



Urban mobility and citizen perception: quality, safety, and comfort of public transportation in Bogotá

Movilidad urbana y percepción ciudadana: calidad, seguridad y confort del transporte público en Bogotá

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ABSTRACT This study analyzes how the quality, safety, and comfort of public transportation influence usage frequency and citizen satisfaction in Bogotá, within a framework of sustainable mobility and spatial justice. Based on surveys of 385 users and correlation analysis, a critical gap was identified: 60% of users perceive insecurity and 40% rate service quality negatively. Perceived quality correlates with frequency of use ($r = 0.35$, $p < 0.05$), while comfort emerges as a key factor in satisfaction. The results show that the deficit in well-being and trust limits system efficiency and reproduces territorial inequality, guiding strategies consistent with SDG 11.

RESUMEN Este estudio analiza cómo la calidad, la seguridad y el confort del transporte público inciden en la frecuencia de uso y la satisfacción ciudadana en Bogotá, desde un enfoque de movilidad sostenible y justicia espacial. Con base en encuestas a 385 usuarios y análisis de correlación, se identificó una brecha crítica: el 60% percibe inseguridad y el 40% califica negativamente la calidad del servicio. La percepción de calidad se relaciona con la frecuencia de uso ($r = 0.35$, $p < 0.05$), mientras el confort es un factor clave de satisfacción. Los resultados muestran que el déficit en bienestar y confianza limita la eficiencia del sistema y reproduce desigualdad territorial, orientando estrategias acordes con el ODS 11.

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KEYWORDS public transportation, citizen perception, urban environment quality, urban planning, sustainable mobility

PALABRAS CLAVE transporte público, percepción ciudadana, calidad urbana, planificación urbana, movilidad sostenible



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1. Introduction

Urban mobility is a structural element in large contemporary cities, given its impact on quality of life, environmental sustainability, and social cohesion. In Latin America, rapid population growth and disorderly metropolitan expansion have increased demand for efficient public transportation and safe pedestrian infrastructure, challenging institutional capacity to implement comprehensive, sustainable mobility policies (Eberts, 2000; Berechman et al., 2006; Weisbrod, 2008).

This context has made sustainable urban mobility a central focus of planning, understood not only as a technical issue of efficiency, but also as a social and political phenomenon that determines urban equity (Banister and Berechman, 2001; Ferrari et al., 2018; Asprilla-Lara et al., 2022). To address this dimension of equity, this study draws on the approaches of spatial justice (Harvey, 2013) and livable cities (Gehl, 2010), in which sustainable mobility seeks to ensure equitable access to urban goods and to promote a safe, comfortable, and efficient travel experience.

Following Oviedo and Bocarejo (2011) and Sánchez Caballero (2024), service quality, perceived safety, and travel comfort are interrelated dimensions that influence citizen satisfaction and the legitimacy of mobility policies. In this regard, recent literature highlights that transportation systems should also be evaluated based on their perceived social value (Wener and Evans, 2011; Cárdenas Jaramillo and González Pérez, 2023). Pedestrian traffic and accessibility to public spaces are essential components of urban equity, as they promote social interaction and reduce vulnerability (Ponce et al., 2023), and they conceive non-motorized mobility as an extension of the right to the city (Lefebvre, 1978; Atencio Ortiz et al., 2024).

Together, the approaches of Harvey (spatial justice and redistribution of resources), Lefebvre (right to inhabit and appropriate space), and Gehl (design criteria that prioritize the human experience) allow us to understand urban mobility as a social and spatial right that transcends infrastructure. From this theoretical articulation, it is recognized that transportation policies must balance technical efficiency with citizen well-being. Based on this conceptual framework, the case of Bogotá is examined as an example of the tensions between planning, perception, and equity.

Bogotá, as an urban setting representative of the tensions between planning and citizen experience, is an emblematic case for examining these dynamics. Despite the implementation of mass transit systems such as TransMilenio and the Integrated Public Transport System (SITP), a critical gap remains between infrastructure efficiency and the quality of the urban experience. Deficiencies in service, perceived safety, and travel comfort, according to González-Savignat and Matas (2010) and Zúñiga-Ortega et al. (2025), condition citizen acceptance and the sustainability of the system. Criticisms of overcrowding and insecurity show that the focus on vehicle capacity is insufficient.

