Distributive Justice, Equity, and Accessibility in Public Transportation in Intermediary Cities: An Integrated Framework for Equitable Territorial Planning Centered on San Juan De Pasto, Nariño, Colombia.

Jorge Luis Argoty Burbano[1], Karen Patricia Mosquera Ibarra[2]

[1] Universidad de Nariño, Facultad de Ingeniería, Programa de Ingeniería Civil, Pasto, Colombia, https://orcid.org/0000-0001-6661-1398
[2] Ingeniero Civil, Especialista en Ingeniería de Proyectos, https://orcid.org/0000-0001-9346-7862

Abstract
This article examines the applicability of distributive justice theories to intermediate cities such as Pasto, demonstrating how the normative frameworks of Rawls and Sen can illuminate concrete urban realities. Over the past decade, urban transport, mobility, distributive justice, and equity have gained prominence, bearing profound implications for social inclusion and territorial cohesion. Bibliometric studies confirm exponential growth in scientific output explicitly addressing transport equity and justice since 2013, with accessibility emerging as the pivotal organizing concept. However, scholarly debate has overwhelmingly concentrated on major metropolises, leaving intermediate cities demographically significant and strategically crucial severely underrepresented in academic literature.
This philosophical-descriptive analysis articulates distributive justice theories specifically Rawlsian egalitarianism and Sen's capability approach with contemporary debates on transport equity and spatial justice, applied descriptively to San Juan de Pasto, Nariño, Colombia. It contends that accessibility constitutes a multidimensional human capability and structural component of potential urban social rights, and that public transport planning in intermediate cities must be explicitly guided by five core normative principles: prioritization of the most vulnerable, verifiable minimum accessibility standards, policy non-regression, respect for fundamental rights and freedoms, and active territorial defragmentation.
The descriptive diagnosis of accessibility inequities in Pasto reveals sociospatial segregation patterns rooted in mountainous topography, the historical concentration of opportunities in consolidated urban cores, and the territorial fragmentation of vulnerable peripheral populations. The article interrogates the tension between hegemonic political discourse on accessibility and persistent structural inequities characteristic of Latin American intermediate cities, proposing a suite of normative indicators and conceptually rigorous evaluative tools attuned to the proposed principles for operationalizing spatial planning decisions. This constitutes a philosophical-descriptive essay, not an empirical investigation with quantitatively verified data regarding Pasto, capital of Nariño Department, Republic of Colombia.
Keywords: distributive justice, transport equity, accessibility, intermediate cities, capability approach, Pasto, public transport, territorial fragmentation, right to the city.

1. INTRODUCTION.

Over the course of the last two decades, the literature on urban mobility has moved from a paradigm focused on technical efficiency and the optimization of vehicular

flow to one focused on equity, social justice, and territorial justice in the formulation and evaluation of transport policies (Pereira et al., 2017; Sheller, 2018). This statement highlights the growing recognition that transport systems are not neutral infrastructures, but mechanisms of social structuring with the proven capacity to expand or limit equitable access to fundamental urban opportunities: formal employment, high-quality education, health services, citizen participation and cultural goods (Guzmán et al., 2017; Mladenović, M. N. 2019; Sheller & Urry, 2006).

Under this approach, urban mobility emerges as an ideal scenario to investigate how territorial planning policies, public investment and regulatory frameworks reproduce, strengthen or alter the historical socio-spatial inequalities of the city (Lucas, K, 2012). Accessibility, defined as the ability of individuals to reach destinations of interest in a context of time, economy, and tolerable efforts, is configured as an indicator of urban equity (Pereira & Karner, 2021). This entails overcoming the restricted conception of transport as a physical activity, to consider it as an opportunity for social rights and palpable well-being (Lucas, K, 2012).

However, despite conceptual and empirical advances, a significant discrepancy persists in the international and Latin American literature regarding equity and accessibility in transportation: the concentration of research in large-scale metropolises (Bogotá, São Paulo, Santiago, Mexico City) and the lack of systematic analyses in intermediate cities, defined as urban complexes with populations between 250,000 and 1,000,000 residents (Corporación Andina de Fomento, 2019). This underrepresentation is worrying, given that intermediate cities are home to around 35-40% of the urban population in Latin America and act as links of regional territorial articulation (Bellet et al., 2007; Aguirre-Ramírez et al. 2025).

Intermediate cities manifest spatial attributes that are not equated to metropolises or small towns: they boast solid historical nuclei and vast informal peripheries; they expand rapidly and in a dispersed way, which leads to territorial fragmentation; they have hybrid public transport systems that are deficient in terms of operational and fare integration; and have poor governance frameworks, with constrained budgets and a lack of technical capacities (Inter-American Development Bank, 2020; Harvey, 2008). These represent case studies to investigate how institutional constraints codify criteria of distributive justice in territorial planning.

Pasto, the departmental capital of Nariño, located in the southern region of Colombia, is a distinctive example of an intermediate city. With an urban population projection of 386,600 inhabitants for the year 2019 and located at an altitude of 2,527 meters above sea level, Pasto is characterized by its mountainous geography, categorized as a hillside city, which characterizes unique forms of urban expansion and socio-spatial segregation. Ecuador's geographical position as a regional epicenter, its economic dependence on administrative and educational functions, together with its role as a service center for adjacent rural regions, positions it as a significant case for reflection on distributive justice in intermediation contexts.

