upon bifurcation of Andhra Pradesh state into Telangana and residual Andhra Pradesh, TSRTC operated as a separate entity from 03.06.2015. APSRTC working Vijayawada (Pandit Nehru Bus Stand) as Headquarters 13 district New State of ANDHRA PRADESH.

The organisation is divided into twelve Regional Managers with four zones. It has a total of 11,678 buses (government-owned 8964; hire on rental 2714) operating in 44.15 lakh kilometres and has a total of 426 bus stations and 126 bus depots.

### Guiding Principles of APSRTC

- To provide efficient, effective, ethical management of the business.
- To assist the State administration in attaining good governance. To treat the customer, i.e. passenger, as a central aim of the Corporation's business and provide the best likely facility.
- To explore and exploit technological, financial and managerial opportunities and developments and render the business cost effective at all times.

### 1.1 Vijayawada

Vijayawada is a city in the Andhra Pradesh Capital Region, on the banks of River Krishna in Krishna

district. The city is the third most compactly populated in the urban population of urbanized areas in the world and is the second major city in Andhra Pradesh by population.

As of 2011 Census of India, the city had a population of 1,476,931. The total population constituted 524, 918 males and 523, 322 females for a sex ratio of 997 females per 1000 males higher than the national average of 940 per 1000. 92,848 children were in the age group of 0-6 years, in that 47, 582 were boys and 45,266 were girls: the ratio is 951 per 1000. The average literacy rate stood at 82.59% (male 86.25%; female 78.94%) with 789,038 literates, significantly higher than the national average of 73.00%. Vijayawada is one of the most compactly populated cities with about 31,200 people per square km.

The main modes of intra-city public transport are city buses and auto rickshaws. Apart from these, other means of transport are motorcycles, cycle rickshaws, and bicycles. The PNBS and the Vijayawada railway station are the major transport organization in the city for road and rail transport. Also two more are other modes of transport organizations i.e., Autonagar bus terminal and city bus port. Another nearest railway station to Vijayawada is Krishna canal Junction. The Pandit Nehru bus station is the administrative headquarters of APSRTC, which is ranked as the fourth largest and busiest bus terminals in the country. The Vijayawada City Division of APSRTC operates close to 450 buses for an average of 300,000 daily commuting passengers and is supported by BRTS corridors. The two main National Highways of NH16 (Old NH5) and NH-65 (previously designated as NH-9) provides access to other states. National Highway 30 from Jagdalpur of Chhattisgarh terminates near the city suburb of Ibrahimpatnam. The Inner Ring Road connects NH 16 and 65 to serve the main purpose of easing traffic congestion. The city has a entire road length of 1,264.24 km (785.56 mi), casing1, 230.00 km (764.29 mi) of municipal roads, 22.74 km (14.13 mi) of R&B department



roads, 11.50 km (7.15 mi) of National Highways. M.G. Road and Eluru road are the key arterial roads of the city. Benz Circle is one of the busiest road junctions in the city with an average of 57,000 vehicles crossing daily; the junction has the intersection of two national highways of NH 16 and NH 65.

### 1.2 Guntur

Guntur district is an administrative district in the Coastal Andhra region of the Indian state of Andhra Pradesh. The administrative building of the district is located at Guntur, the major city of the district in positions of area and population. It has a coastline of approximately 100 km and is situated on the right bank of Krishna River that separates it from Krishna district and extends till it empties into the Bay of Bengal. It is limited on the south by Prakasam district and to west by the state of Telangana. It has an area of 11,391 km<sup>2</sup> and is the second most populous district in the state, with a population of 4, 889, 230 as per 2011 census of India. The district is often mentioned to as the Land of Chillies. It is also a main centre for agriculture, education and learning. It exports large quantities of chillies and tobacco.

As of 2011 census of India, the district had a population of 4,887,813 with a density of 193 persons per sq.km. The total population found 2, 447, 292 females and 2,440,521 males. The total urban population is 16, 52, 738 (33.81%) with a literacy rate of 67.40%.

