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FACTORS INFLUENCING PASSENGER TRANSPORT SERVICES IN JIMMA ZONE, ETHIOPIA: A CASE STUDY OF THE NONO BENJA DISTRICT

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Abstract:
Efficient and reliable passenger transport services are vital for accessing markets, healthcare, education, and other essential amenities worldwide, particularly in driving socio-economic development in Ethiopia's Oromia Region. This study examines the multifaceted factors affecting passenger transport services in Jimma Zone, with a specific focus on Nono Benja District. Data were collected through field surveys from 350 respondents and analyzed using both qualitative and quantitative methods, including descriptive statistics and an econometric approach specifically, multiple linear regression. The regression results indicate that service quality is significantly influenced by tariffs, operational costs, transport operators' compliance with regulations, and enforcement mechanisms. Additionally, the findings highlight challenges such as inadequate infrastructure, traffic congestion, vehicle shortages, and frequent delays, which collectively restrict access to critical services like markets, healthcare, and education. To address these issues, the study recommends prioritizing upgrades to rural roads, expanding vehicle fleets, adopting digital scheduling systems, strengthening safety protocols, and streamlining regulatory frameworks. These measures aim to enhance reliability and accessibility, ultimately promoting sustainable passenger transport that supports economic growth, reduces inequalities, and improves social well-being in the area.

Keywords:
Passenger transport, Transport services, Tariffs, Service quality, Rural transport, Jimma Zone

1. Introduction
Efficient and reliable passenger transport services form a fundamental pillar of socio-economic development worldwide. Accessible transportation systems connect individuals to markets, healthcare, education, and employment opportunities, serving as essential tools for poverty alleviation, enhanced productivity, and greater social inclusion (World Bank, 2023). However, deficiencies in regulatory oversight and stakeholder coordination often exacerbate sectorial inefficiencies, resulting in elevated costs and diminished service quality (UNCTAD, 2022). Key challenges include high tariffs influenced by fluctuating fuel prices, vehicle maintenance, and labor costs; seasonal demand fluctuations that complicate planning; weak enforcement of regulations; inconsistent licensing; and variable safety standards (Bekele, 2023). These issues disproportionately affect affordability for low-income populations (Chae et al., 2023). Operational expenses primarily fuel, maintenance, and labor directly impact service reliability and frequency (Nguyen et al., 2023). Their studies indicate that strategic cost management, such as transitioning to fuel-efficient vehicles, can elevate service quality while maintaining or reducing fares. Poor road infrastructure represents another major impediment, prolonging travel times, increasing vehicle wear, and heightening safety risks, thereby undermining overall reliability (Botrić et al., 2023). Robust regulatory frameworks are vital for promoting accountability, standardization, and sustained improvements in service delivery (Yuda et al., 2023).

In many least-developed countries, road transportation is hampered by substandard roads, inadequate supporting infrastructure, and high transit costs. Across Africa, road transport predominates as the primary mode of motorized mobility, facilitating movement for millions and fostering economic and social linkages. Inadequate infrastructure, however, continues to impede access to commerce, education, and healthcare, imposing an estimated annual economic burden of 2–3% of GDP on the continent (AfDB, 2023). Rising demand and escalating tariffs render passenger transport increasingly inaccessible for low-income households (Chae et al., 2019). Achieving financial sustainability ensuring equitable, affordable services and a balanced tariff structure is crucial for long-term economic progress. Factors such as fuel and diesel prices, travel expenses, wages, repairs, depreciation, registration fees, taxes, and insurance profoundly influence service provision. In addition, broader elements including connectivity, accessibility, travel duration, operational efficiency, safety, comfort, mode selection, modal shifts, economic growth, trade facilitation, urban planning, land-use patterns, and road infrastructure play equally critical roles in affecting passenger transport service quality (Botrić et al., 2023).

