impact International Journals and Publications

© IIJP 2026 | Volume 2, Issue 3, pp. 2668-2681 | ISSN: 2636-4484

COMMUTING EXPERIENCE AND PERCEIVED WORK OUTCOMES AMONG CIVIL SERVANTS USING THE TIN CITY METRO, JOS, NIGERIA

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ARTICLE INFO

Article No.: 0615
Accepted Date: 02/09/2026
Published Date: 30/09/2026
Type: Research

ABSTRACT

Urban public transport interventions are increasingly used to address commuting constraints in rapidly growing African cities, yet evidence from secondary cities and specific worker populations remains limited. This study examines reported commuting patterns, service-quality perceptions, and work-related outcomes among civil servants using the Tin City Metro service in the Jos-Bukuru metropolis of Plateau State, Nigeria. A quantitative cross-sectional survey design was employed. The study targeted civil servants in the study area and administered 377 questionnaires, of which 300 usable responses were returned, yielding a 79.6% response rate. Descriptive statistics were used to summarize mode choice, journey time, commuting cost, travel frequency, service-quality perceptions, and perceived work and well-being outcomes. 51% of respondents identified Tin City Metro as their primary commuting mode. The reported journey times were concentrated in the 21-30 (34%) and 31-40 (44.3%) minute ranges, while ₦400 (51%) and ₦800 (18.3%) were the most frequently reported daily commuting-cost categories. About 50.3% of respondents reported favorable assessments of reliability, 50% of safety, 50% of fare affordability, and 50% of accessibility, while about 68% and 67% reported dissatisfaction with comfort/cleanliness and driver/operator professionalism, respectively. About 51% reported positive effects on punctuality and work productivity/efficiency, while 50% indicated that transport challenges affected job satisfaction, and 50% were neutral regarding physical and mental well-being. The findings indicate substantial adoption and mixed service quality, but they do not establish causal effects given the descriptive, self-reported design. The study contributes context-specific evidence on organized urban bus transport in a secondary Nigerian city and identifies operational priorities for reliability, passenger experience, and network integration.

Keywords: Public transport, Urban bus service, Commuting, Service quality, Civil servants, Productivity, Well-being, Jos, Nigeria

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1. Introduction

Urban mobility is closely connected to access to employment, household welfare, social participation, and the functioning of city economies. For workers with fixed schedules, the daily commute is not simply a movement between two locations; its duration, reliability, monetary cost, comfort, and predictability can shape how workers allocate their time, work experience, and non-work life. Jos is a major urban centre in Plateau State, and its civil servants constitute a defined commuter population. Civil servants generally operate within structured work schedules, making punctuality and predictable travel particularly salient. The Tin City Metro initiative was formally launched in Jos, the Plateau State capital, on 7 May 2024 with 15 MAN diesel buses, intended to reduce intra-city transport costs and ease commuting difficulties in Jos and its environs. A second phase involving 15 additional buses was commissioned in June 2025, bringing the reported fleet to 30 buses across the Greater Jos metropolis. Tin City Metro is not classified as a Bus Rapid Transit (BRT) system. Established BRT literature defines BRT as a package involving features such as dedicated busways or rights-of-way, modern vehicles, and intelligent transport technologies (Deng & Nelson, 2011). The distinction is important because Tin City Metro should be assessed as an organized urban bus service rather than against the specific infrastructure and operational characteristics of a BRT system, with attention therefore placed on the service and commuting attributes experienced by its users.

The research problem is not whether Tin City Metro has caused productivity gains but whether the service is associated with distinctive commuting patterns, how users evaluate its service quality, and whether users perceive meaningful work-related and well-being consequences. Three gaps motivate the study. First, evidence on organized public transport in Nigeria is disproportionately concentrated in large metropolitan settings such as Lagos (Alade et al., 2019; Aderinlewo et al., 2020), while medium-sized cities such as Jos remain less studied. Second, many studies aggregate all commuters, even though worker groups with fixed schedules may experience transport constraints differently. Third, transport evaluations often focus on operational performance or satisfaction without explicitly linking commuting experience to perceived workplace outcomes. The study responds to these gaps by linking three empirical domains: commuting characteristics, service-quality perceptions, and reported work and well-being outcomes. It does not claim that these domains are causally linked; rather, it documents their observed distribution within the surveyed population. The study therefore contributes context-specific evidence by bringing these three domains together in the context of an organized urban bus service in a Nigerian secondary city, with particular attention to civil servants in Jos.