The total of main road network of the district is 1,274.632 km. It comprises 458.230 km of existing and a proposed length of 816.403 km. There exists 406 km of rail network in the district.

### 1.3 Vuyyuru

Vuyyuru is a town in Krishna district, state of Andhra Pradesh. Under Nuzvid revenue division, has Nagar panchayat and headquarters of VuyyuruMandal.

As of 2015 Census of India, the town had a population of 46,490. The total population constitutes 23, 178 females and 23,312 male. The town's average literacy rate is 81.87% with 34,513 literates.

It is located on the National Highway 9. APSRTC functions buses from Vuyyuru bus station which has a bus depot. The town has a total road length of 64.14 km.

## 2. METHODOLOGY

### 2.1 Data Collection

Various studies are conducted on quality of public transport system in and around the world. Few of the research papers are collected and reviewed for the present study. These research papers are collected from various sources such as engineering journals and through internet from various research sites.

For the present work, the sources for data collection such as Vijayawada (PNBS), Guntur, and Vuyyuru.

## 2.2 Samples Collection

### 2.2.1 Collection of samples in Vijayawada (PNBS) bus stand

Vijayawada is the most populous city in Andhra Pradesh state of India. This city is famous for its resources. It is also a major centre for employment, education and learning. On the basis of survey, the males and females percentage is obtained. As now it is a capital city the population has been increased like never before. As the Vijayawada is the centre for employment, education and commercial purposes, most of the people from other cities, villages and districts travel to Vijayawada through bus transport.

We have surveyed the people based on different categories such as comfort, safety, economical, frequency, routes, timings, near to drop point, arrival, departure, morning services, evening services, travelling time, information of buses, information of routes, help desk condition, ticket fare, ticket collection, urinal facilities, platform information, food facilities, driver behaviour, conductor behaviour, bus neatness, wifi facilities. Regarding the above questionnaire the study analysed the customer perceptions of the public transport.

### 2.2.2 Collection of samples in Guntur

Guntur is the third most populous city in Andhra Pradesh state of India. The district is often mentioned to as the Land of Chillies. It is also a main centre for agriculture, education and learning. For the present work, it is surveyed the people based on different categories.

### 2.2.3 Collection of samples in Vuyyuru

Vuyyuru is a mandal where most of the people travel to urban areas daily for their source of income, employment, educational purposes. Vuyyuru Mandal has been developed to a great extent where the population growth is rapidly increased compared to the previous census. For the present work, it is surveyed the people based on different categories.

## 3. ANALYSIS

### 3.1 Vijayawada (PNBS) Analysis

#### 3.1.1 Survey based on gender

Vijayawada is the most populous city in Andhra Pradesh state of India. This city is famous for its resources. It is also a major centre for employment, education and learning. A total of 1000 samples was collected through Survey. Aarithmetricgraphic analysis of the sample was carried out. The sample was spread over 54 percent of male and 46 percent of female respondents as shown in the Figure-3.1.1:

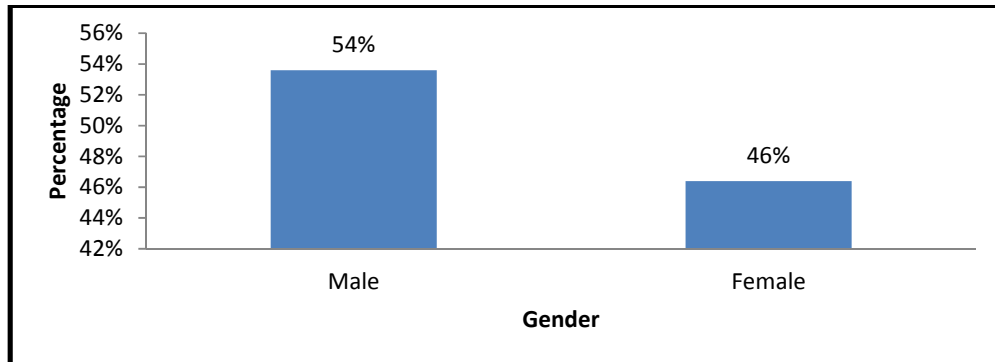


Figure-3.1.1. Gender wise percentage at PNBS.