Experiences in cities such as Curitiba, Medellín, Buenos Aires, and São Paulo, where metropolitan trains have been essential for coordinating interurban mobility, show that the effectiveness of transportation policies depends as much on technical efficiency as on citizens' perception of well-being (Abarca Calderón et al., 2024; Lepe Miranda, 2025; Rosero Ordóñez, 2025). In the case of Bogotá, this emotional and perceptual dimension is key, as how citizens experience mobility, safety, and comfort also expresses urban sensibilities and emotional ties to public space. In this way, mobility reveals itself not only as a functional issue but also as a field of everyday experiences and urban emotions.

In this context, the city has made progress in formulating policies aimed at more inclusive mobility. Law 1753 of 2015 and the active mobility strategies promoted by the Mobility Secretariat promote an integrated vision of sustainable transport (Bogotá Mobility Secretariat, 2020; Martínez-Leiva, 2024). However, persistent territorial inequalities and institutional fragmentation continue to limit the real impact of these policies, highlighting the gap between regulatory design and the citizen experience of mobility.

From this analytical perspective, sustainable urban mobility will be addressed through empirical measurement of three interrelated axes: service quality, linked to operational efficiency; safety, associated with trust and risk perception; and comfort, understood as physical and psychological well-being during the trip. Together, these factors reflect the degree of territorial justice and social cohesion in the city (Harvey, 2013; Gehl, 2010).

Consequently, this study seeks to answer the following research question: How do the quality, safety, and comfort of public transportation affect citizens' perceptions and the frequency of use in Bogotá? Based on this question, the aim is to provide empirical evidence to guide the formulation of more inclusive and sustainable urban policies, focused on the daily experience of public transportation users. The study, therefore, seeks not only to identify these relationships but also to offer a critical reading of how citizen perception can reshape public transport planning in unequal urban contexts.

2. Methods

The evaluation of public transport in Bogotá required a rigorous methodological procedure that integrated dimensions of sustainable mobility, citizen opinion, and urban planning. This study adopted a quantitative, descriptive, and cross-sectional approach, framed within a positivist paradigm, which enabled an objective examination of the relationship between public transport characteristics and the performance of the urban environment, providing accurate, verifiable data for the formulation of public policies.

Phase 1: Study design. A quantitative, descriptive, and cross-sectional design was defined, suitable for analyzing variables related to citizen appreciation, public transport performance, and sustainable mobility in Bogotá. This design enabled the identification of patterns, correlations, and relationships among variables at a specific point in time, ensuring objectivity and reliability.

Phase 2: Definition of population and sample. The study population consisted of the inhabitants of Bogotá, estimated at 8,034,649 in 2024 (DANE). To ensure representativeness, a probabilistic sample of 385 public transport users was selected, with a 95% confidence level and a 5% margin of error. Stratified sampling was applied, accounting for geographic coverage, socioeconomic heterogeneity, and the modal distribution of transportation, ensuring the sample reflected the diversity of the Bogotá population.

Phase 3: Data collection instrument. A structured survey using a five-point Likert scale was administered to evaluate five key dimensions: accessibility, service performance, protection, assessment of the

urban environment, and sustainable mobility. The instrument's validity was verified through expert judgment using Aiken's V, which ensured the relevance and comprehensiveness of the items. Reliability was verified by calculating Cronbach's alpha, which yielded an overall value greater than 0.90, indicating internal consistency.

Phase 4: Data collection. The information was collected in person during January and February 2024 at 20 strategic TransMilenio stations (out of 138 stations and 9 portals) and at key points of the Integrated Public Transport System (SITP). These points were selected based on criteria of territorial representativeness, passenger volume, system functionality, and diversity of urban opinions, ensuring a broad and heterogeneous sample.