However, the academic evaluation of Pasto from the perspective of distributive justice and equity in transportation is practically non-existent. This deficiency reveals that not only is there a lack of representation of intermediary cities in the scientific literature worldwide, but also a lack of systematized data on mobility, accessibility, and equity in contexts such as Pastu. The purpose of this study is to contribute to the satisfaction of this gap, through the elaboration of a philosophical-descriptive analysis that integrates normative frameworks of distributive justice with considerations about the territorial structure, public transport models and accessibility patterns in the city of Pasto.

The challenge lies in the integration of normative approaches to distributive justice (such as those suggested by John Rawls or Amartya Sen) with analytical accessibility tools to analyse the distribution of capacities and opportunities among social groups and geographical locations. The link between normative theory and the empirical representation of urban realities is just emerging in Latin America, particularly in intermediate cities with dispersed institutional capacities such as San Juan de Pasto.

2. THEORETICAL FRAMEWORK.

2.1. Philosophical foundations.

Distributive justice is one of the fundamental concerns of modern political philosophy. Critically, this tradition of thought questions how goods, resources, opportunities, and burdens should be distributed in a society; what principles legitimize such distributions; and how these material distributions are linked to the freedom, dignity, and capacity of citizens to lead autonomous and valuable lives (Rawls, 1971, 1999; Sen, 1999). In the urban context, these abstract questions acquire immediate concreteness: how is accessibility to employment, health, education and participation distributed among residents of different neighborhoods, socioeconomic groups and genders? What makes a distribution of mobility opportunities fair or unfair? Who has the right to complain about inequalities in access to transport and destinations?

In the specific field of urban transport, these questions materialize in the allocation of benefits and burdens between social groups and territories. The benefits include dimensions such as accessibility to job opportunities, quality and reliability of service, safety, comfort, and access to cultural goods. The burdens include long travel times, monetary costs in transportation, exposure to environmental pollution, accident risks, and the daily experience of segregation (Pereira et al., 2017). Recent literature consistently emphasizes that these distributions do not emerge neutrally or inevitably from the "market," but rather result from deliberate planning, regulation, and investment decisions that reflect explicit or implicit policy priorities (Sheller, 2018; Adli & Chowdhury, 2021).

The Rawlsian Egalitarianism developed by John Rawls, when in his influential work *A Theory of Justice* (1971), proposes two principles of justice that have exerted a profound influence on contemporary reflections on equity in transportation. The first establishes that all people should enjoy an equal scheme of basic freedoms compatible with the same freedom for others, which Rawls calls the "principle of equal freedom" (Rawls, 1999). These basic freedoms include freedom of conscience and thought, political freedom to participate in collective decisions, freedom of movement, and access to opportunities under conditions of formal equality (Rawls, 1971).

Transferred to the context of urban mobility, this first principle would imply that no transport policy should violate the fundamental right of people to move freely through urban space, to access valued destinations, and to participate in urban life under conditions of formal equality. The segmentation of urban spaces, the exclusion of groups of territories, or the imposition of arbitrary restrictions on movement would violate this principle (Pereira et al., 2017).

The second Rawlsian principle, the "difference principle", is especially generative for thinking about equity in transport. This principle holds that socioeconomic inequalities are morally admissible only if they benefit the least advantaged members of society (Rawls, 1971, 1999). Applied to transport, this means that inequalities in accessibility between territorial or socioeconomic groups could be justified only if

their existence would improve the situation of those who are less well off. A critical implication is that the evaluation of transport policies should focus primarily on impacts on vulnerable groups, not on maximizing aggregate benefits. Behbahani et al. (2019) demonstrate how this principle can be operationalized in the context of territorial planning.

In Latin American intermediary cities such as Pasto, where strong socio-spatial inequalities, limited fiscal capacities, and high dependence on public transport coexist, the application of the Rawlsian framework suggests that transport investments should be prioritized based on how they improve accessibility for peripheral populations, low-income groups, and residents of fragmented territories, even if this does not maximize the efficiency of the aggregate system.

The capabilities approach, developed by Amartya Sen (1999, 2009) and expanded by Martha Nussbaum (2011), offers a fundamental reconfiguration of how we think about distributive justice. Sen challenges the standard premise of previous distributive theories that equality means equality in the distribution of resources, goods, or utility. Instead, Sen proposes that the fundamental variable for justice evaluations is not the distribution of *resources*, but the distribution of *capacities*: the real freedoms that people have to be and do what they value (Sen, 1999).

The Senian approach has been empirically operationalized in diverse urban contexts. (Azmoodeh et al, 2023) demonstrate through structural equation analysis how individual characteristics, housing environment, and transportation options influence the real capabilities of urban residents, identifying high-ability demographics (18-45 years, high-income) contrasted with low-ability populations.

A profound implication is that two people with access to the same resources, say, the same amount of money for transportation or proximity to a bus stop may possess radically different abilities. A young, able-bodied, flexibly employed person can turn transportation facilities into effective access to opportunities. An elderly person, with reduced mobility, responsible for the care of children, or subject to security restrictions (such as women who avoid certain spaces or schedules), faces unequal "conversions" of the same resources into effective capacities (Sen, 1999; Nussbaum, 2011). Nordbakke (2013) documents in a qualitative study where older people have formal access to transportation, their real capacities are limited by multiple factors.

In urban contexts, this implies that analyzing equity in transportation cannot be limited to questions about the distribution of infrastructure or services. It must ask: what are the real capacities of different groups to access opportunities? How do variables such as gender, age, disability, residential location and structural discrimination affect the conversion of mobility opportunities into effective access to employment, education, health?