Aim and Objectives

The aim is to assess the commuting experience and perceived work outcomes among civil servants using the Tin City Metro, Jos. The specific objectives are to:

i. examine the commuting experience of civil servants using the Tin City Metro service in Jos-Bukuru, including journey time, commuting cost, travel frequency, and service-quality perceptions.

ii. assess the perceived effects of the Tin City Metro commuting experience on civil servants' punctuality, work productivity/efficiency, and job satisfaction.

iii. examine the reported relationship between commuting experience and the physical and mental well-being of civil servants using the Tin City Metro service.

Literature Review

Conceptual Review

1 Commuting, Work and Well-Being

Commuting refers to the regular movement between a person's residence and place of work and constitutes an important component of the daily work experience. It involves more than physical movement; the duration, cost, reliability, comfort and predictability of the journey determine the time and resources workers devote to accessing employment. For workers with fixed schedules, commuting conditions may be particularly consequential because delays, excessive waiting or unreliable services can interfere with punctual arrival and the allocation of time before and after work. In this study, commuting experience refers to the characteristics and perceptions associated with workers' daily journeys, particularly mode of transport, journey time, commuting cost and frequency of travel. These characteristics provide the immediate context within which users experience Tin City Metro. The concept of commuting experience is therefore broader than transport use itself because it incorporates the temporal, financial and experiential dimensions of the journey. Work outcomes refer to employees' perceptions of how their commuting circumstances relate to their ability to meet workplace requirements. The present study focuses specifically on perceived punctuality, productivity or work efficiency, and job satisfaction. Well-being is treated as a related but distinct outcome, encompassing respondents' perceived physical and mental well-being. The distinction between perceived and objectively measured outcomes is important: the study examines workers' reported experiences rather than attendance records, supervisor-rated productivity or clinical measures of health.

2 Public Transport Service Quality

Public transport service quality refers to the extent to which a transport service meets users' expectations and requirements concerning the characteristics of the journey and their interaction with the service. It is inherently multidimensional because users may evaluate a service differently according to its reliability, safety, cost, accessibility, physical conditions and operator behaviour. Thus, fare or vehicle availability alone provides an incomplete representation of public transport quality. Table 1 conceptualises service quality through six dimensions.

Table 1 Dimensions of service quality

Dimension	Conceptual meaning in this study
Reliability	Consistency and predictability of service operation and travel arrangements.
Safety	Perceived protection from traffic, crash and personal-security risks.
Affordability	Perceived financial manageability of the cost of using the service.
Accessibility	Ease of reaching, boarding and using the service for daily commuting.
Comfort and cleanliness	Physical condition, cleanliness, seating and general comfort of vehicles and waiting environments.
Operator professionalism	Courtesy, conduct, responsiveness and quality of interactions between operators/staff and passengers.

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These dimensions capture both technical aspects of service delivery, such as reliability and accessibility, and user-experience attributes, including comfort, cleanliness and operator professionalism. Safety and affordability additionally reflect the extent to which the service is perceived as secure and financially accessible. In combination, the dimensions provide a comprehensive basis for assessing how civil servants experience an organised urban bus service.