Phase 5: Data processing and analysis. The data were organized and processed using SPSS version 25. Descriptive statistical techniques (frequencies, means, and standard deviations) were applied to identify general trends. In addition, Pearson correlation analyses and multiple linear regression models were performed to evaluate significant relationships among variables and to determine how citizens' perceptions of transportation performance, safety, and comfort influence urban quality of life.

Phase 6: Comparative analysis and additional empirical reference. To contextualize the findings from Bogotá, comparisons were made with urban mobility studies in other Latin American cities with established mass transit systems, such as Medellín, Lima, and Cuenca. These analyses enabled comparisons of users' opinions on transport performance, safety, and comfort, identifying relevant patterns and differences in frequency of use and satisfaction (Ponce et al., 2023; Sánchez Caballero, 2024; Asprilla Lara et al., 2022). The incorporation of this external reference strengthened the validity of the results and provided a comparative framework to guide improvements in urban transport planning and management in Bogotá.

3. Results

The findings of this research were derived from the analysis of 385 surveys administered to public transport users in Bogotá, supplemented by systematic observations at TransMilenio and SITP stations and stops. The variables considered were service quality, safety, frequency of use, and comfort. The main results are presented below in detail, integrating critical and comparative interpretations that strengthen the study's validity.

To contextualize the findings, a summary of the Bogotá mobility system is provided. The city has a fragmented modal matrix: approximately 30% of daily trips are made by mass transit (TransMilenio and SITP), 35% by collective and informal transport, 15%

by private car, 10% by non-motorized modes (walking and cycling), and the remainder by motorcycle and other means. This distribution highlights the strong dependence on buses as the central axis of travel, with more than 3.5 million daily trips concentrated in TransMilenio and 1.2 million in the zonal SITP, as shown in Figure 1.

A distinctive feature of Bogotá has been the historical absence of urban rail infrastructure, which has consolidated the bus network as the backbone of mobility. This contrasts with Latin American capitals such as Mexico City, Santiago, and Lima, where metro systems already play a structuring role.

Currently, the First Line of the Bogotá Metro (PLMB) is under construction, connecting Bosa with Calle 72, and is scheduled to begin commercial operations in 2028. This project introduces a high-capacity rail network to the capital for the first time, representing a structural change in the logic of urban mobility.

Complementing this, the Regiotram de Occidente, a commuter train that will link Bogotá with municipalities in Cundinamarca such as Facatativá and Mosquera, is being implemented, with operations beginning in 2027. Added to this are the designs for the Regiotram del Norte and studies on a possible Corredor Sur as part of the regional rail transport system.

These developments seek to integrate metropolitan mobility and reduce pressure on bus trunk lines, which currently carry around 60% of inter-municipal trips to the capital, as shown in Figure 2.

The lack of a metro and train system to date explains much of the tension observed in the quality, safety, and comfort indicators. The dependence on buses as the main mode of transport has led to congestion, overcrowded stations, and long waiting times, especially in the suburbs. These structural factors help to understand how citizens value the system, as discussed below.

- Service quality: Transport quality was one of the most critically evaluated aspects. The average Likert score was 2.8 with a standard deviation of 0.9, indicating a predominantly negative assessment. 45% rated the service as “fair”, 30% rated it between “poor” and “very poor”, and only 25% rated it “good” or “very good.” The most frequent causes of dissatisfaction were lack of punctuality, poor coordination between routes, and deterioration of infrastructure, as shown in Figure 3.

An examination of the open comments showed that the notion of quality includes operational dimensions, staff treatment, accessibility, and cleanliness.



Figure 1: Schematic map of Bogotá's public transport system (TransMilenio and SITP). (2025)



Figure 2: Representative vehicles of Bogotá's public transport system: a) TransMilenio articulated bus and b) SITP zonal bus.
a) Lascar, J (2010) and b) Restrepo Acosta, F. (2013)

In spatial terms, contrasts emerged: while the suburbs (Ciudad Bolívar, Usme, Bosa) reported greater dissatisfaction due to long waits and overcrowding, central areas such as Chapinero and Teusaquillo received better ratings. This pattern reflects territorial inequalities that deepen social gaps and require more equitable urban planning.