In the city of Pasto specifically, the capabilities approach suggests that although a periphery resident may have formal access to public transportation connected to the center, his or her effective ability to access job or educational opportunities may be severely limited by: extensive travel times derived from mountain topography; cumulative costs that represent significant fractions of precarious income; restrictions on schedules compatible with caregiving responsibilities; real or perceived security risks in certain spaces or times; and limited access to information about distant opportunities. These barriers operate as obstacles to the effective conversion of "formal access to transportation" into "real ability to access valued urban opportunities."

Contemporary literature on transport equity increasingly conceptualises accessibility as a multidimensional human capacity that emerges from the complex interaction

between three orders of factors: characteristics of transport networks and services (quality, frequency, reliability, cost, safety); spatial distribution of opportunities (where jobs, hospitals, schools are located); and individual attributes (income, age, health, gender, access to private vehicles, disabilities) (Pereira et al., 2017).

Under this approach, accessibility is not simply a "technical variable" measurable by distance or travel time indicators. It is a relational capacity that expresses the real freedom of specific people located in specific territories, with specific individual characteristics, to reach valued destinations under reasonable conditions of time, cost and safety. A critical implication is that two people may have the "same accessibility" technically, but radically different abilities; Conversely, "aggregated" improvements in accessibility can coexist with worsening capacities of specific groups if they disproportionately benefit privileged populations. Cooke et al. (2022) demonstrate that geographical proximity does not guarantee real accessibility.

In the case of San Juan de Pasto, the conceptualization of accessibility as a capacity forces us to ask not only about the extension of routes or frequencies of service, but also about how the rugged mountainous topography, the spatial segregation of activities, and the differentiated socioeconomic characteristics of populations neighborhood by neighborhood generate radically unequal capacities for participation in the city.

Accessibility as an Urban Social Right is an increasingly central argument in the literature on transport and justice where accessibility should be recognized as a component of basic urban social rights (Pereira & Karner, 2021; Lucas, K, 2012)). This argument stems from a simple but profound observation: without accessibility to safe and affordable transport, other fundamental rights are compromised or are virtually irrecoverable. Rode (2023) proposes that equitable urban mobility requires guaranteeing minimum standards of access.

The right to education, for example, presupposes access to educational institutions; But for populations that do not reside in immediate proximity to schools or colleges, this requires affordable transportation. The right to work and employment opportunities presupposes access to labour markets that are often geographically concentrated in urban centres; without transportation, this right remains formal, not substantive. The right to health requires access to medical services, often specialized and geographically concentrated; accessibility barriers are barriers to the right itself (Guzmán et al., 2017).

This rights-based perspective repositions accessibility from a technical or "efficiency" issue to a fundamental justice issue. It implies that democratic societies have obligations to guarantee, as a component of basic citizen rights, that all their members, regardless of residential location, income or individual characteristics, can reasonably access essential opportunities.

2.2. Intermediate Cities.

Intermediary cities are conventionally defined as medium-sized urban centers, typically with populations between 200,000 and 1,000,000 inhabitants, which function as nodes of articulation between rural territories and large metropolises (Corporación Andina de Fomento, 2019). In Colombia, paradigmatic examples include Pasto, Pereira, Barranquilla, Bucaramanga, Santa Marta and Cúcuta. Although this categorization is schematic, it captures an important demographic and strategic reality: these cities concentrate growing fractions of the Latin American urban population (35-40% in the region) and function as pivots of territorial, economic, and social integration (Aguirre-Ramírez et al. 2025).

The relationship between investment in transport and urban integration has been extensively documented. (Banister et al., 2000) show how investment in transport infrastructure impacts economic growth, although the distribution of benefits depends critically on planning decisions that prioritize certain socio-spatial groups over others.

Intermediary cities exhibit a set of shared urban-territorial characteristics that distinguish them from large metropolises and small agglomerations. They have consolidated historic centers with a significant concentration of commercial, administrative and institutional activities; emerging sub-centres; and extensive peripheries, often informal, in accelerated expansion. This multipolar structure, less integrated than in large metropolises, generates territorial fragmentation (Bellet et al., 2007). Urban expansion in intermediary cities often occurs in an accelerated, dispersed manner, with limited regulatory control, generating extensive low-density peripheries, often informal, with precarious services (Harvey, 2008). In Pasto specifically, the growth on hillsides has generated informal settlements on steep slopes with topography that complicates basic services. As in Latin American contexts more broadly, intermediary cities exhibit marked residential segregation, with a concentration of high-income in certain corridors (often central or on high slopes taking advantage of views) and concentration of low-income populations in poorly connected peripheries (Inter-American Development Bank, 2020). Transportation systems in intermediary cities typically combine private companies operating competing routes without integration; absence of integrated tariff or operational systems; inconsistent frequencies; and weak institutional capacity for regulation and planning (CAF, 2019). In Pasto, the SETP (Strategic Public Transport System) operates 23 routes distributed among 4 transport companies with 486 vehicles, but with documented integration problems and inconsistent frequencies. Intermediary cities often have weaker municipal institutions, limited technical capacities for comprehensive planning, restricted budgets, and less access to credit for infrastructure investment compared to large metropolises (Inter-American Development Bank, 2020; OECD, 2017).

A concept that is especially relevant for intermediary cities is "urban fragmentation" or "territorial fragmentation": the existence of discontinuous, segregated urban territories with weak functional and social integration, where mobility between fragments is hindered by infrastructural barriers, costs, distances or access restrictions (Jirón, Paola, 2007). Unlike large metropolises, where mass transit systems often achieve functional integration of territories in at least some corridors, intermediate cities such as Pasto exhibit more pronounced fragmentation.