3 Public Transport and Commuter Experience in the Nigerian Context

Public transport provides the connection between residential locations, employment centres and other urban activities. In Nigeria, the commuter experience is shaped by the interaction of formal and informal transport modes, road conditions, travel demand, service reliability, affordability and accessibility. Organised bus services represent one response to these mobility challenges because they provide a structured alternative to more fragmented forms of urban transport. The Nigerian context is important because transport-service concepts developed largely from high-income or highly regulated transport systems cannot be transferred uncritically to Nigerian cities. Differences in infrastructure, income, road conditions, travel behaviour, institutional arrangements and the coexistence of formal and informal modes can influence how service quality is experienced. The present study consequently applies the general dimensions of public transport service quality to the specific context of Tin City Metro and its users rather than assuming that their relative importance is identical to that reported elsewhere. For Jos, the introduction of Tin City Metro provides a distinct context for examining organised urban bus transport. Previous research on public transportation in Jos has largely addressed the broader urban transport system, including conventional and informal modes. The present study focuses more narrowly on users of the government-organised bus service and, specifically, on civil servants whose structured working hours make commuting reliability and predictability particularly relevant.

4 Accessibility and the Spatial Context of Commuting

Accessibility concerns the ease with which people can reach desired destinations through available transport and the surrounding spatial environment. In public transport, accessibility is not limited to the presence of a bus or the availability of a route. It also encompasses the connection between residential areas, stops, routes, workplaces and other modes used to complete a journey. Consequently, a service may be available but still impose a substantial commuting burden where access to stops or onward connections is difficult. The spatial context of commuting therefore provides an important background to understanding public transport experience in Jos-Bukuru. Residential distribution, employment concentrations, road-network connectivity and the location of transport stops can influence the practical accessibility of Tin City Metro. However, land-use configuration, residential-to-workplace distance and detailed spatial accessibility are not directly measured in the present survey. They are consequently treated as contextual concepts that help explain commuting experience rather than as variables subjected to empirical testing. Overall, the conceptual review positions service quality and commuting characteristics as the principal dimensions of the commuting experience, while perceived work outcomes and well-being represent the principal reported consequences examined in the study. This conceptualisation provides the basis for the subsequent empirical review and the study's conceptual framework, without implying causal relationships between these domains.

Theoretical Perspectives

Three complementary perspectives inform the conceptual framing of the study.
1 The residential/job-location perspective: treats commuting as a consequence of spatial trade-offs between residential location, employment opportunities and travel burden. White (1986), for example, provides an empirical contribution to the analysis of urban commuting patterns and gender differences. In the present study, this perspective provides a background explanation for why transport connectivity can influence the practical burden associated with spatial separation between homes and workplaces, even when residential and employment locations themselves remain unchanged. Because residential location, workplace location and commuting distance were not directly measured in the questionnaire, this perspective serves primarily as contextual background rather than as a directly tested explanatory model.

2 Ajzen's (1991) Theory of Planned Behavior (TPB): provides a complementary behavioural perspective. The theory proposes that attitudes, subjective norms and perceived behavioural control contribute to behavioural intentions and subsequent behaviour. In the present study, perceptions of reliability, safety, affordability and accessibility are conceptually relevant to perceived behavioural control because they concern the extent to which the service is perceived as manageable and practicable to use. Comfort/cleanliness and operator professionalism are more closely related to users' evaluations or attitudes toward the service. The questionnaire did not include a direct measure of subjective norms (the social expectations surrounding use of the service), so this component of the theory is not empirically covered; this gap is discussed further in Section 7.1 (Limitations).

3 Utility perspective: provides a further basis for understanding commuting choices by treating travellers as weighing competing attributes such as travel time, monetary cost, reliability, comfort, safety and convenience. In the present study, this perspective helps explain why commuters may evaluate the same transport service differently depending on the combination of time, cost and service characteristics they experience. As with the preceding perspectives, the utility perspective informs interpretation of the observed commuting patterns rather than implying causal choice mechanisms.

Empirical Review

Empirical research demonstrates that public transport service quality is multidimensional and extends beyond fare levels or vehicle availability. Reliability, accessibility, safety, comfort, waiting time, travel time and service encounters are recurrent determinants of passengers' evaluations. A systematic review of 104 studies on bus transport in developing countries found that safety, security, comfort, reliability and accessibility were among the most important determinants of perceived service quality and passenger satisfaction, while first- and last-mile connectivity remained a persistent challenge (Sogbe et al., 2025). This evidence indicates that service quality is experienced across the complete journey, including access to stops, waiting, the in-vehicle journey and connection to the final destination.