- Safety: Safety was identified as the most sensitive issue. Sixty percent of respondents said they felt “unsafe” or “very unsafe”, while only 15% said they felt protected within the system. The Average was 2.4, with a standard deviation of 1.2, showing dispersion attributable to differences in schedule and location, as shown in Table 1.

70% said they had witnessed incidents such as theft, sexual harassment, vandalism, and fights. Women reported greater vulnerability, especially during rush hour, when physical proximity creates additional risks. The lack of police presence, damaged cameras, and poor lighting were the most frequently mentioned triggers of insecurity. In addition, critical stations in the south of the city and nighttime sections with adverse conditions were identified.

The age analysis revealed that young people are more willing to take risks than older adults. However, this does not necessarily imply a perception of greater safety, but rather resignation in the face of a lack of alternatives. This finding aligns with the quality results: the service's low reliability forces people to continue using it, even in conditions perceived as unsafe.

Frequency of use and links to quality. Public transport was described as essential in daily life: 50% used it daily, 25% between two and four times a week, and the rest sporadically.

On average, 3.8 days of weekly use and two daily trips were recorded, confirming the population's structural dependence on the system, as shown in Table 2.

The correlation between perceived quality and frequency of use was positive ($r = 0.35$; $p < 0.05$). However, this relationship suggests a paradox: those who use the system more tend to evaluate it with a certain degree of leniency, probably due to adaptation strategies, while sporadic users are more critical. This finding indicates that the system discourages occasional use, limiting its potential to attract new users.

The analysis by time slot reinforced this interpretation: trips during peak hours (5:30–8:30 a.m.) received the most negative ratings, highlighting overcrowding and safety concerns. These data suggest that the daily experience is directly conditioned by the available infrastructure and the system's capacity to absorb demand.

- Comfort and user experience: Comfort ratings were consistently low. Users cited lack of space, absence of air conditioning, excessive noise, and poor signage. Overcrowding was the main factor reported, with direct implications for perceived safety and overall satisfaction, as shown in Figure 4.

Observations confirmed recurring problems, including damaged seats, floors in poor condition, and the accumulation of waste on buses and at stations. These factors not only affect comfort but also convey an image of institutional neglect, undermining public confidence in the system. In addition, poor hygiene poses a health risk that most impacts older adults and vulnerable populations.

Perception of safety in the public transport system in Bogotá			
Dimension	Measurement item	Response category	Percentage
Overall perception of safety	Do you feel safe using public transportation in Bogotá?	Very safe	5
		Safe	10
		Neutral	25
		Unsure	35
		Very insecure	25
Personal experiences	Have you experienced any safety incidents on public transport?	Yes	70
		No	30
Perceived causes of insecurity	Factors that generate a feeling of insecurity	Lack of lighting	40
		Presence of crime	30
		Physical condition of the vehicle	20
		Driver behavior	10
		Other (specify)	5

Tabla 1: Assessment of safety on public transport in Bogotá. (2025)

Dimension	Measurement item	Response category	Percentage (%) / Average
Overall frequency of use	How often do you use public transportation in Bogotá?	Daily	50
		Weekly	25
		Biweekly	15
		Monthly	5
		Rarely	5
Weekly intensity of use	How many times a week do you use public transportation?	Average number of times per week	3.8
Time slot of highest usage	At what time of day do you use public transportation most often?	Morning (6:00 a.m. - 9:00 a.m.)	40
		Afternoon (12:00 p.m. - 3:00 p.m.)	35
		Evening (6:00 p.m. - 9:00 p.m.)	15
		Other (specify)	10

Table 2: Frequency and intensity of public transport use in Bogotá. (2025)

4. Discussion and conclusions

- Interconnection between dimensions: The results show that quality, safety, frequency, and comfort do not operate in isolation. Overcrowding, for example, affects perceptions of safety and comfort, while unpunctuality undermines assessments of quality and discourages frequent use. This interdependence shows that improvements must be planned comprehensively, coordinating infrastructure, operational management, and safety policies.
- Regional comparison: In contrast to Medellín, where perceptions of safety have improved thanks to the integrated metro-cable system, Bogotá has higher rates of insecurity and overcrowding. In Lima, the problems of informality and saturation are comparable, although with differences in infrastructure. In Cuenca, the operation of the tram has raised perceptions of quality and comfort, in contrast to the deficiencies in Bogotá. These comparisons strengthen the study's validity, as they show that Bogotá's weaknesses are not universal but depend on urban planning and management decisions.