In Pasto, territorial fragmentation responds to multiple factors such as the pronounced topography on the slope that generates spatial discontinuity and raises infrastructure construction costs; historical concentration of activities in consolidated centers on medium and lower slopes, generating "functional gaps" in peripheries; absence of road connectors that effectively integrate high areas with centers of opportunity; residential segregation that has concentrated low-income populations in hard-to-reach areas; insufficiency of basic services in peripheries, reinforcing isolation.

Territorial fragmentation has profound implications for accessibility. When the city is fragmented, improvements in any specific fragment do not generalize benefits; residents of disconnected territories remain excluded. Conversely, in cities with greater functional integration, improvements in accessibility tend to benefit more

widely. For intermediary cities, this implies that strategies to improve equity must explicitly address territorial integration as an objective, not just efficiency of services. On the other hand, recent research in Latin American intermediary cities documents specific vulnerabilities that distinguish their equity challenges from those faced by large metropolises:

Deeply unequal accessibility maps developed in research in intermediary cities show that corridors served generally by "trunk" routes more frequently connect shopping and administrative centers, mainly benefiting middle- and high-income users who have access to private vehicles. Disconnected peripheries, especially hillside neighborhoods and informal settlements, suffer from severely poor accessibility with few services and long travel times. (Bellet et al., 2007; Harvey, 2008).

In intermediary cities, territorial fragmentation means that peripheral residents often require multiple transfers to reach centers of opportunity. In contexts without tariff integration, this implies significant cumulative costs. For low-income workers, transportation costs can represent 15-25% of precarious daily income, configuring a substantive barrier to access to employment (Inter-American Development Bank, 2020). Transport safety also often varies significantly between corridors served by formal systems and peripheries with informal or precarious services. Women in peripheries face differentiated risks in spaces with less institutional surveillance. Young people in areas with territorial violence may suffer mobility restrictions for security reasons unrelated to transportation (Jirón, Paola, 2007). Unlike large metropolises with institutions specializing in mobility planning, intermediary cities often lack the technical capacity to collect systematized data on mobility, conduct rigorous accessibility analyses, evaluate distributional policy impacts, and coordinate multiple actors in fragmented systems. This reinforces the perpetuation of inequities, by reducing visibility of their magnitudes (CAF, 2019).

3.0. Study area

In terms of geographical, demographic and socioeconomic context, Pasto is the departmental capital of Nariño, a region located in southwestern Colombia, on the border with Ecuador. Located at 2,527 meters above sea level on an Andean plateau, Pasto is a paradigmatic case of an intermediate city located in a mountainous context. With an estimated urban population of approximately 386,600 inhabitants (DANE 2019 projections), it is one of the largest intermediate cities in Colombia after Cali, Barranquilla, and Bucaramanga.

Demographically, Pasto has experienced accelerated urban growth in the last two decades. Its population has increased significantly, from 280,000 inhabitants in 2005 to 386,600 inhabitants in 2019 (National Administrative Department of Statistics [DANE], 2019), especially in peripheral areas where informal settlements have proliferated (Fonseca González, 2009). The socioeconomic composition reflects typical characteristics of Latin American intermediate cities: upper strata concentrated in consolidated central areas and high slopes; middle strata scattered in expansion corridors; and low-income populations in peripheries of recent expansion, often informal (Erazo Ortiz & Rosero Delgado, 2008).

Economically, Pasto functions as a regional administrative center with a concentration of public jobs in departmental and municipal administration; an educational center with universities that generate employment and attract floating population; and commercial service point for adjacent rural territories. However, the local labor market exhibits limitations typical of intermediary cities: formal employment opportunities concentrated in specific sectors (public, education,

commerce); high youth unemployment (18.5% in 2021); and labor informality of 60-65% (National Administrative Department of Statistics. DANE, 2021).

Pasto's most defining physical feature is its rugged mountainous topography. Located on an Andean plateau (2,527 meters above sea level) surrounded by hills, the city has an urban structure in irregular relief with significant elevation differences between consolidated and peripheral sectors (Fonseca González, 2009). This topography conditions: sinuous road structure; high infrastructure costs on hillsides; dynamics of residential segregation where high slopes concentrate medium-high strata and low slopes informal settlements (Piarpusan Pismac, 2012).

Historically, Pasto was structured with a consolidated center on the central plateau (cathedral, squares, institutions) and expansion of medium-high strata towards high slopes. In recent decades, accelerated growth generated extensive informal settlements on surrounding slopes with limited access (Fonseca González, 2009). Northern and northwestern sectors exhibit high population density, precarious services, and complicated topography (Calvache Muñoz, 2019). This pattern reflects Latin American dynamics of uncontrolled expansion in intermediary cities (Corporación Andina de Fomento [CAF], 2019).

Pasto's growth structure has been characterized by the consolidation of the historic center as a nucleus of commercial, administrative, and institutional activities, along with an uncontrolled expansion into the hillside peripheries, often driven by informal developments. The appearance of sub-centres in areas of recent expansion and a weak integration between the scattered territorial fragments of the city are also observed. This pattern of growth reflects widely documented Latin American dynamics, marked by processes of urban expansion without comprehensive planning in intermediary cities (Harvey, 2008).

