



# Comprehensive Assessment of Public Transport System: The Case of Samara – Abala Route, Afar, Ethiopia.

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## ABSTRACT

The authors assessed the public transport system on the Samara–Abala route in Ethiopia's Afar region. The data from 121 participants/commuters was gathered to understand the system better. Most of the commuters were young adults aged 25 to 34. The majority were educated holding degrees or MSc qualifications and employed. This shows that the transport service plays an important role in supporting the working population in the area. The main takeaway is the widespread unhappiness with the quality of public transport services. Most commuters, between 74.4% and 91.8%, gave poor ratings on every service aspect assessed. More than 90% of those surveyed found five main factors below par. These factors include cost, availability during peak hours, comfort on vehicles, delay frequency, and service speed., the high negative ratings for delays at 91.8% and costs at 91.0% highlight significant issues that users face both and The Chi-Square test implies that extreme dissatisfaction applies to everyone regardless of gender. Service issues are serious enough to go beyond demographic factors showing that

In summary, the public transport service along the Samara–Abala route falls short of what commuters need. People find it too expensive, unreliable, and uncomfortable. These issues demand quick and thorough action from the authorities to fix problems with schedules, fares, and infrastructure. Improvements here could make the system more efficient and better for everyone using it.

## KEY WORDS

Accessibility, Affordability, Infrastructure, Reliability, Service Quality, Rural Mobility.

## INTRODUCTION

Public transportation is a key part of helping people move around and access different places in their area. On the Samara–Abala route in Afar, Ethiopia looking into the performance of public transport is very important. It can highlight problems, uncover opportunities, and point out ways to make the transport network work more. This part focuses on giving a detailed evaluation of the public transport setup along the Samara – Abala Route. It explains the main factors that have an impact on the system and explores what it could mean for the people living in the area.

This study investigates understanding the main problems the public transport system in the area is dealing with. These problems include poor infrastructure limited access, safety concerns environmental issues, and high costs. The authors aims to find the main causes of these issues through a detailed study and come up with focused plans to solve them. The goal is to study the current situation of public transport and share ideas to make it better. Solving these issues can improve things for both users and service providers by finding and taking advantage of better opportunities. Afar, a region in northeastern Ethiopia, stands out for its vast desert scenery and rich cultural history. Many people in the area depend on public transport to travel between villages and towns. It is important to assess the public transport system on the Samara to Abala route because this route plays a key role in supporting local communities.

## LITERATURE REVIEW

The public transport system on the road connecting Samara to Abala in Ethiopia's Afar region plays a key role in moving both residents and travellers. But the system has many issues that make it far from ideal. People deal with problems like overcrowded buses and unreliable schedules every day due to limited choices and poor infrastructure. These challenges show the need for better services to improve travel in the area. This paper looks at the condition of the transport system and examines both its good and bad points.

Many studies show that assessing service quality holds much importance to boost public transport use in developing countries (Lai & Chen, 2011). Research in Africa often shows that commuters feel unhappy due to big problems in how services are delivered (Singogo & Tinali, 2021). Key factors that influence user satisfaction are price, dependability, and ease of access (Yaya et al. 2015; Public Transport Affordability Evaluation for Addis Ababa City 2022). Research shows operational problems like uneven train or bus intervals and overcrowding cause bad user opinions and make the system unreliable (Soza-Parra et al. 2019). Some research investigates how people's backgrounds could shape these opinions, but major service issues tend to affect everyone. Big infrastructure flaws are shared problems that all users experience regardless of gender (Yaya et al. 2015).

J. R. Juremalani and his team worked on research focused on improving movement and reusing materials to reduce pollution. Their studies aimed to develop efficient and friendly transportation in areas where different kinds of vehicles share the roads. To refine traffic light timings, they explored Passenger Car Unit values and measured how much traffic flows at crossings with signals (Mahidadiya & Juremalani 2016; Mushtaq et al. 2017). They also examined various models to help understand how people choose their methods of travel (Juremalani & Chauhan 2017; Javeed et al.). In 2019, researchers examined the use of Non-Motorized Vehicles, as noted by Juremalani and Chauhan in 2017, and encouraged movement away from private cars. Biswal and his team in 2021 focused on reusing Construction and Demolition Waste in the DBM layer of flexible pavements to promote material recycling. Bhavsar and colleagues in 2021 explored swapping natural sand with stone sand in concrete to save limited resources. The core idea is simple—using smart engineering methods like PCU values and recycling creates positive social and environmental effects such as cleaner air safer roads, and conserving resources. This research used a mix of methods focusing on a survey to measure the quality of public

transport services. It also included a qualitative method through interviews with key people or by observing, to understand views from institutions. The study aimed to explain the current service level and figure out what causes people to feel unhappy with the services.