Lunke (2020) provides further empirical evidence from a survey of 7,630 public transport commuters in Oslo. Using ANOVA and regression analysis, the study found that waiting time, walking distance to stations, transfers, reliability and commute duration were associated with

commuter satisfaction. Longer waiting times and journeys were generally associated with lower satisfaction, while some effects varied according to journey characteristics. The study is particularly relevant because its respondents were workers commuting to their workplaces. Nigerian evidence also supports the multidimensional nature of transport-service evaluation. Olawole (2021), using data from 272 commuters in Abeokuta, applied SERVPERF, exploratory factor analysis and multiple regression and identified four service-quality factors explaining 59.06% of the variance in satisfaction. Three factors significantly influenced perceived satisfaction, demonstrating that commuters' evaluations extend beyond a single operational attribute.

Evidence from Lagos further illustrates the importance of operationally specific measures. Aderinlewo et al. (2020), examining the Lagos BRT system, incorporated passenger arrival rates, boarding and alighting patterns, headway, waiting time and travel time into their operational assessment. Such measures demonstrate why generalized satisfaction alone may not adequately capture public transport performance. However, the present study does not contain sufficient route-level operational records to reproduce a network-performance analysis of this type.

The Jos context is particularly important. Owoeye et al. (2022) examined the operational characteristics of public transportation in Jos using primary and secondary data and reported, among other findings, that 35% of buses experienced overloading during weekday peak periods. The authors consequently emphasized the need for higher-capacity public transport to reduce passenger waiting time. However, their study examined the broader conventional and informal transport system before the introduction of Tin City Metro in 2024. It therefore provides useful pre-intervention contextual evidence but does not evaluate the current organized bus service.

Beyond service quality, empirical research demonstrates that commuting characteristics themselves are associated with workers' experiences. Lunke (2020) found that commute duration, waiting time, transfers and walking distance were related to satisfaction among public transport users. Similarly, Simón et al. (2020), examining workers in Spain, found that longer commuting times were associated with lower satisfaction across several life domains, including job satisfaction. These findings provide empirical justification for considering journey time, commuting frequency, cost and mode alongside service-quality perceptions in the present study. However, much of this evidence derives from European cities whose transport infrastructure, spatial structures and socioeconomic conditions differ substantially from those of Jos. The findings should therefore inform the analytical framework rather than be assumed to apply directly to the Nigerian context.

A further body of research examines the relationship between commuting and workers' broader well-being. Chatterjee et al. (2020), in a critical review of empirical studies, concluded that commuting can affect individuals during the journey, immediately afterwards and over longer periods. Congestion, crowding and unpredictability may generate stress and affect experiences at work and home, although evidence concerning overall life satisfaction remains mixed. Clark et al. (2020), using longitudinal panel data involving more than 26,000 workers, found associations between commuting characteristics and job satisfaction, leisure-time satisfaction and self-reported health. The longitudinal design allows changes within individuals to be examined over time.

Norgate et al. (2020) reached similar conclusions in a systematic review of 47 quantitative studies on public transport commuting and the health of working people. The review identified evidence relating commuting conditions to perceived stress, health complaints, sickness-related outcomes and sleep, while also noting the substantial reliance on self-reported measures. More recently, Tao et al. (2023), reviewing 41 longitudinal studies, concluded that the commuting–well-being relationship remains complex and context-dependent. Although longitudinal evidence is better suited to examining changes over time, the review emphasized the difficulty of separating commuting effects from simultaneous changes in residential, occupational and personal circumstances.

Collectively, these empirical studies justify examining commuting characteristics, service quality, work-related outcomes and well-being within a common analytical framework. They suggest that commuters' experiences depend not only on whether public transport is available but also on the reliability, affordability, accessibility, safety, comfort and predictability of the journey. They also indicate that commuting conditions may extend beyond the transport journey into workers' perceptions of job satisfaction, productivity and well-being. Nevertheless, the existing evidence does not establish that use of a particular public transport intervention necessarily causes improvements in these outcomes.