4.0. Public Transportation System in Pasto

The Strategic Public Transport System (SETP) of San Juan de Pasto represents the local materialization of the national model of collective public transport established by Decree 1077 of 2015 of the Ministry of Transport, which sought to overcome the historical fragmentation of Colombian urban systems through integrated operation schemes and unified regulation (Ministry of Transport, 2015). In the specific context of Pasto, the SETP currently operates with 23 strategic and complementary routes distributed between consolidated urban territories and emerging peripheral areas, awarded to four transport companies that manage the service in a segmented manner without full operational coordination (National Planning Department [DNP], 2020). The active fleet comprises 486 conventional vehicles, circulating under a unified rate of 2,200 Colombian pesos (COP) per single trip for the year 2023, equivalent to 13-15% of the legal minimum daily wage in force for workers from low socioeconomic strata in 2023. This technical structure, although formally aligned with national standards of strategic systems, shows structural tensions between operational efficiency objectives and principles of distributive equity that make up the analytical core of this essay.

The technical characterization of the SETP reveals critical operational challenges that disproportionately affect vulnerable populations, reproducing patterns of spatial inequity observable in Latin American intermediary cities. First, the limited operational integration between concessionaire companies generates systematic lack of coordination of schedules and frequencies, resulting in average waits of 25-35 minutes for mandatory transfers in intermediate corridors (DNP, 2020). This operational fragmentation particularly penalizes residents of peripheries who depend

on feeder routes to connect with main trunks, increasing total travel times by 30-40% compared to direct routes.

More problematic from the perspective of distributive justice is the total absence of tariff integration. Users who require transshipment between routes, a structural situation for 62% of peripheral residents according to baseline surveys, must pay a full fare for each segment, accumulating costs ranging from COP 4,400 - 6,600 per multimodal trip (DNP, 2020). For households in strata 1-2, where monthly per capita income rarely exceeds COP 800,000, these costs represent 8-12% of weekly family income, configuring a substantive economic barrier to the effective exercise of basic urban rights (Pereira et al., 2017).

Inconsistent frequencies aggravate this structural problem: 48% of trunk routes exceed the maximum regulatory intervals established at 20 minutes during peak hours, with documented average waits of 32 minutes on peripheral corridors compared to 12 minutes on downtown routes (DNP, 2020). This temporal disparity is not random: it reflects both fleet limitations and implicit prioritization of commercial corridors over low-strata residential routes.

The low occupancy of the system operating at 25-30% of installed capacity shows a critical disconnect between technical supply and effective demand (DNP, 2020). Two hypotheses explain this underutilization: inadequate configuration of routes that does not respond to real patterns of origin and destination of working populations; economic and temporal barriers that discourage the use of the formal system, channeling demand towards unregulated alternatives. Finally, the mountainous topography of Pasto acts as an unavoidable exogenous conditioning factor: steep slopes increase fuel consumption by 25-30% and accelerate vehicle wear, raising operating costs that are indirectly passed on to users via reduced frequencies (Fonseca González, 2009).

Mobility patterns in Pasto, determined through baseline surveys with 2,847 representative households, reveal characteristic dynamics of Latin American intermediary cities with complex topography (DNP, 2020). 39% of all daily journeys are made on foot or by bicycle, predominating in strata 1-2 (58%) compared to strata 4-6 (19%), simultaneously reflecting low incomes, relative proximity of destinations on an intermediate urban scale, and the absence of accessible formal alternatives in fragmented peripheries.

The geographical concentration of valued destinations formal jobs (75% in the central plateau), higher education (90% in central corridors), specialized health services (85% in the center) generates structural dependence on periphery-center flows that saturate trunk corridors during peak hours (DNP, 2020). Peripheral residents face average travel times 2.3 times higher than central (47 minutes vs. 21 minutes), reaching 75+ minutes in north-slope neighborhoods during peak congestion.

The frequent transfers required by 62% of peripheral trips due to non-circular radial routes accumulate double or triple costs and additional waits of 25-35 minutes, configuring compound barriers that severely restrict the effective ability of vulnerable populations to participate in formal labor markets (Pereira et al., 2017). Finally, the prevalence of informal motorcycle taxi and shared taxi transport in neighborhoods without formal routes is evidence of market failures that the SETP has not resolved, keeping peripheral populations dependent on unregulated but economically viable alternatives (DNP, 2020).

5. Descriptive Analysis

A descriptive conceptual analysis of accessibility patterns in Pasto based on observation of territorial structure, route configuration and location of opportunities reveals significant inequalities between consolidated and peripheral areas:

In consolidated areas such as the areasof the historic center (where commercial, administrative, institutional activities converge) and well-connected mid-slope sectors, they exhibit relatively better accessibility to multiple opportunities. Residents of these areas can reach jobs concentrated in public administration and services; higher education (universities located in the central area); specialized health services (concentrated hospitals and clinics); cultural and commercial spaces. Travel times typically fluctuate between 15-35 minutes from these areas to major destinations.

In contrast, areas of recent urban expansion on steep slopes (particularly in the north and northwest) exhibit significantly limited accessibility. Residents of these areas face: limited options for nearby formal employment, with the need to travel to centers; secondary education often available locally, but higher education requires travel to the center; limited basic health services, with specialties concentrated in the center; Extended travel times: 45-75+ minutes to reach employment/education centers from some peripheries. These patterns are consistent with documentation of Latin American intermediary cities (Inter-American Development Bank, 2020).

Particularly vulnerable sectors, with informal settlements on steep slopes, suffer from extremely limited accessibility, often with precarious and irregular access roads; non-existent public transport or informal transport (motorcycle taxis); the need to walk significant distances to connect with public transport; high costs of informal transport; exposure to safety risks and environmental saturation.