## OBJECTIVES

The objectives of the assessment are:

To identify the existing public transport options available for commuters.

To assess the reliability, frequency, and accessibility of the current public transport services.

To analyse the current state of the public transport system.

To identify the challenges and constraints of public transport services in the mentioned route in the region.

## METHODOLOGY

The study looked at the Samara–Abala Route in Ethiopia's Afar region. All people taking part in the public transit system on this route made up the study group. Authors collected information from 121 individuals in total. They used a structured questionnaire to gather their data. This questionnaire asked about various topics like age, gender, education, job, and income. It also included questions to assess public transport services. To evaluate how commuters felt about the services, they used Likert-type scales. These scales helped measure key factors such as how affordable, accessible, reliable, and fast the transport was as well as its comfort, delays, and availability during busy times.

Experts examined the gathered information with several statistical methods.

**Descriptive Statistics:** Analysts used this to summarize data by calculating things like frequencies and percentages. Tables displayed details about respondents' profiles and measured how unhappy people were with different service aspects.

**Inferential Statistics:** Authors applied Chi-Square analysis to check if any links existed between demographic categories like gender and service perception categories such as affordability. This helped figure out if users' personal traits had an influence on their views of the service.

## RESLUTS AND DISCUSSION

Table 1 highlights the demographic details of the 179 people who took part in the survey. Most respondents are men making up 68.2% of the group. The study targeted commuters, who form the largest portion at 67.6% (121 people). Out of these commuters, most are men (57.9%), many are married (65.3%), and a big chunk comes from the 25-34 age range (40.5%) considered the most productive age group. This group of commuters also shows high education levels. More than half have either a degree (28.1%) or an MSc (24.0%)., the majority either work jobs (50.4%) or run their own businesses (25.6%). This profile shows that most of the study's findings come from data on young educated working men who commute.

Table 1. Respondent Characteristics

| Characteristic  | Category            | Commuters (N=121) | Commuters (%) |
|-----------------|---------------------|-------------------|---------------|
| Gender          | Male                | 70                | 57.90%        |
|                 | Female              | 51                | 42.10%        |
| Marital Status  | Married             | 79                | 65.30%        |
|                 | Bachelors           | 31                | 25.60%        |
|                 | Divorced            | 11                | 9.10%         |
| Age Group       | Dominant Group      | 25-34             | 40.50%        |
| Education Level | Degree              | 34                | 28.10%        |
|                 | MSc                 | 29                | 24.00%        |
|                 | Diploma             | 22                | 18.20%        |
|                 | Student             | 20                | 16.50%        |
|                 | No formal education | 12                | 9.90%         |
| Occupation      | Certificate         | 4                 | 3.30%         |
|                 | Employed            | 61                | 50.40%        |
|                 | Business Owners     | 31                | 25.60%        |
|                 | Unemployed          | 16                | 13.20%        |
|                 | Self-employed       | 11                | 9.10%         |
|                 | Investors           | 2                 | 1.70%         |

Table 2 highlights that 121 commuters feel dissatisfied with public transport on the Samara-Abala route. Over 90 percent of those surveyed shared negative views on several areas. A large number said the service costs too much, with 91 percent agreeing. About 91 percent also said it was slow, and the same percentage criticized the lack of available transport during rush hours. 91.8 percent pointed out that the vehicles are uncomfortable, and 83 percent noted major issues with accessibility. The main issue seems to come from the poor reliability and overall performance of the service. About 91.8% of passengers often face delays, and 74.4% think the whole system fails to follow its schedule.

Table 2. Vulnerable Groups Affected by Transport Pollution

| Public Transport Characteristic | Commuter Assessment Category                               | Commuters (%) |
|---------------------------------|------------------------------------------------------------|---------------|
| Accessibility                   | Somewhat Difficult to access                               | 58.70%        |
|                                 | Very Difficult to access                                   | 24.80%        |
|                                 | Total finding accessibility difficult                      | 83.50%        |
| Affordability (Cost)            | Expensive                                                  | 57.90%        |
|                                 | Very Expensive                                             | 33.10%        |
|                                 | Total finding cost expensive                               | 91.00%        |
| Reliability                     | Somewhat Unreliable (in terms of schedule and punctuality) | 49.60%        |
|                                 | Very Unreliable (in terms of schedule and punctuality)     | 24.80%        |
|                                 | Total finding system unreliable                            | 74.40%        |
| Speed of Service                | Slow                                                       | 74.40%        |
|                                 | Very Slow                                                  | 16.50%        |
|                                 | Total finding service slow                                 | 90.90%        |