This distinction is particularly important for the present study. The Tin City Metro research measures work outcomes and well-being through respondents' perceptions rather than attendance records, supervisor assessments, objective productivity measures, physiological indicators or longitudinal observations. Accordingly, the study examines perceived work and well-being outcomes rather than objectively measured productivity or health effects. The evidence reviewed above provides empirical justification for examining these outcomes but does not imply that Tin City Metro caused them.

Research Gap

The literature reveals three important gaps. First, Nigerian public transport research has concentrated substantially on operational performance, passenger satisfaction and major metropolitan systems, particularly Lagos, with comparatively limited evidence on organized bus services in secondary cities such as Jos. Second, existing studies frequently examine general passenger populations rather than workers with structured employment schedules, whose commuting requirements may make punctuality and journey reliability particularly consequential. Third, relatively few studies integrate commuting characteristics, multidimensional service-quality perceptions and perceived work and well-being outcomes within a single empirical framework. The present study addresses these gaps by examining civil servants using Tin City Metro in Jos and documenting the distribution of their commuting characteristics, evaluations of service quality, and perceived work-related and well-being outcomes. Given its descriptive design, the study identifies patterns and reported associations rather than causal effects.

5 Conceptual Model

The strengthened conceptual model is: Public Transport Service Quality → Commuting Experience → Perceived Work Outcomes and Well-being. Socio-demographic characteristics and trip context are treated as potential conditioning factors. The arrows represent hypothesized relationships for interpretation rather than demonstrated causal pathways.

Methodology

1 Study Area

The study was conducted in Jos, the Plateau State capital, located in the North-Central region of Nigeria. The state lies approximately between latitude 8°24′N and 10°38′N and longitude 7°45′E and 9°22′E. It shares boundaries with Bauchi State to the northeast, Kaduna State to the northwest, Nasarawa State to the southwest, and Taraba State to the southeast (National Bureau of Statistics [NBS], 2018). The research specifically focuses on Jos North Local Government Area, Jos South Local Government Area, and part of Jos East Local Government Area, which together constitute the Jos metropolitan area. These areas serve as the administrative and commercial hub of the state (Plateau State Government, 2018).



Figure 1: Administrative Map of Plateau State and Its Constituent Local Government Areas (Source: National Bureau of Statistics, 2018)

2 Sampling and Instrument

A quantitative cross-sectional survey design was used. The target population comprised civil servants working within the study area, including personnel in the Plateau State Secretariat, Federal Secretariat, and selected government agencies. The study used a working population estimate of approximately 19,500 civil servants (Plateau State Government, 2018 administrative and demographic records). Based on the Krejcie and Morgan (1970) table, the required sample size for this population is approximately 377. Accordingly, 377 questionnaires were administered, and 300 usable responses were returned, producing a response rate of 79.6%.

The questionnaire covered socio-demographic characteristics, primary commuting mode, journey time, daily commuting cost, commuting frequency, and perceptions of reliability, comfort/cleanliness, safety, fare affordability, operator professionalism, and accessibility. Respondents also reported perceived effects on punctuality, productivity/efficiency, job satisfaction, and physical/mental well-being. The original instrument used five-point Likert responses (Strongly Disagree to Strongly Agree) for service-quality and outcome items.

Descriptive statistics were used to summarize mode choice, journey time, commuting cost, frequency of travel, service-quality perceptions, and perceived work and well-being outcomes. No bivariate or correlational test was applied, consistent with the study's descriptive rather than inferential objectives.