The territorial fragmentation observable in Pasto results from multiple interrelated dynamics, as the concentration of low-income populations in distant peripheries has been a historical process, reinforced by: lower land prices in peripheries, public policies for the development of social housing in peripheral areas, and the absence of integration policies or segregation regulation. This concentration creates territorial enclaves where shared conditions of poverty and precariousness prevail.

Pasto lacks road infrastructure that effectively integrates peripheries with centers. The topography on the slope means that roads need to be winding, expensive; and politically, infrastructure expansion requires coordination that weak municipal systems often fail to achieve, resulting in peripheries remaining functionally isolated from centers. Jobs, higher education, specialized services remain concentrated in historic centers, without significant decentralization. This is partially economically rational (agglomeration economies), but it generates dependence on long journeys for peripheral populations.

The transport system, instead of integrating territories, often reinforces fragmentation. Routes often connect peripheries with the center, but not between peripheries. Without fare integration, transfers are costly or non-existent. The result is peripheries that remain disconnected not only from schools, but from each other, hindering territorial solidarity and reinforcing isolation.

The concepts mentioned are presented in Figure 1. Territorial Fragmentation as a Consequence of Segregation and Infrastructure

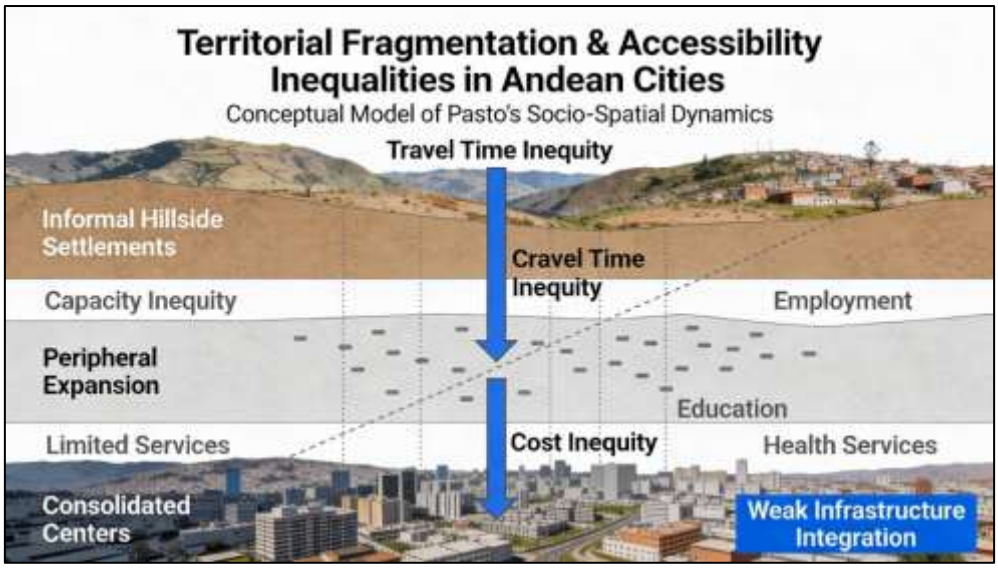

Figure 1. Territorial Fragmentation as a Consequence of Segregation and Infrastructure

A descriptive analysis of inequity in accessibility in Pasto can be disaggregated into multiple dimensions, conceptually consistent with the capabilities approach:

- **Temporal inequity:** Residents of the peripheries face significantly longer travel times. If we assume 45 minutes as the "reasonable" maximum travel time to reach employment/education destinations, distant peripheral populations often exceed this threshold, implying that the portion of the day spent commuting is disproportionately larger. This compresses the time available for paid work, education, rest, care.
- **Cost inequity:** With a fare of COP 2,200 per trip and without fare integration, a trip that requires a transfer implies a cost of COP 4,400 (one way) or more if it requires multiple transfers. For low-income workers with minimum wage (~11,000 COP per day), this represents 40% of income if they require a round trip with transfer. In contrast, a central resident who accesses destinations without a transfer pays COP 2,200. The regression is direct: those who can pay the least face higher costs.
- **Safety inequity:** Transportation safety varies significantly. Formal transportation in main corridors operates with visible surveillance; informal transport in the peripheries lacks security measures. For women, this implies differentiated risks: spaces with less institutional surveillance generate greater exposure. Young people in areas with territorial violence may face mobility restrictions derived from urban violence, regardless of transportation.
- **Capacity inequity:** Considering the conceptualization of accessibility as capacity (Sen), the above inequities are combined into capacity restriction: peripheral populations have significantly limited real capacity to participate in formal urban opportunities. A young person from a peripheral neighborhood would face: long time (can he dedicate 2-3 hours a day to transportation and still sustain employment?), high costs (can he afford the cost of access to employment in the center if he is unemployed/precarious?), potential limited security. These barriers combine into capacity constraint.

6. Proposed regulatory framework.

The articulation between normative theory of justice and urban transport planning in intermediary cities requires concrete translation into operational principles that guide public policy decisions. Based on the synthesis of Rawlsian frameworks, Sen's capabilities approach, and contemporary debates on transport equity (Pereira et al.,

2017; Sheller, 2018), this essay proposes five fundamental normative principles that should explicitly guide the planning of Pasto's Strategic Public Transport System (SETP) and analogous systems in Latin American intermediary cities.