|                     |      |                                                                    |        |
|---------------------|------|--------------------------------------------------------------------|--------|
| Frequency of Delays |      | Sometimes experience delays                                        | 75.20% |
|                     |      | Often experience delays                                            | 8.30%  |
|                     |      | Always face delays                                                 | 8.30%  |
|                     |      | Total experiencing delays                                          | 91.80% |
| Vehicle Comfort     |      | Somewhat Uncomfortable                                             | 83.50% |
|                     |      | Very Uncomfortable                                                 | 8.30%  |
|                     |      | Total finding vehicles uncomfortable                               | 91.80% |
| Peak Availability   | Hour | Not enough transport options available (during peak hours)         | 57.90% |
|                     |      | Options exist but are not frequently available (during peak hours) | 33.90% |
|                     |      | Total facing availability challenges                               | 91.80% |

When putting together the findings in Table 3, it becomes obvious how serious the commuter crisis is on the Samara–Abala public transport route. The numbers show dissatisfaction is not just limited to a few issues. It spreads across the entire system, with over 90% of negative feedback in five out of the seven aspects reviewed. Most of the 121 commuters find affordability, speed, peak-hour availability, vehicle comfort, and delays unsatisfactory. While concerns about accessibility (83.5%) and reliability (74.4%) are also significant, over 90% of people see the other factors as the biggest problems. This overall perspective shows a clear mismatch between what the service delivers and what the travellers need. Fixing the cost, efficiency, and quality of public transportation needs immediate attention through various solutions.

Table 3. Commuters' assessment for public transport.

| Public Transport Service Characteristic | Negative Assessment Category                | Commuters Reporting Negative Assessment (%) |
|-----------------------------------------|---------------------------------------------|---------------------------------------------|
| Affordability (Cost)                    | Expensive / Very Expensive                  | 91.00%                                      |
| Peak Hour Availability                  | Not Enough / Not Frequently Available       | 91.80%                                      |
| Vehicle Comfort                         | Somewhat Uncomfortable / Very Uncomfortable | 91.80%                                      |
| Frequency of Delays                     | Sometimes / Often / Always Delays           | 91.80%                                      |
| Speed of Service                        | Slow / Very Slow                            | 90.90%                                      |
| Accessibility                           | Difficult / Very Difficult to access        | 83.50%                                      |
| Reliability (Schedule & Punctuality)    | Somewhat Unreliable / Very Unreliable       | 74.40%                                      |

Table 4 explains the set of Contingency Tables created to carry out the Chi-Square analysis. This looked at the link between Commuter Gender (Male and Female) and their Negative Opinions on each feature of public transport services. These features cover Affordability, Speed, Delays, Comfort, Availability, Accessibility, and Reliability.

Table 4. Contingency Tables prepared for the Chi-Square analysis.

| Service Characteristic | Negative Perception (%) | Observed Frequencies (O) | Male (N=70) | Female (N=51) | Total (N=121) |
|------------------------|-------------------------|--------------------------|-------------|---------------|---------------|
| Affordability          | 91.00%                  | (Expensive)              | 65          | 45            | 110           |
|                        | 9.00%                   | (Not Expensive)          | 5           | 6             | 11            |
| Speed of Service       | 90.90%                  | (Slow)                   | 64          | 46            | 110           |
|                        | 9.10%                   | (Not Slow)               | 6           | 5             | 11            |
| Frequency of Delays    | 91.80%                  | (Delays)                 | 65          | 46            | 111           |
|                        | 8.20%                   | (No Delays)              | 5           | 5             | 10            |
| Vehicle Comfort        | 91.80%                  | (Uncomfortable)          | 65          | 46            | 111           |
|                        | 8.20%                   | (Comfortable)            | 5           | 5             | 10            |
| Peak Hour Availability | 91.80%                  | (Unavailable)            | 65          | 46            | 111           |
|                        | 8.20%                   | (Available)              | 5           | 5             | 10            |
| Accessibility          | 83.50%                  | (Difficult)              | 59          | 42            | 101           |
|                        | 16.50%                  | (Not Difficult)          | 11          | 9             | 20            |
| Reliability            | 74.40%                  | (Unreliable)             | 51          | 39            | 90            |
|                        | 25.60%                  | (Reliable)               | 19          | 12            | 31            |

## CONCLUSIONS

The main takeaway is that the public transport system on the Samara–Abala route has major issues and is not meeting users' needs. Almost everyone using it feels about it. More than 90% of riders expressed unhappiness with five key things: how much it costs, how available it is during busy hours, how comfortable the vehicles are, how often delays happen, and how fast the service is. This huge dissatisfaction shows that the problem lies in the way the system is running overall, not just in a few random issues.