**3.1.2 Survey based on age groups**

The samples surveyed different age groups of people, in that 40 percent was between 16 to 24 years old; 20 percent was between 25 to 34 years old; 15 percent was between 35 to 44 years old; 12 percent was between 45 to

59 years old; 7 percent was between 60 to 74; 6 percent was between 75+ years old. As the age group between 16 to 24 were students, they were using the bus transport as their medium to reach their destinations daily as shown in the Figure-3.1.2.

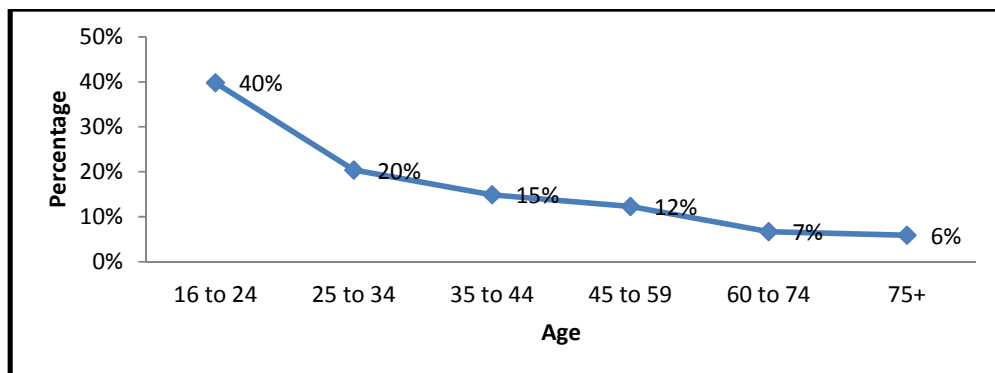


Figure-3.1.2. Age group at PNBS.

**3.1.3 Survey based on Vijayawada economic criteria**

The study surveyed and collected information from different types of people based on their financial status. As Vijayawada is announced as capital city many of the industries, companies, hotels, shopping malls, have been established. As the increase in industries, companies, and hotels the employment rate is also increased in

Vijayawada. Based on the survey, 28 percent was spread over Employed; 10 percent was spread over looking after home or family; 14 percent was spread over Retired; 8 percent was spread over Unemployed/seeking work; 41 percent was spread over Education/Training as shown in the Figure-3.1.3:

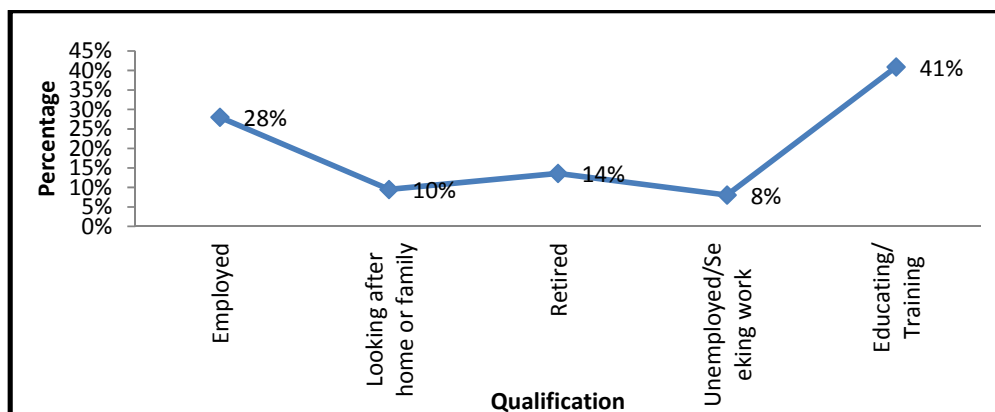


Figure-3.1.3. Economic criteria of PNBS.