The primary objective of regulatory bodies is to develop and promote transportation systems that facilitate seamless access to workplaces, retail outlets, public facilities, commercial and industrial zones, healthcare services, and other essential amenities (Verma & Ramanayya, 2019). These agencies also enhance overall service standards by overseeing vehicle repair and maintenance practices (Henry et al., 2020). In Ethiopia, substantial infrastructure investments over the past two decades have supported average annual GDP growth of 7 to 10% (UNCTAD, 2019). Nevertheless, persistent obstacles such as elevated transport costs, deteriorating road conditions, and insufficient regulatory supervision continue to constrain the sector. These problems are especially pronounced in rural areas, where services remain unreliable, costly, and inadequate relative to demand. In the Oromia Regional State, which includes the Jimma Zone, these challenges are vividly illustrated. The Jimma-Nono Benja District functions as a vital conduit linking rural communities to urban hubs like Jimma City. Yet, it grapples with poorly maintained rural roads, high operational costs for providers, and scarce vehicle availability. Such barriers limit access to critical services, deepen poverty, and obstruct economic advancement, particularly among low-income households dependent on public transport for daily needs. Rural farmers in the district frequently encounter delays in delivering produce to markets, leading to reduced earnings and diminished opportunities.

Rural transport systems confront distinct hurdles, including seasonal road impassability during heavy rains, limited vehicle supply, and socioeconomic vulnerabilities like low incomes and unemployment, which intensify inequities. Previous research (Chae et al., 2023, Henry et al., 2020; Verma & Ramanayya, 2019; Yuda et al., 2023) has often suffered from methodological limitations, such as reliance on single-method approaches or neglect of seasonal variations and socioeconomic influences, thereby constraining deeper insights into these interactions. This study bridges these gaps by examining the interconnected roles of tariffs, operational costs, infrastructure quality, regulatory mechanisms, and operator adherence in determining service quality within the Jimma-Nono Benja District. The lack of dependable and accessible transport profoundly affects rural populations: delayed healthcare access worsens health outcomes, while restricted market reach curtails prospects for farmers and small enterprises (Yuda Bakti et al., 2023). By pinpointing precise influencing factors, this research aims to deliver evidence-based recommendations for targeted policies that improve reliability, affordability, and accessibility. Such measures are indispensable for mitigating disparities, stimulating economic vitality, and advancing sustainable development in the Jimma Zone and beyond.

2. Materials and Methods

2.1 Study Area and Research Design

The study districts were selected based on their socio-economic importance and the prevalence of transport-related challenges, including inadequate road infrastructure, high operational costs, and limited vehicle availability. This research employed a mixed-methods approach to examine the factors influencing passenger transport services in Ethiopia's Jimma Zone, with particular emphasis on the Jimma-Nono Benja route and surrounding districts. The methodology integrated quantitative and qualitative techniques to provide a comprehensive and robust analysis of the determinants of service quality, encompassing tariffs, operational costs, infrastructure, regulatory frameworks, and operator compliance. An explanatory sequential mixed-methods design was adopted, whereby quantitative data collection was followed by qualitative analysis to validate, explain, and enrich the initial findings (Creswell & Creswell, 2023). The quantitative phase utilized structured questionnaires to collect data on passenger demographics,

perceptions of service quality, and key transport challenges. The subsequent qualitative phase involved semi-structured interviews and field observations to obtain in-depth insights from passengers, transport operators, and regulatory officials, thereby ensuring a holistic understanding of the passenger transport system.

2.2 Sampling Technique

The target population consisted of passengers, transport operators, and regulatory officials within the selected districts of Limmu Kossa, Limmu Seka, and Nono Benja. To achieve adequate representation, a total sample of 350 respondents was drawn. Stratified random sampling was applied to select participants from each district, ensuring proportional representation according to population size. The sample size was determined using Yamane (1973) simplified formula:

$$n = \frac{N}{1+N(e2)} = \frac{2{,}800}{1+2{,}800\ (0.05^2)} = 350$$

Where n is the sample size, N is the total population, and e is the precision level (at 0.05 for 95% confidence). Applying this formula to the estimated population of 2,800 regular users across the three districts yielded a sample size of 350. Proportionate allocation was then used to distribute the sample across districts as follows:

Table 1: Distribution of Respondents by District

Selected District	Population (N_i)	Sample (n_i)
Limmu kossa	1074	134
Limmu seka	953	119
Nono Benja	773	97
Total	2800	350

Note: n_i represents the number of respondents from district i (i = 1, 2, 3); N_i represents the estimated population of regular transport users in district i.