Most commuters about 91% see the service as too costly, creating financial strain on working people who rely on it. Almost 92% of users deal with delays, while 74% think the system isn't reliable. These numbers highlight major issues like poor planning or overcrowding, which hurt the ability to be on time and travel. The poor service tends to hit a key group for the hardest. Most commuters are young adults aged 25 to 34 who are well-educated with degrees or master's qualifications and employed. Long delays, inconsistency, and slow speeds waste their time lower productivity, and hurt the economic output of this crucial part of the local workforce. Men and women commuters experience similarly high levels of dissatisfaction. Because of this, gender does not play a big role in explaining why people view the service proving the quality is bad across the board. This means solutions should not focus on specific groups but instead on everyone. The findings make it clear that small fixes will not solve the problem. A broad plan is needed to bring major changes. This should include buying modern and more comfortable vehicles, making routes and schedules better to cut delays, and looking at ticket prices to make them more affordable.

**REFERENCES:**

- A N Mahidadiya, J. R. Juremalani (2016). Estimation of passenger car unit value at signalized intersection. *International Journal of Scientific Research in Science, Engineering and Technology*. pp1317-1324.
- Lai, W.-T., & Chen, C.-F. (2011). Behavioral intentions of public transit passengers—The roles of service quality, perceived value, satisfaction and involvement. *Transport Policy*, 18(2), 318–325.
- Akash Kumar, Ankita Sharma, J. R. Juremalani, D. R. Juremalani. (2021) Analysis of Road Accidents under Mix Traffic Conditions-A Case Study of Vadodara City. *Ilkogretim Online*. Volume 20 Issue 4.
- J. R. Juremalani, K. A. Chauhan (2017) Comparison of different mode choice models for work trips using data mining process. *Indian Journal of Science and Technology*.
- J. R. Juremalani, K. A. Chauhan (2017). Evaluation of Use of Non-Motorized Vehicles for Shopping Trips under Mix Traffic Conditions. *ASCE India-1<sup>st</sup> National Conference*.
- Subhrata Biswal, J. R. Juremalani, Tejas Pandya, D. R. Juremalani. (2021) Feasibility Study of Construction and Demolition Waste Use in DBM Layer of Flexible Pavement. *Elementary Education*.
- Shaikh Nazneen Mushtaq, J. R. Juremalani, Siddharth Gupte (2017). Literature review on saturation flow at signalized intersection under mixed traffic flow conditions. *International Journal of Science Technology & Engineering*.
- Naitik Gandhi, J. R. Juremalani. (2019) On-Street Parking Problems in CBD Area & Remedial Measures-A Case Study of Godhra City. *International Journal of Civil Engineering and Technology*. Volume 10 issue 3.
- Vaishali Mahavar, J. R. Juremalani (2018). Literature Review on Traffic Control Systems Used Worldwide. *Journal of Emerging Technologies and Innovative Research*. Volume 5 issue 5.
- Faizi Ahmad Javeed, Bagadia Sanket, Juremalani Dharmesh, J. R. Juremalani (2019) A critical appraisal of mode choice model of work trips. *International Journal of Engineering and Advanced Technology*. pp1766-1770.
- Raj Kothiya, Tejas Pandya, J. R. Juremalani, D. R. Juremalani (2022). Evaluation of Pedestrian Road Crossing Behavior at Signalized Intersection. *Elementary Education Online*. Vol 20, issue 4, pp. 1770-1776.
- Devang J Bhavsar, J. R. Juremalani, D. R. Juremalani, Tejas Pandya (2021) Partial Replacement of Stone Sand by Natural Sand in Concrete". *Ilkogretim Online*. Volume 20 Issue 4.
- Soza-Parra, J., Raveau, S., Muñoz, J. C., & Cats, O. (2019). The underlying effect of public transport reliability on users' satisfaction. *Transportation Research Part A: Policy and Practice*, 123, 11–24.
- Singogo, P. C., & Tinali, G. Z. (2021). The influence of monitoring and incentives on inter-regional bus drivers' performance in Tanzania: The moderating role of road and bus conditions. *Business Management Review*, 24(2), 80–99.
- Yaya, L. H. P., Fortià, M. F., Canals, C. S., & Viadiu, F. M. (2015). Service quality assessment of public transport and the implication role of demographic characteristics. *Public Transport*, 7, 409–429.
- Zewdu, T. T., & Mengistu, M. (2022). Public transport affordability evaluation for Addis Ababa City. *Sustainability*, 14(11), 6883.