Results and Discussion

1 Respondent Characteristics

Table 2: Respondent Characteristics (N = 300)

Characteristic	Category	Share	n (of 300)
Age	18-27	9%	27
	28-37	21%	63
	38-47	50.7%	152
	48-57	19.3%	58
Gender	Male	70.7%	212
	Female	29.3%	88
Marital status	Single	11%	33
	Married	70%	210
	Divorced	8.3%	25
	Widowed	10.7%	32
Education	Secondary	9%	27
	Diploma	20.7%	62
	Bachelor's	41%	123
	Master's	29.3%	88
Occupation	Civil servant	100%	300

Table 2 shows that the sample is dominated by respondents aged 38-47 years (50.7%), with males representing 70.7% and 70% married respondents. Bachelor's and master's degree holders together account for 70.3%.

2 Commuting Patterns

Table 3: Reported Commuting Patterns (N = 300)

Indicator	Category	Share	n (of 300)
Primary mode	Tin City Metro	51%	153
	Taxi	17.3%	52
	Motorcycle	18.3%	55
	Private car	13.3%	40
Journey time	11-20 minutes	11.7%	35
	21-30 minutes	34%	102
	31-40 minutes	44.3%	133
	41-50 minutes	10%	30
Daily commuting cost	₦400	51%	153
	₦800	18.3%	55
	₦1,000	13%	39
	₦2,000	4.3%	13
Frequency	Daily	60.7%	182
	3-4 times weekly	39.3%	118

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Tin City Metro is the dominant reported primary mode in the sample, accounting for 51% of respondents, suggesting substantial adoption of Tin City Metro among surveyed civil servants. 21 – 30 minutes (34%) and 31 – 40 minutes (44.3%) together suggest that 78.3% of civil servants journey time to work is between 21 and 40 minutes, and the most common daily-cost category is ₦400 (51%), followed by ₦800 (18.3%).

4.3 Service-Quality Perceptions

Table 4: Service-Quality Perceptions (N = 300)

Attribute	Reported Direction	Share	n (of 300)
Schedule reliability	Positive	50.3%	151
Safety	Positive	50%	150
Fare affordability	Positive	50%	150
Accessibility	Positive	48.3%	145
Comfort and cleanliness	Negative/dissatisfied	68%	204
Driver/operator professionalism	Negative/dissatisfied	67%	201

The service-quality profile is polarized. Reliability, safety, affordability and accessibility receive favourable assessments. Comfort/cleanliness and operator professionalism are reported as weaknesses. This pattern is broadly consistent with developing-country bus-service research, where safety, reliability, comfort and accessibility repeatedly emerge as important determinants of satisfaction (Sogbe et al., 2025).

The contrast between favourable assessments of reliability, safety, affordability and accessibility and unfavourable assessments of comfort/cleanliness and operator professionalism is arguably the most policy-relevant result. It indicates that access to a low-cost organized bus service does not automatically imply high overall service quality. The finding closely corresponds to the systematic developing-country evidence that passenger satisfaction is multidimensional and that comfort and service encounters matter alongside affordability and reliability (Sogbe et al., 2025). The implication is that policy should move beyond fleet acquisition toward service-management indicators: vehicle cleanliness, preventive maintenance, driver behaviour, schedule adherence, passenger complaints, crowding, stop accessibility and route-level reliability.

4 Perceived Work and Well-Being Outcomes

Table 5: Perceived Work and Well-Being Outcomes (N = 300)

Outcome	Reported Direction	Share	n (of 300)
Punctuality at work	Positive	51%	153
Work productivity/efficiency	Positive influence	50%	150
Job satisfaction	Reported an effect (direction not specified)	50%	150
Physical/mental well-being	Neutral	50%	150

The work-outcome results require careful interpretation. 51% report positive effects on punctuality and work productivity/efficiency. However, the data do not establish objective productivity improvement. Similarly, the 50% result for job satisfaction means that transport challenges were reported to affect job satisfaction; it does not indicate whether the effect was positive or negative. The neutral response from 50% of respondents on physical/mental well-being suggests that transport organization alone may not be sufficient to remove commuting-related stress or fatigue. This is compatible with the wider empirical literature showing that commuting duration and conditions can influence subjective well-being (Clark et al., 2020).