2.3 Data Collection

Both primary and secondary data were utilized to thoroughly investigate the factors affecting passenger transport services in the study area. Primary data were gathered directly from key stakeholders, including passengers, transport service providers (operators), regulatory bodies, local government officials, and community members. Data collection instruments comprised structured questionnaires for quantitative responses, semi-structured interview guides for qualitative insights, and observational checklists for field notes. Secondary data were sourced from relevant books, journal articles, official reports, policy documents, archival records, and administrative data maintained by transport authorities and local government offices in the study area. These sources provided contextual information on historical trends, regulatory evolution, and infrastructure development.

2.4 Data Analysis

The study analyzed both quantitative and qualitative data to explore the variables influencing passenger transport service quality. Quantitative data were processed using descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics, primarily multiple linear regression analysis. The regression model was employed to quantify the impact of selected independent variables on the dependent variable (perceived service quality). The multiple linear regression models were specified as follows:

$$Y = \beta_0\beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \varepsilon \qquad 1$$

Whereas Y is Perceived passenger transport service quality (dependent variable), β0 is Intercept (constant), β1 to β8, is Regression coefficients representing the change in Y for a one-unit change in each predictor, X1 is tariffs, X2 is operational costs, X3 is road infrastructure, X4 is government policies and regulations, X5 is demand variability, X6 is legal framework governing transport services, X7 is compliance by transport operators, X8 is enforcement

mechanisms, and ε is error term. Qualitative data from interviews and observations were thematically analyzed using content analysis techniques. Themes emerging from the qualitative phase were triangulated with quantitative results to enhance validity and provide deeper explanatory insights.

Table 2: Description of Variables in the Regression Model

S. No	Variables	Types	Measurement	Expected Sign
1	Tariffs	Continuous	In Birr	+
2	Government Policies and Regulations	Dummy	If 1 = supported and 0 = not supported	+
3	Demand Variability	Continuous	In numbers	-
4	Legal framework governing transport services	Dummy	If 1 = gets service and 0 = not gets service	+
5	Compliance by transport operators	Dummy	If 1 = complained and 0 = not s complained	+
6	Operational Cost	Continuous	In Birr	+
7	Enforcement Mechanisms	Dummy	If 1 = got legal enforcement and 0 = not got legal enforcement	+
8	Road Infrastructure	Dummy	If 1 = access and 0 = not access	+

Source: Source: Developed based on literature review and research hypotheses (2025)

3. Results and Discussion

3.1 Descriptive Analysis

As shown in Table 3, a significant portion of the working-age population relies heavily on public transport. Among the respondents, 65% were male, indicating a potential gender disparity in public transport usage, possibly due to higher male participation in the workforce or travel patterns. Additionally, 45% of respondents were employed full-time, while 52% reported monthly incomes below 3,000 Birr, highlighting the socioeconomic profile of users who depend on affordable transport options.

Table 3: Demographic Characteristics of Respondents

Characteristic	Category	Frequency	Percentage
Age	18–24	45	13
	25–34	120	34
	35–44	85	24
	45+	100	29
Gender	Male	228	65
	Female	122	35
Occupation	Employed	158	45
	Student	70	20
	Other	122	35
Income	<3,000 Birr	182	52
	3,000+ Birr	168	48

Source: Own survey Data, 2025

The study revealed several critical challenges impacting passenger transport services in the Jimma Zone. Poor infrastructure emerged as the most prominent issue, with 68% of respondents rating it as inadequate. This deficiency contributes to frequent delays, vehicle deterioration, and heightened safety risks. To enhance service reliability and efficiency, urgent investments in road maintenance such as repairing potholes and expanding the network—are essential. Traffic congestion was cited by 18% of respondents, exacerbating travel times and diminishing overall service quality. Effective strategies to mitigate this include improved infrastructure planning and advanced traffic management systems.