**3.1.4 Survey based on questionnaire**

The study surveyed the people based on different categories such as comfort, safety, economical, frequency, routes, timings, near to drop point, arrival, departure, morning services, evening services, travelling time, information of buses, information of routes, help desk

condition, ticket fare, ticket collection, urinal facilities, platform information, food facilities, driver behaviour, conductor behaviour, bus neatness, wifi facilities. Regarding the above questionnaire we have analyzed the customer perceptions of the public transport as shown in the Figure-3.1.4:

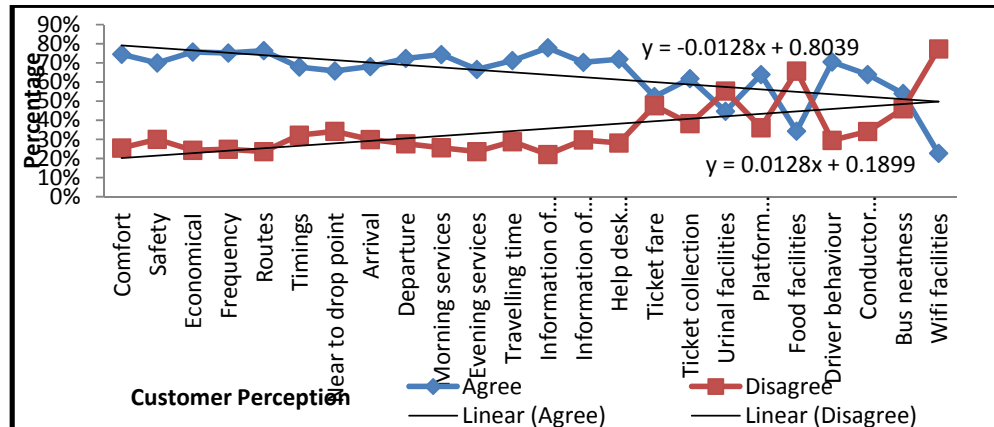


Figure-3.1.4. Questionnaire at PNBS.

**3.2 Guntur Analysis**

**3.2.1 Survey based on gender**

Guntur is the third most populous city in Andhra Pradesh state of India. The district is often mentioned to as the Land of Chillies. It is also a main centre for

agriculture, education and learning. A total of 150 samples was collected through Survey. Aarithmetricgraphic analysis of the sample was carried out. The sample was spread over 74 percent of male and 26 percent of female respondents as shown in the Figure-3.2.1:

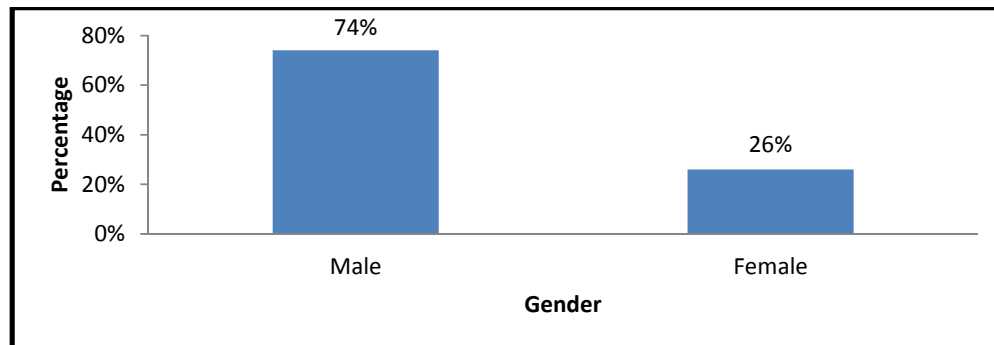


Figure-3.2.1. Genderwise percentage at Guntur.