Overall, the results show that public transport in Bogotá is characterized by a structural deficit that negatively affects users' daily lives. The travel experience is marked by territorial inequalities, recurrent insecurity, and lack of comfort, which limit its sustainability and social acceptance. These findings reinforce the urgency of integrated policies that simultaneously address operational quality, citizen safety, territorial equity, and comfort to ensure a more efficient, inclusive, and resilient system.

This study, based on a sample of 385 users, shows that service quality and safety are the most decisive factors in user satisfaction in Bogotá. 74,5% reported substantial improvements in their experience when they perceive efficient service, while 68,2% highlighted safety in stations and vehicles as an essential condition for maintaining frequent use of the system. These results coincide with findings in São Paulo and Mexico City, where both elements also condition user loyalty (Hermida et al., 2021; Inzulza Contardo, 2020).

Comfort appears to be another critical factor: 62,1% of participants considered that space, ventilation, and cleanliness influence their experience, and 59% of those who reported discomfort acknowledged that this limits their willingness to use the system regularly. While cities such as Santiago and Curitiba have prioritized improvements in habitability and accessibility, Bogotá continues to experience high levels of overcrowding, especially on trunk lines such as Caracas and Suba, which reduces the system's competitiveness compared to other modes of transport.

Analysis of the interaction among safety, comfort, and quality shows that 81,3% of satisfied users rate these three dimensions positively overall. This confirms that isolated interventions are insufficient and that only a comprehensive approach can substantially improve public perception. Examples of successful integration include Curitiba, where congestion was reduced by 30%, and Medellín, where the SITVA reduced congestion. However, Bogotá faces a unique scenario: its mobility depends almost exclusively on TransMilenio and the SITP, due to the historical absence of a metro and metropolitan train system. This dependence has led to chronic congestion and overcrowding at stations, which explains much of the dissatisfaction revealed in this study.

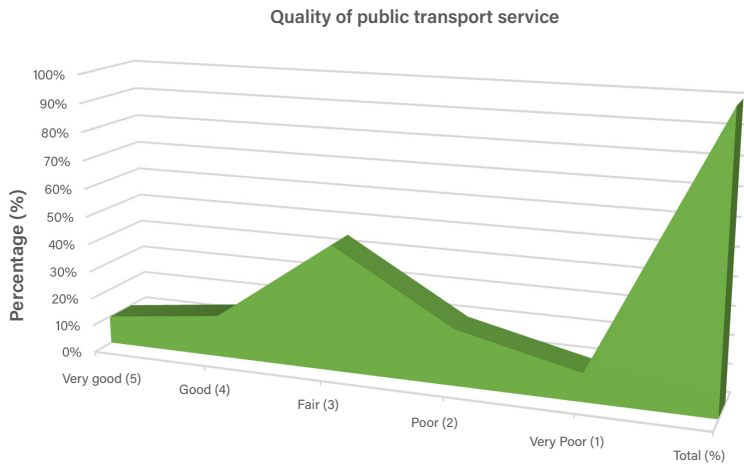


Figure 3: Quality of public transport service. (2025)