Furthermore, 28% of participants identified vehicle shortages as a major barrier, leading to overcrowding and prolonged waiting periods. Addressing this could involve fleet expansion and incentives for private operators to increase vehicle supply. Safety concerns were raised by another 28% of respondents, underscoring the need for enhanced measures. These findings collectively emphasize the necessity for targeted interventions: strengthening infrastructure, optimizing traffic flow, increasing vehicle availability, and prioritizing safety protocols. Such improvements would significantly elevate the quality of passenger transport services across the assessed areas in the Jimma Zone.

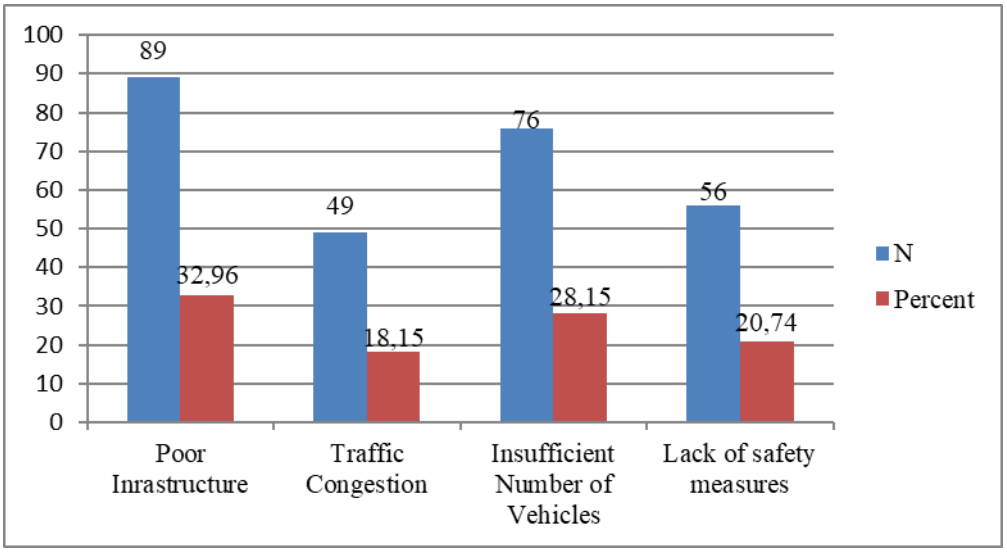

Figure 1: Challenges of passengers transport service

Source: Own survey data, 2025 (N represents the number of respondents)

Effective route planning is widely recognized as vital for minimizing travel times and alleviating congestion. Increasing service frequency would reduce waiting times, thereby enhancing convenience and reliability for commuters. Affordable fares are crucial to balance accessibility for users particularly low-income groups with the economic sustainability of transport providers. Robust safety procedures, including rigorous maintenance and enforcement of standards, address passenger concerns about secure travel environments. Although only 7% of respondents explicitly highlighted improved safety processes, this aspect remains fundamental. These interconnected principles efficient routing, frequent services, affordable pricing, enhanced safety, and overall comfort form a comprehensive framework for reforming public transport. By aligning with community needs, these strategies aim to boost efficiency, reliability, affordability, comfort, and safety, ultimately fostering greater user satisfaction and utilization.