**3.2.2 Survey based on age groups**

The samples surveyed different age groups of people, in that 41 percent was between 16 to 24 years old; 24 percent was between 25 to 34 years old; 18 percent was between 35 to 44 years old; 9 percent was between 45 to

59 years old; 6 percent was between 60 to 74; 2 percent was between 75+ years old. As the age group between 16 to 24 were students, they were using the bus transport as their medium to reach their destinations daily as shown in the Figure-4.2.2:

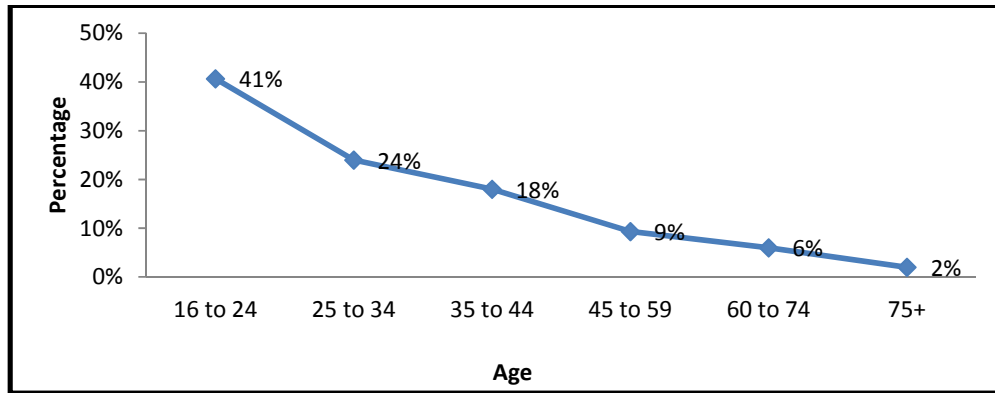


Figure-3.2.2. Age groups at Guntur.

**3.2.3 Survey based on guntur economic criteria**

The study surveyed and collected information from different types of people based on their financial status. As the Guntur is famous for red chillies and tobacco production, most of the employment relies on the production. Based on the survey, 40 percent was spread

over Employed; 17 percent was spread over looking after home or family; 3 percent was spread over Retired; 10 percent was spread over Unemployed/seeking work; 30 percent was spread over Education/Training as shown in the Figure-3.2.3:

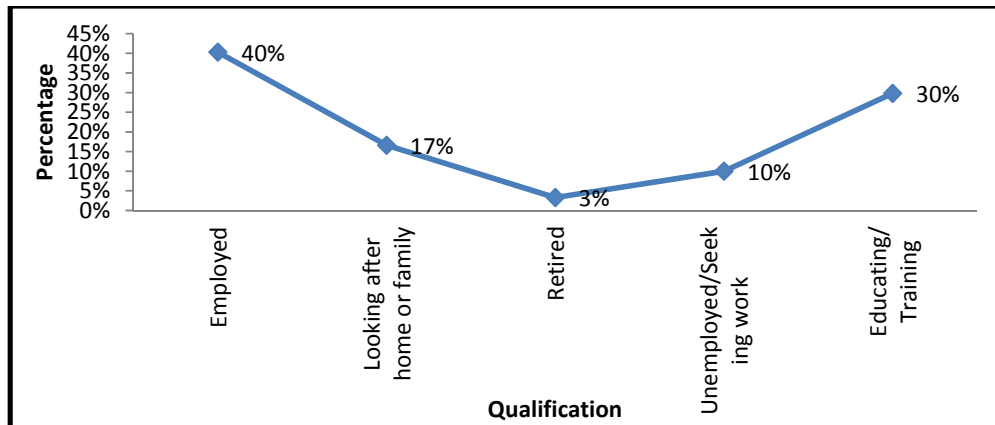


Figure-3.2.3. Economic criteria of Guntur.