The findings support a service-improvement agenda centred on reliability and passenger experience. Operational monitoring should include headway, waiting time, journey time, vehicle availability, breakdowns, passenger loads, and route-level demand. Nigerian BRT research demonstrates the feasibility and value of collecting such operational data (Aderinlewo et al., 2020). First- and last-mile integration is also important. Evidence from Lagos shows that BRT users may walk, use motorcycles, or connect through other modes to reach stops, meaning that the quality of a bus system cannot be evaluated solely inside the vehicle. This is particularly relevant for Jos, where the spatial relationship between residential neighbourhoods, bus stops and government workplaces may determine effective accessibility (Ewing & Cervero, 2010).

Conclusion

The findings indicate that Tin City Metro has become an important component of the commuting experience among the surveyed civil servants in Jos-Bukuru. Its reported strengths in reliability, safety, affordability and accessibility coexist with notable weaknesses in comfort/cleanliness and operator professionalism. The findings also show that users perceive the service as relevant to punctuality and work productivity/efficiency, while perceptions of its effects on job satisfaction and physical/mental well-being are less uniformly positive. Overall, the study establishes a clear pattern of service use, multidimensional service-quality perceptions and reported work and well-being outcomes, but not a causal effect of Tin City Metro on those outcomes. The principal implication is that the value of the service should be assessed not only in terms of ridership but also through the quality and predictability of the commuting experience. Future assessment should therefore combine user-based evidence with longitudinal data, route-level operational indicators and objective measures of work and service performance.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. The Plateau State government should prioritize vehicle cleanliness, preventive maintenance and passenger comfort because these are the clearest reported weaknesses, strengthen driver/operator training and accountability, with measurable indicators for passenger relations, safe driving and service discipline.

2. Tin City Metro management should introduce systematic passenger-satisfaction and complaint monitoring and publish key service-performance indicators.

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Limitations

Several limitations qualify the findings of this study. First, the cross-sectional design captures perceptions and reported behaviour at a single point in time and cannot establish causal relationships between Tin City Metro use, service-quality perceptions, and work or well-being outcomes. Second, all commuting, service-quality, and outcome measures are self-reported rather than derived from objective records such as GPS-tracked journey times, attendance logs, or supervisor-rated performance, which may introduce recall or social-desirability bias. Third, the absence of a pre-intervention baseline means the study cannot demonstrate that Tin City Metro produced a modal shift, a reduction in travel time, or a change in any outcome relative to conditions before the service was introduced. Fourth, the analysis is descriptive rather than inferential, no bivariate or correlational tests were applied, so the reported associations between commuting experience and work or well-being outcomes are patterns of co-occurrence rather than statistically tested relationships. Fifth, the questionnaire did not include a direct measure of subjective norms, limiting the study's ability to fully operationalize the Theory of Planned Behavior framework it draws upon. Finally, the dataset lacks route-level operational detail, such as headway, waiting time, vehicle breakdowns, and passenger loads, that would be needed to reproduce a full network-performance analysis of the kind conducted for Lagos BRT.

Directions for Future Research

Building on these limitations, future research could strengthen the evidence base in several ways. A panel or longitudinal design that follows the same civil servants before and after exposure to Tin City Metro, in the manner of Clark et al. (2020), would allow stronger inference about modal shift, travel-time change, and work or well-being effects. Linking survey responses to objective records, such as attendance logs, lateness records, or supervisor-rated performance, would help distinguish perceived from actual productivity effects. Future studies could also collect route-level operational data, including headway, waiting time, passenger loads, and breakdown frequency, to permit the kind of network-performance analysis conducted for Lagos BRT. Extending the instrument to include a direct measure of subjective norms would allow a fuller test of the Theory of Planned Behavior framework. Further research could examine whether perceived safety, comfort, and accessibility differ systematically by gender, given the male-dominated composition of the present sample, and could extend this line of inquiry to other Nigerian secondary cities introducing organized bus services, to establish whether the patterns identified in Jos reflect broader dynamics or are specific to this context.

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