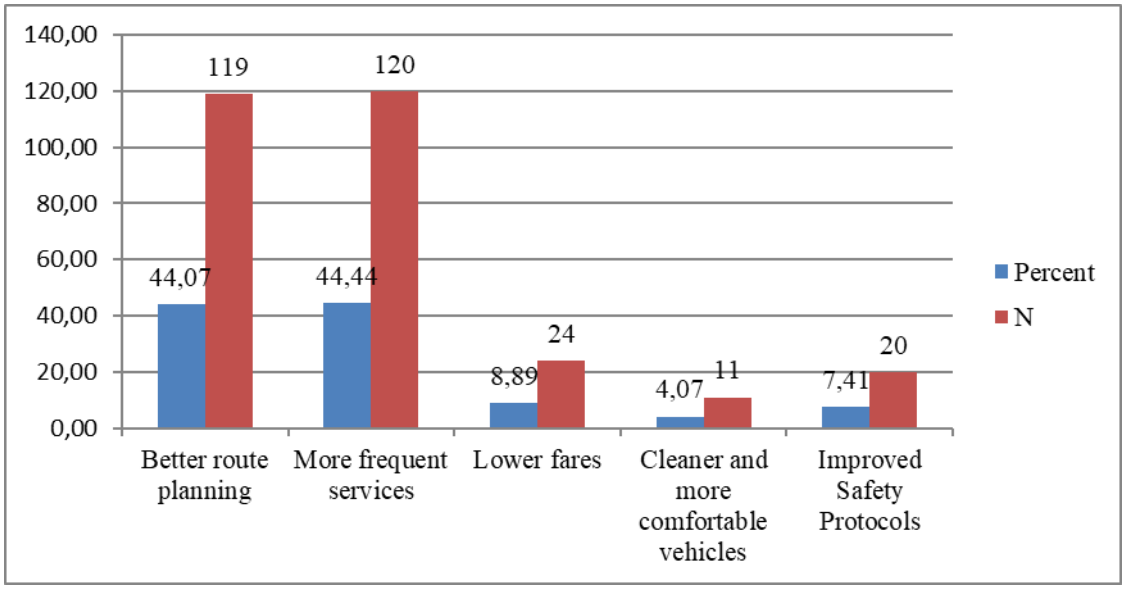

Figure 2: Priorities for Improving Public Transport
Source: Own survey data, 2025 (N represents the number of respondents)

3.2 Econometric Results

The key variables positively influencing passenger transport services in the study area are operational expenses (OPC), tariffs (TR), transport operator compliance (CTS), and enforcement methods (EM). The findings highlight the critical role of infrastructure in determining transport efficiency, aligning with Botrić et al. (2023), who emphasize that poor road conditions increase travel times, vehicle wear, and safety risks. In Jimma-Nono Benja, 68% of respondents rated infrastructure as poor, contributing to delays affecting 75% of users. These delays have significant socioeconomic implications, limiting access to markets, healthcare, and education, particularly for low-income households. The positive influence of tariffs and operational costs on service quality suggests that investments in vehicle maintenance and fuel efficiency can enhance reliability, although high tariffs pose affordability challenges for low-income users (Chae et al., 2023). The negative impact of enforcement mechanisms indicates that overly stringent regulations may burden operators, reducing their ability to provide efficient services. This finding aligns with Yuda et al. (2023), who argue for balanced regulatory frameworks that support operators while ensuring accountability. Operator compliance positively influences service quality, suggesting that adherence to safety and service standards can enhance passenger trust and satisfaction. However, qualitative data revealed gaps in operator training, with passengers reporting rude behavior and unsafe practices, which align with customer satisfaction theory (Parasuraman et al., 1985).

Frequent delays, affecting 75% of users, mirror challenges identified in urban Ethiopian studies (Weldeamanuel, 2023) but are exacerbated in rural contexts by poor infrastructure and seasonal demand variability. For example, during rainy seasons, unpaved roads become impassable, isolating communities and disrupting services. Opportunities for improvement, such as infrastructure upgrades (72% priority), fleet expansion (65%), and smart technology adoption (58%), offer practical pathways to enhance reliability and accessibility. For instance, GPS tracking and real-time scheduling could improve punctuality, addressing the low confidence in on-time arrivals (25% confident). These findings provide a foundation for targeted interventions that align with Ethiopia's national development goals and the SDGs, particularly SDG 9 (Industry, Innovation, and Infrastructure) and SDG 11 (Sustainable Cities and Communities).