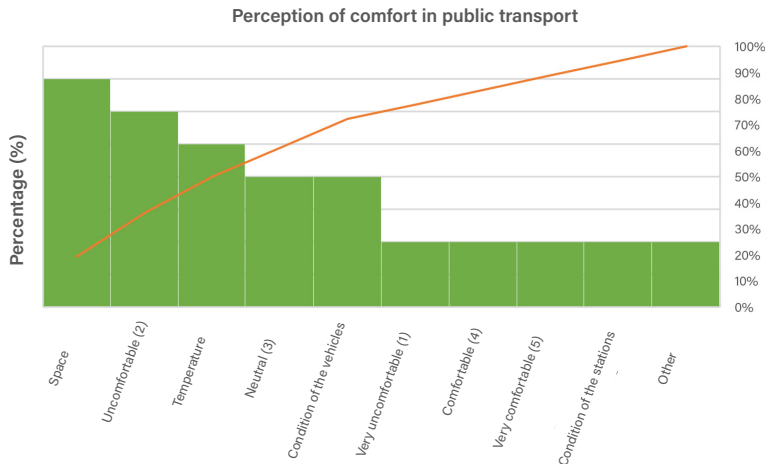


Figure 4: Perception of comfort in public transport. (2025)

Safety remains a priority concern. Sixty-seven percent of respondents considered it necessary to implement surveillance cameras and accompanying personnel during critical hours. Unlike other Latin American capitals with more robust rail systems and advanced control technologies, Bogotá relies heavily on bus corridors, increasing exposure to crime and perceptions of risk. Resolving this vulnerability requires a combination of infrastructure, technological innovation, and sustained institutional presence.

In social terms, 58% of respondents belong to socioeconomic strata 1 and 2, with higher levels of dissatisfaction in peripheral locations such as Ciudad Bolívar, Kennedy, and Usme. These areas are characterized by long wait times and high levels of overcrowding, which accentuate urban inequalities. Unlike Mexico City or Santiago, which have progressively expanded their rail coverage to the periphery, Bogotá continues to rely on buses as the main means of territorial integration. This situation underscores the need for targeted policies that address population heterogeneity and reduce access gaps to public transportation.

Therefore, regarding sustainability, 71% of participants supported the introduction of electric or hybrid buses to reduce emissions and improve air quality. This preference aligns with the Sustainable Development Goals and successful experiences in Santiago and Medellín. In the case of Bogotá, the challenge is greater: to advance the technological transition while building the First Metro Line (scheduled to begin operating in 2028) and the Regiotram de Occidente (2027). These projects represent a unique opportunity to diversify the modal matrix and reduce exclusive dependence on buses.

In conclusion, this study confirms that service quality, safety, and comfort are key determinants of user satisfaction, but it also reveals Bogotá's uniqueness compared to other cities in the region. Its historical dependence on buses has led to structural overload, dissatisfaction, and territorial inequalities. Overcoming these limitations requires more than operational adjustments: it requires completing the transition to sustainable modes of transport, prioritizing safety, and designing policies sensitive to social and territorial differences. Only through this transformation will it be possible to build a more efficient, safe, and equitable public transport system capable of responding to the challenges of a growing city.

5. Recommendations

Strengthening urban mobility in Bogotá requires a comprehensive strategy that combines immediate and long-term actions, linking operational efficiency with the citizen experience. First, it is proposed to strengthen the system's overall security by installing video surveillance cameras and deploying specialized personnel at stations and in vehicles, prioritizing areas with the highest crime rates. These measures should be evaluated based on reductions in complaints and improvements in citizen perception indicators, enabling a tangible impact in the short term.

Second, it proposes improving the user experience by developing digital participation channels, such as mobile applications and web portals that facilitate incident reporting and follow-up on institutional responses. At the same time, it is necessary to optimize the internal infrastructure of public transport—incorporating air conditioning systems, tactile signage, and universal accessibility—to increase satisfaction, comfort, and confidence in the service. These actions, to be implemented progressively, contribute to a more inclusive and efficient mobility model.

Finally, it is recommended that investments be directed toward reducing territorial inequalities, prioritizing peripheral sectors where infrastructure and transportation coverage deficits persist. This involves promoting safe, accessible pedestrian corridors that are well connected to mass transit

networks, as well as establishing prioritization criteria based on social vulnerability indicators. This line of action, which is more complex and long-term, consolidates urban mobility as an instrument of territorial justice and social cohesion.

Conflict of interest. The authors declares no conflicts of interest.

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