**3.2.4 Survey based on questionnaire**

The study surveyed the people based on different categories such as comfort, safety, economical, frequency, routes, timings, near to drop point, arrival, departure, morning services, evening services, travelling time, information of buses, information of routes, help desk

condition, ticket fare, ticket collection, urinal facilities, platform information, food facilities, driver behaviour, conductor behaviour, bus neatness, wifi facilities. Regarding the above questionnaire we have analyzed the customer perceptions of the public transport as shown in the Figure-4.2.4:

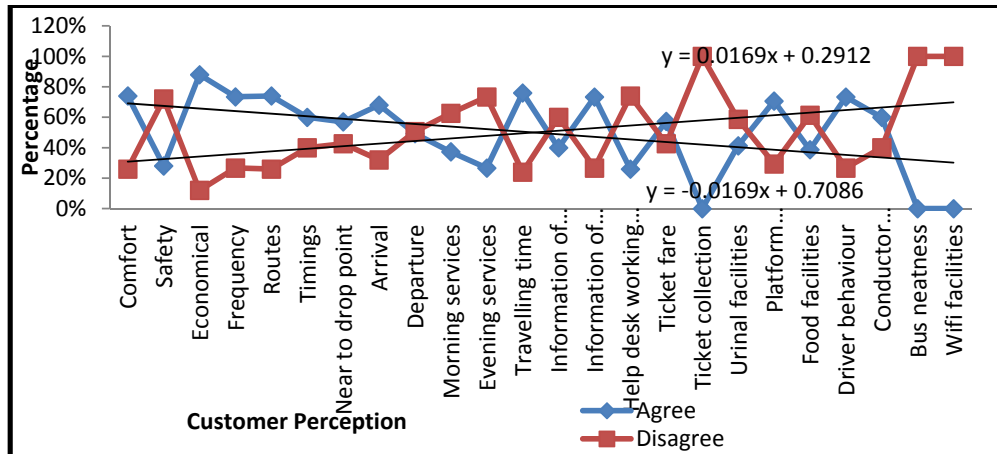


Figure-3.2.4. Questionnaire at Guntur.

3.3 Vuyyuru Analysis

3.3.1 Survey based on gender

Vuyyuru is a mandal where most of the people travel to urban areas daily for their source of income, employment, educational purposes. Vuyyurumandal has been developed to a great extent where the population

growth is rapidly increased compared to the previous census. A total of 150 samples was collected through Survey. A statistical descriptive analysis of the sample was carried out. The sample was spread over 59 percent of male and 41 percent of female respondents as shown in the Figure-3.3.1:

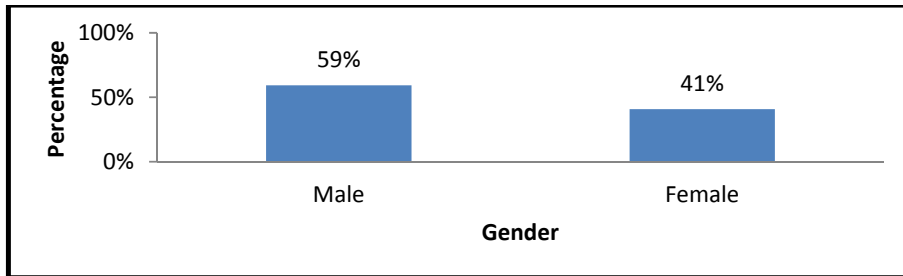


Figure-3.3.1. Genderwise percentage at Vuyyuru.

3.3.2 Survey based on age groups

The samples surveyed different age groups of people, in that 34 percent was between 16 to 24 years old; 22 percent was between 25 to 34 years old; 20 percent was between 35 to 44 years old; 17 percent was between 45 to

59 years old; 6 percent was between 60 to 74; 2 percent was between 75+ years old. As the age group between 16 to 24 were students, they were using the bus transport as their medium to reach their destinations daily as shown in the Figure-3.3.2:

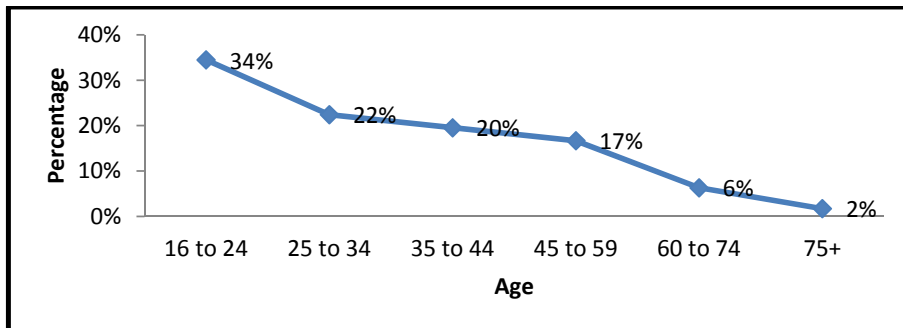


Figure-3.3.2. Age groups at Vuyyuru.



**3.3.3 Survey based on economic criteria**

The study surveyed and collected information from different types of people based on their financial status. Vuyyuru mainly relies on sugarcane factory where the huge amount of sugar is been produced since it has more sugar cane sources. Other than sugar cane factory Vuyyuru also depends upon crops where the reaping,

packing and selling process takes place which provides finance as well as employment. Based on the survey, 23 percent was spread over Employed; 24 percent was spread over Looking after home or family; 6 percent was spread over Retired; 13 percent was spread over Unemployed/seeking work; 34percent was spread over Education/Training as shown in the Figure-3.3.3:

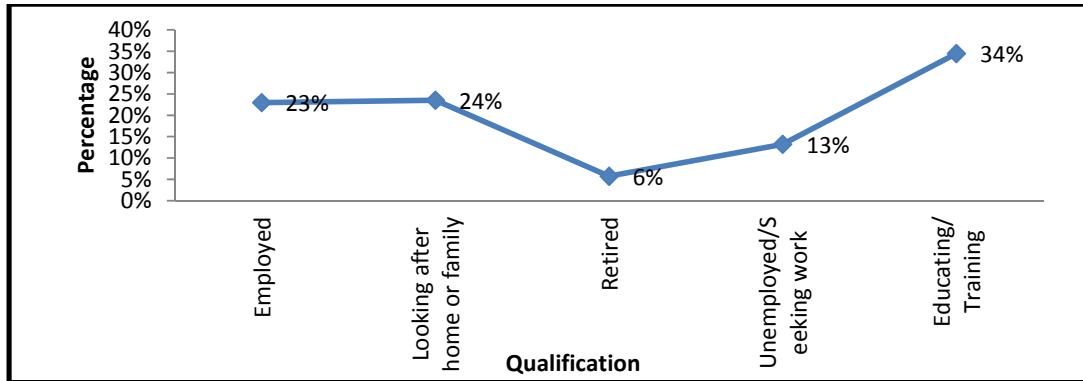


Figure-3.3.3. Economic criteria of Vuyyuru.

**3.3.4 Survey based on questionnaire**

The study surveyed the people based on different categories such as comfort, safety, economical, frequency, routes, timings, near to drop point, arrival, departure, morning services, evening services, travelling time, information of buses, information of routes, help desk

condition, ticket fare, ticket collection, urinal facilities, platform information, food facilities, driver behaviour, conductor behaviour, bus neatness, wifi facilities. Regarding the above questionnaire we have analyzed the customer perceptions of the public transport as shown in the Figure-3.3.4:

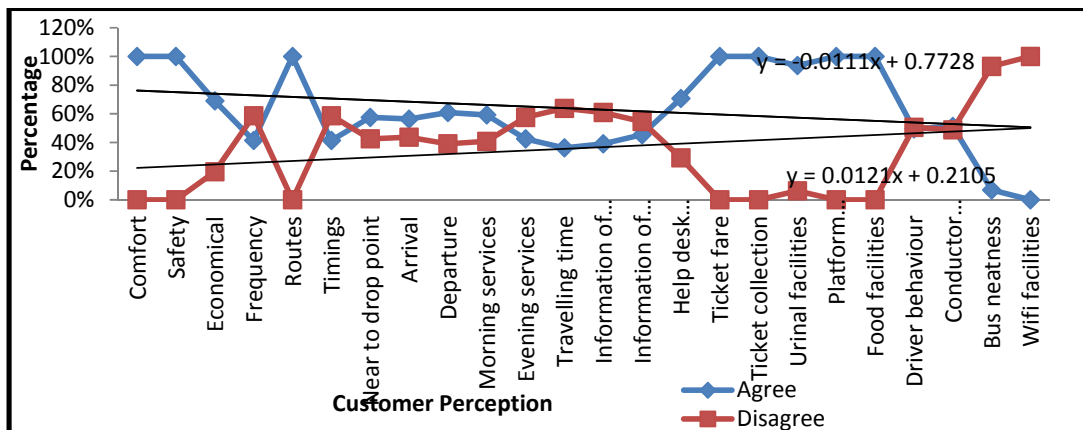


Figure-3.3.4. Questionnaire at Vuyyuru.

**3.4 Regression Equations for Agree and Disagree Questionnaire**

The study identified the regression equations for agree and disagree questionnaire to people based on different categories such as comfort, safety, economical, frequency, routes, timings, near to drop point, arrival, departure, morning services, evening services, travelling

time, information of buses, information of routes, help desk condition, ticket fare, ticket collection, urinal facilities, platform information, food facilities, driver behaviour, conductor behaviour, bus neatness, wifi facilities. Regarding the above questionnaire the study analyzed the customer perceptions of the public transport. The results presented below Table-3.4.

**Table-3.4.** Regression equations.

S. No.	Name of the Station	Regression Equation for Agree	Regression Equation for Disagree
1	PNBS	$y = -0.012x + 0.803$	$y = 0.012x + 0.189$
2	Guntur	$y = 0.016x + 0.291$	$y = -0.016x + 0.708$
3	Vuyyuru	$y = -0.011x + 0.772$	$y = 0.012x + 0.210$

#### 4. CONCLUSIONS

The primary objective of the research project reported in this study is to demonstrate the additional knowledge which can be generated through a more detailed evaluation of the quality of service indicator for bus transport utilised by APSRTC, Vijayawada and Guntur. Factor analysis of the measurement scale which comprises this indicator identifies three latent constructs to be present covering issues related to perceived convenience, quality of the cabin environment and ease of use. This construct structure holds resemblances to that observed by other research projects studying this topic (Eboli and Mazzulla, 2007; Yaya *et al.* 2014), suggesting that a three construct structure for quality of service provides a useable representation of this concept. Taking this into account alongside the way in which the identified constructs share similarities with past research findings, the constructs identified in the factor analysis seemingly represent underlining dimensions of perceived service quality.

The analysis reported in this study may also be of use in considering how the quality of service indicator employed by the APSRTC could be developed to produce additional insights. Firstly, in its current form, the quality of service indicator is only deployed with existing bus customers. Whilst this allows the APSRTC to understand how current patrons perceive the service, it offers no insights concerning the perceptions of non-bus users towards service quality. Extending the deployment to non-bus users would allow the APSRTC to understand how perceptions differ between current customers and citizens who currently do not utilise bus services. This understanding may offer insights regarding how non-bus users could be attracted to the service, which would assist in the development of policies aimed at generating modal shift from car to bus which represents a strategic objective of the APSRTC. Secondly, the APSRTC may want to consider extending the service of quality indicator to include a number of additional issues which past research has shown to represent valid quality dimensions.

At a more general level, this study demonstrates the added value which can be attained by a more thorough analysis of existing transport policy data. Indeed, relatively simple quality of service indicators such as the one utilised by the APSRTC can offer further insights upon closer inspection. With growing levels of data being made available as departments follow openness and transparency policies, significant opportunities are emerging for secondary data analysis which will likely have a direct engagement with the issues currently active in the policy making environment.

#### 4.1 Conclusions of the Study:

- Qualitative and Quantitative surveys in PNBS Vijayawada, Guntur and Vuyyur done and presented
- Analysis and Interpretation of results with regression equations was done.

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