Table 2: Multiple linear regression result

Variables	Coef.	SE	P >|Z|
Tariffs	0.464	0.940	0.001
Government Policies and Regulations	-0.022	0.055	0.889
Demand Variability	0.259	0.710	0.715
Legal framework governing transport services	-0.106	0.065	0.635
Compliance by transport operators	0.510	0.869	0.000
Operational Cost	0.155	0.213	0.007
Enforcement Mechanisms	-7.230E-6	0.000	0.035
Road Infrastructure	-0.159	0.888	0.658
Constant			

Source: Own survey data 2025

4. Conclusion and Recommendations

4.1 Conclusion

This study offers a thorough examination of the factors shaping passenger transport services in the Jimma-Nono Benja District, a vital area for socioeconomic linkages within Ethiopia's Jimma Zone. Employing a mixed-methods approach, the research identified tariffs, operational costs, and operator compliance as strong positive determinants of service quality, whereas stringent enforcement mechanisms exert a negative influence. Major obstacles include inadequate infrastructure, traffic congestion, vehicle scarcity, and recurrent passenger delays, all of which restrict access to essential services such as markets, healthcare facilities, and educational institutions. Passenger satisfaction with service reliability remains moderate, with qualitative insights revealing persistent concerns over elevated fares, discourteous conductor conduct, and inefficient complaint resolution processes. The study successfully achieves its objectives by pinpointing barriers to dependable transport and illuminating pathways for enhancement, including infrastructure improvements, fleet expansion, and the integration of smart technologies. These evidence-based findings provide policymakers with a practical framework to elevate service quality, mitigate disparities, and foster sustainable socioeconomic progress in the Jimma Zone. The results extend beyond the local context, offering valuable lessons for rural transport systems across Ethiopia and sub-Saharan Africa, where analogous challenges prevail. Targeted interventions in these areas hold the potential to bolster accessibility, stimulate economic growth, improve quality of life, and align with Ethiopia's national development priorities and broader global sustainability goals.

4.2 Recommendations

To overcome the identified challenges and elevate passenger transport services in the Jimma-Nono Benja District, the following evidence-based recommendations are put forward: prioritize substantial investments in rural road construction and ongoing maintenance, given that many respondents rated existing infrastructure as inadequate. Partner with international organizations to obtain funding and technical support for durable upgrades, such as paving critical routes and constructing bridges to ensure year-round connectivity, particularly during rainy seasons. Tackle vehicle shortages by offering subsidies or low-interest loans to transport operators for procuring fuel-efficient, higher-capacity vehicles. Such measures would boost service frequency and dependability, better serving daily commuters and alleviating overcrowding. A reform enforcement mechanism is essential to counteract their adverse effects on service quality. Develop transparent, supportive regulations that maintain operator accountability while allowing necessary operational flexibility. Introduce digital complaint platforms, including mobile applications and dedicated hotlines, to remedy dissatisfaction with current handling procedures, thereby enhancing responsiveness and accountability. Establish equitable tariff structures that preserve affordability for low-income passengers many of whom earn less than 3,000 Birr monthly while ensuring operators recover costs. Support this with training programs focused on efficient cost management, including route optimization and fuel-conserving driving techniques, enabling quality improvements without fare hikes. Invest in GPS-based tracking and real-time scheduling systems, which 58% of respondents prioritized, to enhance punctuality and deliver reliable information to passengers, addressing the low confidence in timely arrivals (only 25% expressed assurance). Pilot these technologies in the Jimma-Nono Benja

District to assess their viability in rural environments. Mandate comprehensive training for drivers and conductors in customer service, safety standards, and conflict resolution to counter reports of rude behavior and unsafe operations. Ground these programs in established customer satisfaction principles to meaningfully improve passenger experiences. These recommendations seek to enhance the reliability, accessibility, and safety of passenger transport services, ultimately promoting socioeconomic advancement and reducing inequalities across the Jimma Zone. Successful implementation requires coordinated efforts among government bodies, transport operators, community stakeholders, and development partners to guarantee long-term sustainability and measurable outcomes.

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