These principles are not detailed technical prescriptions, but normative evaluation criteria that make it possible to judge whether transport decisions are fair or unjust from the perspective of distributive justice. Each principle articulates a specific dimension of equity, priority of the worst-placed, minimum standards, non-regressivity, respect for basic rights, territorial justice, and specifies verifiable operational implications applicable to the specific context of San Juan de Pasto.

Section	Description
Principle 1.	Priority of the worst-placed groups (Rawlsian Difference Principle)
Definition of the principle	In the allocation of resources, investment and regulation of public transport systems, the improvement of accessibility and mobility of socioeconomically disadvantaged groups must be explicitly prioritized, in accordance with the Rawlsian principle of difference (Rawls, 1971; Behbahani et al., 2019).
Theoretical foundation	Rawls argues that socioeconomic inequalities are just only if they benefit the less advantaged. Transferred to transport in intermediate cities such as Pasto, this implies that investments should be prioritized not in projects that maximize the aggregate efficiency of the system, but in projects that substantially improve the capacities of peripheral populations, with low incomes, with reduced mobility.
Operational implications	- Explicit identification of "worst situated" groups and territories through geospatial analysis of accessibility, socioeconomic vulnerability and indicators of precariousness. - Establishment of specific goals to reduce gaps. For example, hypothetically: "Reduce travel time gaps between peripheral areas and employment centers from 60 minutes to 40 minutes in 10 years." - Prioritization of investment in peripheral connectivity: new routes to disconnected areas, improvement of access roads, subsidies focused on low-income populations. - Mandatory assessment of distributional impacts of all policies prior to implementation: does this policy benefit or harm poorer groups?
Applicability to Pasto	This principle would suggest prioritizing, in Pasto: extension of public transport to informal settlements on northern/northwestern slopes; improvement of access roads and reduction of travel times from these areas; tariff subsidies focused on unemployed populations or those with very low incomes; Design of routes that connect peripheries not only with the center, but potentially between peripheries, reducing the need for transfers.

Section	Description
Principle 2.	Minimum Verifiable Standards of Accessibility
Definition of the principle	All urban residents should have access to a guaranteed minimum level of key opportunities within reasonable time and cost thresholds, considered as thresholds of sufficiency, regardless of residential location. (Rode, 2023; Pereira & Karner, 2021).
Theoretical foundation	This principle draws inspiration from both Rawlsianism (guarantee of minimum capabilities) and rights-based approaches (access to employment, education, health as rights, not luxuries). The central idea is that there are "sufficiencies" below which access to opportunities cannot be considered fair, regardless of the aggregate average of the system.
Operational implications	- Explicit definition of minimum standards. For intermediate cities such as Pasto, they could include: access to at least 200-300 formal jobs within 45 minutes of travel by public transport; access to at least one referral hospital within 30 minutes; access to basic secondary education within 20 minutes on foot/transport; transportation cost not exceeding 6% of daily income. - Periodic monitoring: annual audits of compliance with standards by area/neighborhood, identifying where they are not met. - Improvement plans when standards are not met: if the peripheral area does not meet minimum standards, a specific improvement plan (with schedule, budget, managers) must be developed. - Non-acceptance of averages as a substitute: aggregate improvement (system average increases) does not justify non-compliance with minimums in specific areas.
Applicability to Pasto	Pasto could establish verifiable minimum standards: that 90% of the population has access to at least X jobs in 45 minutes; that all areas have access to basic education in a maximum of 20 minutes; that the fare does not exceed 6% of income in low-income areas. Periodic monitoring would identify areas where standards are not met (presumably peripheries on hillsides), triggering interventions.

Section	Description
Principle 3	Non-Regressivity in Accessibility
Definition of the principle	No transport policy should worsen accessibility for already disadvantaged groups, even when it improves aggregate system indicators. (Nussbaum, 2011; Sheller, 2018).
Theoretical foundation	This principle includes the doctrine of "non-regression in social rights" from international human rights

	jurisprudence (Nussbaum, 2011). The idea is that, although societies cannot guarantee permanent progress in all rights, they can prohibit setbacks, especially for vulnerable groups. In transportation, this means that policies that improve the overall system but worsen accessibility for vulnerable groups are unfair.
Operational implications	- Counterfactual analysis of distributional impacts: before implementing any changes (route closure, frequency reduction, fare change), carry out rigorous analysis of how it affects specific groups/territories. - Prohibition of road closures or substantial reduction of services in areas of high vulnerability without providing reasonable alternatives. - Compensation mechanisms when changes generate losses in accessibility: for example, if a route that served the peripheral area is closed, an alternative (new route, fare subsidy, other mechanism) that maintains minimum accessibility must be offered. - Binding incorporation of the voice of affected users in decision-making processes, especially vulnerable populations.
Applicability to Pasto	This principle would prohibit, for example, frequency reductions on routes that serve peripheries on the grounds of "aggregate efficiency," without guaranteeing that peripheral populations would maintain minimum access. If for fiscal reasons or business profitability it is necessary to adjust routes, it should be designed in such a way that accessibility does not return to vulnerable populations.

Section	Description
Principle 4	**Respect for Basic Rights and Freedoms**
Definition of the principle	No transportation decision is acceptable if it violates fundamental rights to dignity, safety, freedom of movement, or participation in urban life, regardless of benefits in added accessibility (Rawls, 1971; Nussbaum, 2011).
Theoretical foundation	Rawls emphasizes that basic freedoms take absolute priority even over added benefits. In the context of transportation, this means that dimensions such as personal safety, non-discrimination, respect for dignity, must be guaranteed and not sacrificed for operational efficiency. Nussbaum complements with a specific list of core capabilities that include freedom of movement and body safety.
Operational implications	- **Gender safety:** Adequate lighting at bus stops; institutional presence (staff, cameras); anti-harassment protocols with effective sanctions; emergency buttons; schedules compatible with care responsibilities.

	- **Accessibility for people with disabilities:** Accessible physical infrastructure; trained staff; clear signage; flexible fare schemes; operational flexibility. - **Freedom of movement without discrimination:** Explicit policies against discrimination based on race, ethnicity, social class, or other protected characteristics.
Applicability to Pasto	In Pasto it would require: specific analysis of safety perceived by women in public transport SETP; current accessibility audit at stops and vehicles (many currently do not meet standards); explicit anti-discrimination policies against indigenous, Afro-descendant and migrant populations in vulnerable peripheries.

Section	Description
Principle 5	**Territorial Justice and Active Fragmentation Reduction**
Definition of the principle	The transport system should actively contribute to reducing urban fragmentation and connecting historically disconnected territories, rather than reinforcing patterns of spatial segregation (Sheller, 2018; CAF, 2019).
Theoretical foundation	Perspectives on territorial justice argue that justice in the city requires territorial integration: populations should not be confined to isolated fragments (Harvey, 2008; Sheller, 2018). Transport acts as a key mechanism for territorial integration, not only as a technical service, but also as a structural instrument of urban cohesion.
Operational implications	- **Design of connective networks:** Routes that connect peripheries with each other, not only with centers, diversifying mobility options. - **Fare integration:** Affordable transfers (without full payment for each connection), especially benefiting peripheral populations. - **Transport-urban development coordination:** Transit-Oriented Development; decentralization of public jobs, education, health to accessible subcenters. - **Segregation monitoring:** Systematic evaluation of whether projects reduce or reinforce territorial fragmentation.
Applicability to Pasto	In Pasto I would suggest: SETP fare integration for affordable transfers; direct routes between peripheries (avoiding mandatory passage through the centre); decentralized relocation of public jobs to peripheral subcenters; investment in connecting roads between currently isolated areas.

7. Illustrative Indicators for Evaluating Progress Towards Distributive Justice in Transportation

The operationalization of normative principles requires concrete, verifiable indicators. These indicators should be illustrative, they are not intended to be "real data"

measured in Pasto, but examples of how normative concepts could be translated into evaluable metrics:

Equity Dimension	Illustrative Indicator	Conceptual Metrics	Proposed Regulatory Threshold
Minimum Accessibility	Coverage of access to minimum employment	% population with access to ≥200 jobs in ≤45 min	90% of population
Inequity of Accessibility	Time gap between zones	Difference in travel time between peripheral area vs. center	Reduce to a maximum of 20 minutes difference
Affordability	Cost as a percentage of revenue	% daily revenue dedicated to transportation (Q1/Q5)	≤6% of income in all groups
Security Fairness	Differentiated perceived safety	% of women/vulnerable groups reporting safety	≥85% in all areas
Territorial Integration	Periphery Transportation Coverage	% of neighborhoods with access to formal transportation	100% of areas with minimal access
Non-Regression	Monitoring changes in accessibility	Annual accessibility maintenance check by zone	Zero setbacks in accessibility for vulnerable groups

8. CONCLUSIONS**.**

The theoretical invisibility of intermediary cities in research on transport equity reveals structural academic biases towards metropolises, leaving without systematic analysis contexts where 35-40% of the Latin American urban population resides with qualitatively different challenges.

Sen's conceptualization of accessibility as a human capacity for real freedom conditioned by unequal conversion of resources instrumentalizes equity in transport beyond technical indicators, questioning effective freedoms of urban participation differentiated by gender, disability, location and socioeconomic status.

Transport systems are not neutral infrastructures but political devices that materialize implicit policy priorities. Inequities in Pasto emerge not only from topography but also from deliberate decisions on investment, route design and prioritization of benefited groups.

Territorial fragmentation defines inequity in intermediary cities: radial systems (periphery-center) isolate urban fragments without inter-peripheral connectors, reinforcing spatial segregation where mobility between peripheries remains unviable.

Rawlsian difference principle justifiable inequalities only if they benefit the worst placed establishes clear normative criteria to prioritize investment in transport: capacities of vulnerable peripheries prevail over aggregate efficiency of the system.

Accessibility averages mask extreme disparities; Distributive justice demands territorially differentiated minimum standards with systematic monitoring, rejecting aggregate improvements that perpetuate localized exclusion.
"Efficiency" policies that consolidate routes or reduce peripheral frequencies violate the doctrine of non-regression in acquired rights. Any reorganization must ensure that minimum accessibility is maintained for pre-existing vulnerable groups.
Women's perceived security and converting barriers for people with disabilities transform formal access into effective exclusion. These intersectional axes demand specific designs beyond generic accessibility standards.
The absence of tariff integration constitutes structural regressivity: peripheral populations that objectively require transfers pay proportionally more, violating basic principles of contributory capacity and horizontal equity.
Distributive justice requires institutionalization of binding public deliberation where historically excluded peripheral voices determine transportation normative priorities.
No framework is sufficient without effective democratic accountability
The analysis of distributive justice, equity and accessibility in Pasto is not merely a technical or urban management matter. It is fundamentally a matter of human dignity, of real freedom, of what kind of city we want to be. These philosophical frameworks offer language and concepts for thinking about these questions seriously.

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